

JUNE 2011

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New York State Energy
Research and Development
Authority

New Energy in
Northwest Iowa

Ontario Embraces
a Cleaner Future

Potential in the Texas
Panhandle

Greening the
Columbia Gorge

**FAVORABLE WINDS
IN MISSOURI**

DEPARTMENTS

Construction—NAES Corp.

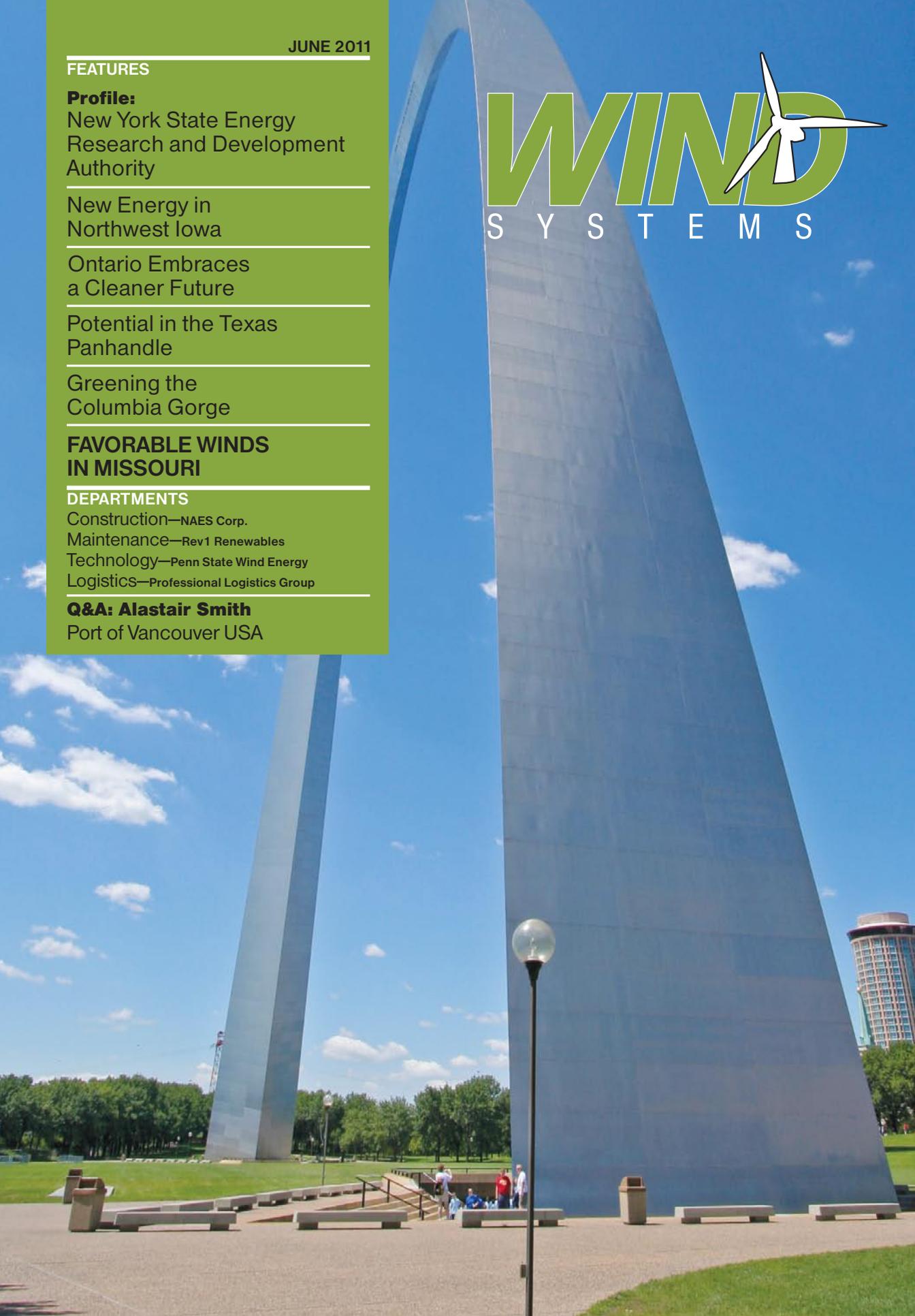
Maintenance—Rev1 Renewables

Technology—Penn State Wind Energy

Logistics—Professional Logistics Group

Q&A: Alastair Smith

Port of Vancouver USA





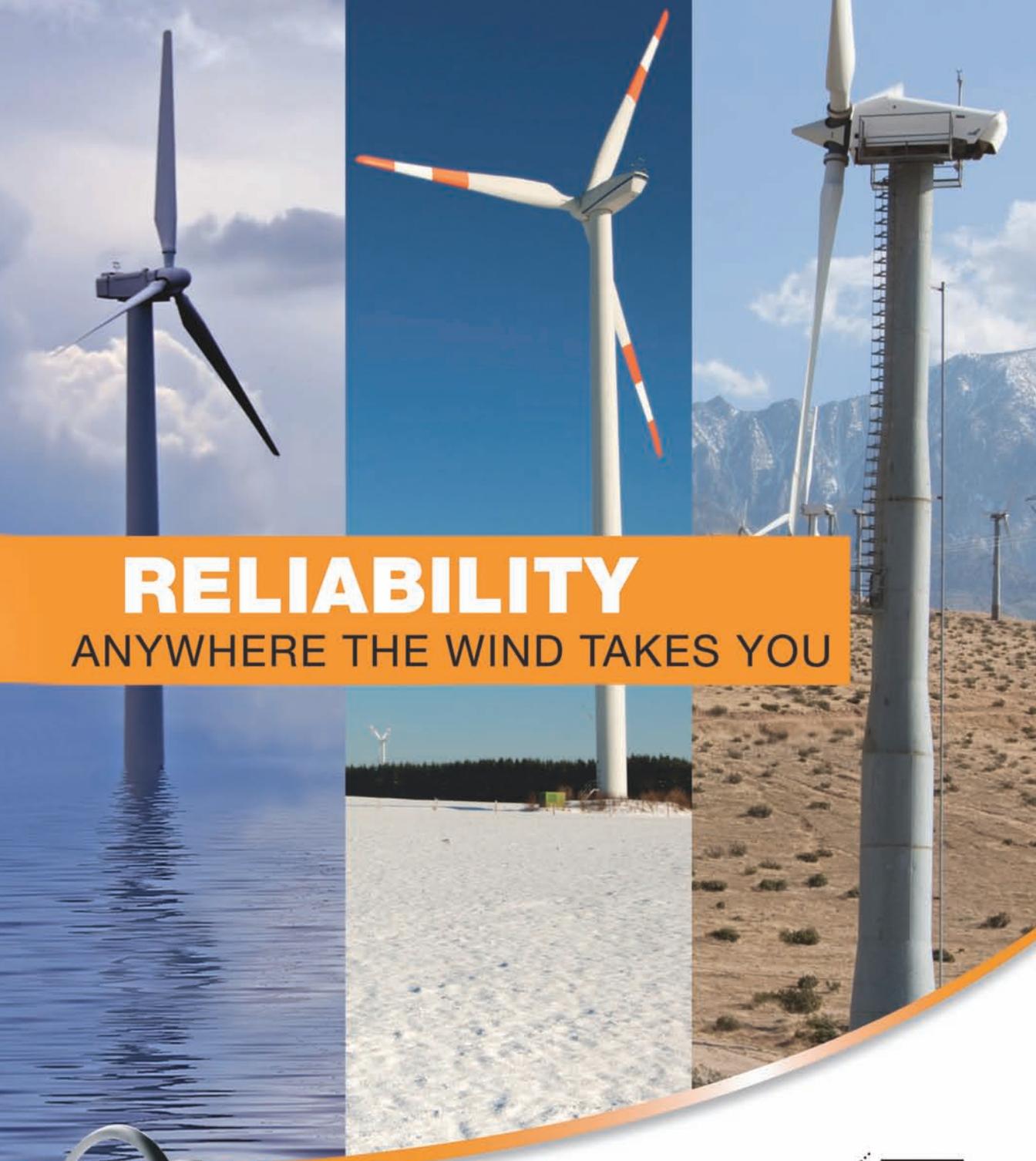
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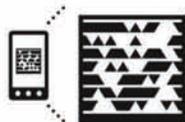
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FEATURES



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DEPARTMENTS

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Port of Vancouver USA

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I would first like to congratulate everyone at the American Wind Energy Association for a spectacular WINDPOWER 2011 Exhibition & Conference held last month. We thoroughly enjoyed the educational programs, the social activities, and especially the opportunity to make so many new friends from around the world. In fact, knowing that we would be meeting representatives of companies based overseas was the impetus for this special issue devoted to economic development. Having signed up so many new readers in Anaheim who are interested in establishing a presence in North America, we wanted to give EDCs from around the United States and Canada the chance to make their own case.

Our lineup includes "New Energy in Northwest Iowa" by Bob Henningsen, the president of Smart Solutions Group, which represents Northwest Iowa Development. Mike Canon, director of the Economic Development Department for Klickitat County, Washington, describes the Columbia Gorge Bi-state Renewable Energy Zone (CG-BREZ) in "Greening the Columbia Gorge," and Clay Rice—executive director of the Pampa Economic Development Corporation—advocates for east Texas in "Potential in the Panhandle." Christopher Chung, CEO of the Missouri Partnership, predicts "Favorable Winds in Missouri," and Mike Moen, who is senior economic officer (New York) for the Ontario Ministry of Economic Development and Trade, describes the transition from coal-based to renewable energy production in "Ontario Embraces a Cleaner Future." Continuing the regional theme we're pleased to feature the New York State Energy and Research Development Authority (NYSERDA) as our profile—thanks to Francis J. Murray, Jr., president and CEO, for a pleasant and informative conversation—and Alastair Smith, senior director of marketing and operations at the Port of Vancouver USA, is our Q&A subject.

Maintenance columnist Merritt Brown of Rev1 Renewables explains the difference between education and training when seeking to achieve quality outcomes, and Sven Schmitz of the Penn State Wind Program describes why an interdisciplinary workforce of engineers is essential for advancements in wind turbine technology. Ron Krizan of the NAES Corp. encourages the integration of construction engineering into wind facility siting, resulting in increased efficiencies and maximum cost savings, and Anne Puhlovich of the Professional Logistics Group discusses leveraging infrastructure nodes such as ocean and inland ports, rail transload sites, and regional storage locations to reduce logistics costs and risks.

In producing this special issue we've done our best to provide an interesting cross-section of activities, both from a regional as well as a developmental standpoint, spotlighting mature EDCs and others in the earliest stages of their work. We hope those of you who are seeking a location for your wind-related enterprise will find this information helpful. Good luck!



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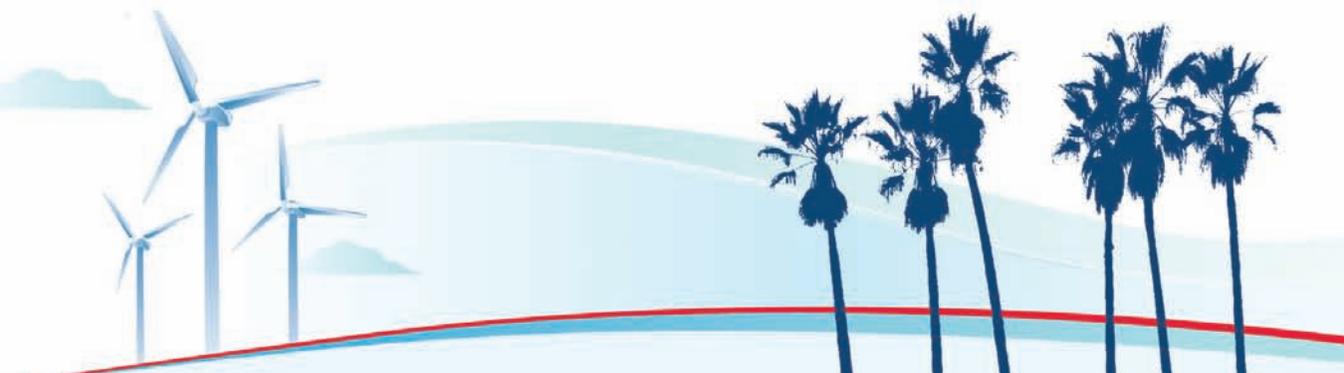


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NORDEX EQUIPS GERMINON WIND FARM

With 30 N100/2500 wind turbines and a total capacity of 75 MW, the Germinon wind farm located to the west of Paris is currently the largest Nordex wind farm in France. On April 6, 2011, the customer GDF Suez officially inaugurated the wind farm. Germinon features the first Gamma Generation series turbines, which Nordex launched in spring 2010. In developing this high-efficiency class, Nordex drew on its 10 years of experience in the operation of multi-megawatt turbines. The Gamma Generation combines proven technology with specific enhancements derived from the

latest research and meeting current market requirements.

With the N100/2500 turbine, utility GDF Suez selected a wind power system that makes optimum use of the mean wind speeds of 7.4 m/s prevailing at the site. As a result, the wind power systems will deliver a combined total of some 226,000MWh of clean energy each year, sufficient to cover the electricity requirements of around 265,000 people. Nordex handed over the wind farm to GDF Suez back in autumn 2010. Briefly after connection to the grid, the majority of the turbines achieved a reliability of over 97 percent.

Companies wishing to submit materials for inclusion in this section should contact Russ Willcutt at russ@windssystemsmag.com. Releases accompanied by color images will be given first consideration.

During the execution of the project last year Nordex organized more than 360 heavy-load hauls to transport the turbine components to their destination. In fact, if all the towers segments were to be laid out end to end they would have a total length of three kilometers. For more information go to www.nordex-online.com.

NORTH AMERICAN POWER MARKET ANALYSIS SERVICES FROM GL GARRAD HASSAN

GL Garrad Hassan's new power market analysis services utilize state of the art simulation software to evaluate the short and long-term risks to renewable development projects associated with external power market influences. These include assessing the impacts of energy curtailment, policy changes, and infrastructure development and quantifying the financial ramifications that they have for a specific site or project. The new services support

investors and developers of renewable energy projects in North America at all stages of the project lifecycle. The power market analysis services complement GL Garrad Hassan's existing independent engineering portfolio, which has helped to deliver 45 percent of all U.S. and 39 percent of all Canadian wind farms.

As wind power has matured and the volume of projects connected to the grid has risen, there are an increasing number of geographical areas where projects experience curtailment issues. Accounting for the risk related to reduced opportunity for energy delivery, and the corresponding revenue loss, is now an essential factor in determining the value of a proposed site for project development, and it forms a key element of any technical due diligence process associated with a project. Once a project is developed, the opportunity for its extension—as well as its long-

term financial viability—can be impacted by factors such as future grid limitations, decisions affecting the design of future energy markets, and changing government policy in relation to renewable energy as part of the broader energy mix.

GL Garrad Hassan is one of the world's largest dedicated renewable energy consultancies and a recognized technical authority on the subject. It offers independent technical and engineering services, products, and training courses to the onshore and offshore wind, wave, tidal, and solar sectors. Although the GL Garrad Hassan name is new, the company has a rich heritage (see profile in September 2010 issue of *Wind Systems* at www.windsystemsmag.com). It is born of the integration of specialist companies that, united, form the renewable energy consulting division of the GL Group. GL Garrad Hassan is a consulting company; it



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has no equity stake in any device or project. This rule of operation is central to its philosophy, something that sets it apart from many of its competitors. For more information contact Gary Moland—GL Garrad Hassan Independent Engineering, San Diego—at (678) 691-5063 or gary.moland@gl-garradhassan.com. Go online to www.gl-garradhassan.com.

MORTENSON CONSTRUCTION TO BUILD 100TH WIND PROJECT

MidAmerican Energy Company has selected Mortenson Construction to build the 443.9MW Rolling Hills Wind Project in southwestern Iowa, one of the largest wind projects in the nation. MidAmerican Energy—which is number-one in the U.S. in ownership of wind-powered electric generation among rate-regulated utilities—selected Mortenson, North America's leading wind power contractor, to build the project. MidAmerican Energy also selected Mortenson to build the 119.6MW Laurel and 29.9MW Pomeroy IV wind projects. The construction of Rolling Hills marks the 100th wind project built by Mortenson's Renewable Energy Group in North America.

"The Rolling Hills Wind Project is truly a landmark project for Mortenson and the wind industry," according to Tim Maag, a vice president and general manager of Mortenson's Renewable Energy Groups. "Having entered the renewables industry in its infancy, Mortenson is proud to achieve such a significant milestone. This is our largest wind power project to date, and it is a testimony to the strength of our industry partnerships and the depth of experience our team members bring to wind power construction."

Together the Rolling Hills, Laurel, and Pomeroy IV wind projects span more than 150 square miles over six



Iowa counties: Adair, Adams, Calhoun, Cass, Marshall, and Pocahontas. MidAmerican Energy has 1,393MW of owned and contracted wind generation facilities in Iowa. According to the American Wind Energy Association, Iowa ranks second in the nation for total number of installed megawatts of wind power and first in the nation for the percentage of electricity generated by wind power. The Rolling Hills Wind Project is the 13th wind power facility built by Mortenson in Iowa, and the sixth wind project built by Mortenson for MidAmerican Energy. During construction of the Rolling Hills Wind Project, Mortenson will erect 193 2.3MW Siemens wind turbines. This is enough electricity to power approximately 190,000 average American homes. Mortenson also will install access roads, underground collection, and tower wiring. The project will become operational by late 2011.

Founded in 1954, Mortenson Construction is a U.S.-based family owned construction company (see profile in April 2010 issue of *Wind Systems* at www.windsystemsmag.com). Ranked as the 24th largest contractor in America according to *Engineering News-Record*, Mortenson provides a complete range of services including planning, program management, preconstruction, general contracting, construction management, design-build, and turnkey development. Mortenson has offices in Chicago, Denver, Milwaukee, Minneapolis, Phoenix, and Seattle, with international operations in Canada and China. More information is available at www.mortenson.com/wind. Also visit www.midamericanenergy.com.

MYR GROUP AWARDED CONTRACT WITH CROSS TEXAS TRANSMISSION

MYR Group, Inc. (MYR), has executed a contract with Cross Texas Transmission, an affiliate of LS Power, to construct approximately 235 miles of 345-kilovolt (kV) transmission line in Texas. The contract is valued in excess of \$160 million and is part of the Competitive Renewable Energy Zone (CREZ) initiative, which is being developed to integrate additional renewable energy and increase system reliability throughout the Electric Reliability Council of Texas (ERCOT). Under the contract, MYR Transmission Services, Inc. (MYRT), an MYR subsidiary, will provide construction management, material procurement, and construction services including right-of-way clearing, environmental controls, foundation installation, structure installation, and conductor stringing. Construction planning has begun, and construction is expected to begin in the fall of 2011 with an expected completion date of spring of 2013.

"We are proud to be playing a significant role on this important project and look forward to working with Cross Texas Transmission in building its part of the transmission system for the Texas Competitive Renewable Energy Zones," says William A. Koertner, chairman and CEO of MYR. "This project will help move electricity generated

by renewable energy resources in the Panhandle of Texas to millions of customers throughout the state, and at the same time provide transmission infrastructure to serve the long-term needs of Texas.”

MYR is a holding company of specialty construction service providers. Through subsidiaries dating back to 1891, MYR is one of the largest national contractors servicing the transmission and distribution sector of the United States electric utility industry. Transmission and distribution customers include electric utilities, private developers, cooperatives, and municipalities. MYR also provides commercial and industrial electrical contracting services to facility owners and general contractors in the Western United States. MYR’s comprehensive services include turnkey construction and maintenance services for the nation’s electrical infrastructure. Learn more at www.myrgroup.com.

O-INSPECT MULTISENSOR MEASURING MACHINE FROM CARL ZEISS

The successful O-INSPECT multisensor measuring machine from Carl Zeiss allows the very easy, very accurate, and thus very efficient inspection of complex parts. It can be used in the electronics and plastics industries, for medical and automotive technology, and precision engineering. A chromatic white light sensor is now available for O-INSPECT.

The white light sensor enables the measurement of parts that cannot be captured with a contact sensor or a camera. This includes very small and sensitive workpieces that feature a transparent, glossy, or low-contrast surface. Reflections or lack of contrast, which can impede the correct focusing of a camera, will no longer be a relevant factor. With the addition of a chromatic white light sensor to O-INSPECT, even workpieces such as these can be measured with maximum precision. “Carl Zeiss thus closes the final gap

in the O-INSPECT measuring range,” says Dr. Dietrich Imkamp, who is in charge of visual systems at Carl Zeiss in Oberkochen.

The workpiece is illuminated with bundled white light. Special optics with chromatic aberrations in the probe split the light into its spectral colors. A spectrometer analyzes the reflected light and determines which color has the highest intensity. The

measuring machine can determine the distance from the sensor to the surface using the spectral color, and it derives the exact topography of the part from this information.

The results are displayed using CAD-based CALYPSO measuring software. It enables extensive size, form, and position measurements with systematic user guidance and makes deviations visible and quantifiable.

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Furthermore, O-INSPECT features an additional light source on the contact-scanning sensor that can be turned on to illuminate the measuring field when the machine is reprogrammed. With this enhancement to O-INSPECT, not only its range of use improves, but also its user friendliness. Obtain more information at www.zeiss.com.

POWER CLIMBER WIND INSTALLS IBEX CLIMB ASSIST IN CHINA

Power Climber Wind—a division of SafeWorks, LLC—has signed a contract with one of the largest wind turbine generator (WTG) OEMs to supply and install the IBEX® climb assist systems for its Dashuiboluo wind farm located in Linxi, Inner Mongolia. The IBEX climb assist systems will be installed in 25 of the company's 2.0MW turbines,



which generate up to 50MW of wind power in the region.

The market leading IBEX climb assist is designed to retrofit and sets the standard for performance, safety, and ease of installation in any new or existing WTG. It puts complete control over the climbing effort and experience into the hands of the climber, delivering personalized performance, increased safety, and better productivity in any tower. "We work in wind turbines globally and are honored to perform in China for the world's largest WTG OEM," says Ruben Bake, vice president and general manager. "Our product provides a perfectly scaled solution for them, by retrofitting the wind turbines and improving the site technician's safety and productivity, and ultimately the turbine performance." To learn more call (206) 394-5306 in the Americas, or go to www.safeworks.com.

ECN WIND ENERGY TO COLLABORATE WITH SANDIA NATIONAL LABORATORIES

On March 31, 2011, the Energy research Centre of the Netherlands (ECN) and Sandia National Laboratories signed a Memorandum of Understanding in which both parties agree on future collaboration in the field of wind energy. Sandia Laboratories focuses on applied scientific research for national security in the U.S., with sustainable energy being one of their key research areas. In the field of wind energy Sandia works on many aspects of wind turbine design, but it has a longstanding history in rotor design with a focus on higher efficiency, reliability, and monitoring technique for optimizing operational management and maintenance to wind turbines.

The joint Sandia-ECN research will focus mainly on scaling up (offshore) wind turbines and developing so-called intelligent blades to further increase the yield of wind turbines, while reducing the mechanical loads. This enables lighter wind turbine designs, longer operating lives, and lower electricity production costs per kWh. Various wind turbine manufacturers have already shown interest in this development. Tests with this type of dynamic blades, which can be adjusted with respect to shape and/or aerodynamic characteristics depending on the operating conditions, can be conducted at the ECN test site in Wieringermeer or at the test site of Sandia in the U.S. Additionally, both Sandia and ECN are already involved in collaborations with Delft University of Technology in this research area. Further collaboration will also be started in the field of aerodynamic wind farm modelling and maintenance and operational management of offshore wind farms. The first concrete projects are expected to start this summer.

The Energy research Centre of the Netherlands (ECN) is the largest research institute in the Netherlands in the field of energy and holds a strong international position. Go to www.ecn.nl. Sandia National Laboratories is managed by Sandia Corporation—a full subsidiary of the Lockheed Martin Corporation—and constitute the most important national laboratories of the U.S. Department of Energy. Next

to research on reliable and safe nuclear technology, Sandia's mission is to secure the future energy system and to make it more sustainable. Visit online at www.sandia.gov.

COMMSCOPE TO SUPPLY TWO MAJOR WIND FARM PROJECTS

CommScope, Inc., a global leader in infrastructure solutions for communications networks, will supply two wind farm projects with its GroundSmart™ copper clad steel solution, an alternative to solid and stranded copper that is increasingly in demand by utilities for its cost-efficiency and anti-theft characteristics. The first project is the Breckenridge Wind Farm, located outside Breckenridge, Michigan, in Gratiot County. The 30,000-acre wind farm will use stranded copper clad steel in the ground grid collector system. It is estimated to produce 200 megawatts of wind energy, which has the capacity to power nearly 54,000 homes. The second project is the Rolling Hills Wind Farm near Massena, Iowa. It is estimated to be one of the largest wind farms under construction in the state.

“As renewable energy continues to increase in popularity, developers are racing to keep up with the demand by constructing new wind farms throughout the country,” according to Ric Johnsen, senior vice president of broadband, CommScope. “These two projects are vital to the areas they serve and developers see GroundSmart as a simple solution to reducing projects costs without compromising the system’s integrity. These contracts also demonstrate that GroundSmart continues to gain acceptance in grounding applications.”

Copper clad steel provides a safe, highly reliable alternative to the use of solid and stranded copper for grounding applications. It is specifically designed to disperse fault currents and lightning strikes at a lower total cost of ownership compared to pure copper. It’s an electrical conductor that has an outer sleeve of copper metallurgically bonded to a solid steel core. GroundSmart copper clad steel benefits from a specialized CommScope BiMetals technology and manufacturing process. The products are created by bonding two different metals into a single conductor, resulting in a low-cost and lightweight alternative to using solid copper. This unique solution for the utility market is produced at the CommScope facility in Statesville, North Carolina, that is ISO 9001 and ISO 14000 registered. Learn more at www.commscope.com.

SENSOR PRODUCTS TO MARKET FUJI PRESSCALE FILM

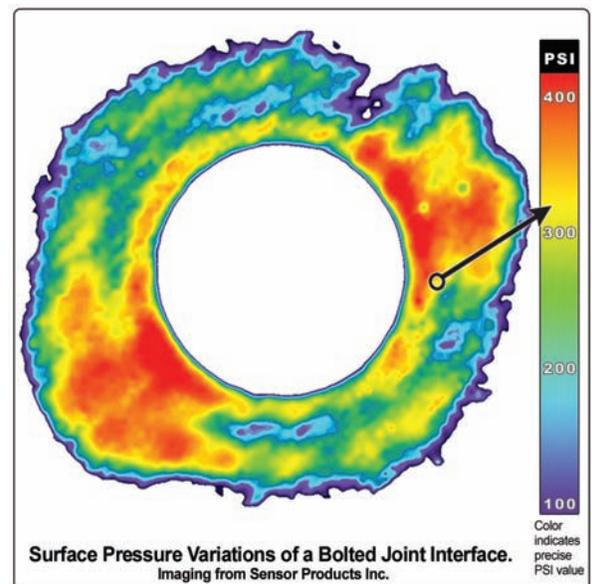
Sensor Products, Inc., a leader in the field of tactile pressure and force measurement, is pleased to announce it is offering Fuji Prescale pressure film. The film is a mylar tactile pressure indicating sensor film that instantly reveals surface pressure magnitude and distribution between contacting or impacting surfaces. When placed between the surfaces it permanently turns different shades of red,

with the color intensity being directly proportional to the amount of pressure applied. Prescale pressure indicating film shows precisely how bolted joints engage and deform under stress. Pressure variations are shown by the color changes left on the film. These colors can be compared to a color calibration chart to determine the exact pressure distribution.

While no instrumentation is required, the film impression can also be digitalized through imaging. Topaqa, an imaging analysis program, assigns colors to pressure values. This graphic reveals pressure variations in a bolted joint interface. The non-uniform pressure distribution may be caused by a variety of factors including dimensional irregularities, surface roughness, and uneven bolt torque.

Since it is difficult to measure the force exerted by the bolts directly, torque values are often assigned for assembly based on trial and error. Prescale speeds assembly by quickly validating and confirming sufficient bolt torque to assure uniform interfacial pressure. To adjust torque values, the film is placed at the bolted joint interface and the bolts are tightened to apply pressure. The film is then removed and reviewed to see if the pressure is uniform. Common applications include measuring the interface pressure of bolted joints, gaskets, clamps, fasteners, connectors, flanges, valves, o-rings, and welding heads, among others. Wind applications include testing the bolted joints used in turbines.

Prescale is thin and flexible, allowing it to conform to both curved and straight surfaces. It may be hand or laser cut to fit unusual shapes and dimensions. It is ideal for invasive and intolerant environments not accessible to conventional transducers. The film confirms FEA predictions and has widespread applicability in research, design and test; assembly and production, quality control, and maintenance. Contact Sensor Products at (973) 884-1755, info@sensorprod.com, or www.sensorprod.com.



CAPITAL SAFETY ANNOUNCES I-SAFE 3.0

Capital Safety, home of the DBI-SALA™ and PROTECTA® brands of fall protection equipment, announces the launch of the i-Safe™ 3.0 Intelligent Safety System. The system is a significant upgrade to the existing i-Safe™ 2.0 system, which was launched in 2006. Capital Safety's i-Safe became the first radio frequency identification (RFID) system dedicated to fall protection equipment and inspection tracking. Since the initial launch Capital Safety has continued to make substantial investments in support of i-Safe's commitment to improve safety compliance and reduce risk. Today Capital Safety is proud to announce the launch of i-Safe 3.0, a significant upgrade that makes managing a safety program easier and more cost-effective.

"With the expanded features now inherent in the i-Safe 3.0 system, it has become an even more advantageous product for our customers," says Tim Maroushek, global product director. "Our aim was to enhance the widely accepted i-Safe 2.0 system and build on its value to save time, improve safety compliance, reduce risk, and enhance user safety through consistent inspection and asset management. With i-Safe 3.0 we've made another significant leap towards achieving that goal."

Key system upgrades include:

- *Multiple software offerings:* Four software options now allow a company to decide if they want Capital Safety to host their data or if they want to manage the data themselves utilizing their own corporate computers or network server.



- *Customizable:* Offers the speed and benefits of pre-packaged solutions along with the advantages of tailoring features to their specific needs so they can efficiently manage their safety inspection program and assets.
- *Consistent inspection tracking:* Extensive list of standard and customized end-user prompted inspection checklists to ensure more consistent inspections with detailed notations, photos, and inspection status.
- *Effective asset management:* The dynamic filtering mechanism allows a company to easily identify, track and reassign the location, status and history of their valuable safety assets.
- *Versatile management reports:* Generates a wide range of operations and management reports including inspection reports, summary of hazards, top 10 hazards, inspector statistics, and more.
- *Inspection scheduling and trigger alerts:* Proactively shares information throughout the organization by advising site managers of upcoming or overdue inspections.
- *Flexibility:* Provides for the flexibility to use high-frequency RFID tags and readers or barcode information capture.

Capital Safety—one of the world's leading manufacturers of fall protection, confined space, and rescue equipment, with 20 operating sites worldwide—is home of the DBI-SALA™ and PROTECTA® brands. Call (800) 328-6146 or (651) 388-8282, or visit www.capitalsafety.com.

AVAILON NORTH AMERICA LAUNCHES NEW WEB SITE

Availon, Inc., a premier provider of services and parts to the wind power industry in North America, is proud to announce the launch of its new, informative, easy-to-navigate, customer-focused Web site. The site's introduction follows the November 2010 name change of SSB Service, an international independent full-service provider of parts, upgrades, services, inspections, maintenance, and monitoring for the wind energy sector. Availon North America began operations from its Grimes, Iowa, headquarters in 2009.

The new Web site features contemporary design, improved navigation, and well-structured sections offering a wealth of information on every aspect of Availon North America services like operations and maintenance, end of warranty inspections, spare part management, and the profit-enhancing engineering upgrades. Availon's over 30 years of experience in wind energy, and specifically, in the megawatt class wind turbines, is documented in numerous case studies and the online publication, OnService Journal, that can be easily downloaded by the site's visitors.

Steve Thompson, Availon North America president, says that "Our energetic and knowledgeable team of engineers and technicians strives to provide the best ever services to the customers, so the main goal of this new website is to allow the visitors to assess our expertise and make educated decisions on the type of services they may need."

Availon specializes in parts and services for GE, Vestas, and Siemens turbines, and is expanding to other turbine types. In addition to being a primary supplier for SSB and Duradrive parts, Availon is also an exclusive vendor for Bachmann, Leonard+Bauer, and Convertec parts. Availon, Inc., is a part of the Availon GmbH family, with more than 170 employees worldwide and business units in the United States, Germany, Spain, and Italy. Availon is the first independent wind turbine service provider to be both ISO 9001 certified and fully certified by Germanischer Lloyd in staff training, troubleshooting, and repair processes. Learn more at www.availon.com.

BZEE AWARDED FIRST ISO 29990 CERTIFICATION IN WIND INDUSTRY

The end of 2010 marked the release of the ISO 29990 standard, a quality management and service standard dedicated to the quality of learning services. Education and training centers now have a means of having their core business approved and certified according to internationally recognized standards. The new standard is designed to allow objective comparisons of the numerous quality systems and models that characterize the education and further education market. ISO 2990 demands a mastery of core processes to enable an evaluation of course offers and the professional competency of the learning service provider. The BZEE Training Centre for Renewable Energy in Husum, Germany, is the first operation in the energy sector worldwide to be awarded the new ISO certificate. Certification was provided by DNV DetNorskeVeritas.

Over the past 11 years BZEE has pioneered the development of a customized qualification program for wind turbine service technicians and delivers this service through a network of national and international cooperation partners. The program has contributed highly to closing the skills gap in the expanding wind energy sector and has opened up new career paths in renewable energy for unemployed skilled workers. DNV has now certified BZEE's learning services and its management system.

DNV Business Assurance, responsible for the certification process, is one of the leading global certification bodies and belongs to the independent DetNorskeVeritas foundation founded in 1864 in Norway. Today DNV boasts 300 locations worldwide and a network of 8600 professionals. "We've benefited immensely from the ISO process and the support offered by DNV and we're proud to be the industry's first education services provider to meet the new standard" says BZEE General Manager Nils Peters.

BZEE's track record shows over 1,400 successfully qualified service technicians in Germany alone, and a growing output of wind energy technicians at the partner locations in France, the UK, Ireland, Canada, and the United States. Throughout this expansion BZEE has remained true to its roots as an industry-driven skills initiative with its 80 company members interacting with BZEE staff

to continually update curricula to meet the demands of emerging technology and enhanced operational routines. Manufacturers, investors, and insurers profit from the guarantee that BZEE qualifications meet the wind industry's needs. More information is available at www.bzee.de and www.dnv.de.

EXXONMOBIL LAUNCHES ONLINE INDUSTRIAL LUBRICANT SELECTOR

ExxonMobil Lubricants & Petroleum Specialties has globally introduced Looble, a user friendly, online industrial lubricant selector designed to help maintenance professionals make informed lubricant decisions for optimizing equipment performance and minimizing unplanned downtime. Looble simplifies the lubricant selection process by providing targeted Mobil-branded product recommendations with performance ratings based upon users' specific industries, applications, and equipment. With just a click of the computer mouse or a touch on most Internet-capable smartphones, Looble enables users to access:

- Lubricant recommendations and application guidance based on their specific applications and operating conditions for a wide range of industries;
- Original Equipment Manufacturers' recommended lubricants and schematics for numerous types of equipment makes and models;
- Detailed descriptions and five-star performance ratings for each recommended lubricant, and;
- Printable recommendation reports.

"With the introduction of Looble, maintenance and production professionals now have a readily accessible resource for lubricant and maintenance best practices that can help them optimize equipment performance and ultimately, enhance their companies' bottom line and gain a global competitive advantage," says Ian Davidson, global industrial marketing manager. "Looble is powered by our valuable application-specific expertise and unique insights that we have gained during more than a century of working with customers and the world's leading industrial equipment manufacturers."

ExxonMobil's broad portfolio of Mobil-branded mineral oils and high-performance synthetic based lubricants are relied upon by successful companies around the globe. As a company that helped pioneer synthetic lubrication technology, ExxonMobil's popular Mobil SHC-branded synthetic industrial lubricants are approved for use in more than 10,000 applications and have exclusive/preferential endorsements from leading original equipment manufacturers for more than 2,200 applications. For more information about Mobil SHC branded synthetic lubricants, or any other Mobil-branded products and services, visit www.mobilindustrial.com. 

Integrating construction engineering into wind facility siting leads to increased efficiencies and maximum cost savings once the work has actually begun.

THE MICRO-SITING PROCESS FOR A WIND facility is the area where most developers struggle to link in all of the requirements related to state and local setbacks, environmental concerns, FAA restrictions, Fresnel zones, landowner requests, maximizing the wind regime, sub-surface conditions, and terrain. Usually the process is long and arduous, and when the sites are “desk selected” there is a perception that the time and budget doesn’t exist to revisit the process if issues are found in the field. This is where the addition of a qualified construction engineer on your micro-siting team can be invaluable. Construction engineers primarily serve as the liaison between the physical construction and the design engineers. Their knowledge of construction techniques, combined with an acute appreciation for design engineering, lets them identify potential issues before they become lost dollars. Two areas where construction engineers are particularly helpful are in the selection of the wind turbine sites and the routing of the access roads.

Selecting the actual turbine location can present numerous ways to minimize costs by melding construction best practices with engineering know-how. One of those areas is in overcoming the misconception that a turbine should be located on the highest point of any given hill or topography change. The reality is that several feet of vertical elevation will not increase turbine output by a measurable amount. In many cases it is much more cost effective to locate the turbine in an area that will minimize the amount of earthwork required to construct the crane pad and the assembly area.

On many large wind facilities, multiple foundation designs are utilized to match the existing subsurface conditions. While most developers realize the importance of high-quality geotechnical data, some don’t realize that design engineers have to base their foundation designs on the data collected by small-diameter soil borings. In many cases, simply increasing the amount of borings or by taking additional borings away from suspect areas can identify more suitable locations. This can potentially eliminate or minimize the need for ground improvements or significantly larger spread footings. Sometimes identifying and then merely gathering additional information as close as 150 feet from a primary site can yield construction cost savings upwards of \$50,000 per turbine site.

Access road layout is another area where employing the services of an experienced construction engineer can reduce construction and maintenance costs while balancing landowner relations. Many of the turbine suppliers severely limit the amount of grade change that is permitted on the access roads in order to facilitate the delivery of the larger components. When that is coupled with landowner demands, an access road can become exponentially expensive. A possible solution is to break with the conventional wisdom that insists construction access roads have to be converted to permanent maintenance roads. When you remove the construction-driven constraints, it is easier to generate a design for the permanent road. That design can then focus on mitigating potential erosion control issues and meeting the needs of the landowner, as well as maintenance personnel.

There are a few things to keep in mind when considering building a temporary construction road. In many cases the subsoil conditions do not improve the deeper you go. If the construction road is to be fully reclaimed, consider just removing the surface organic material and then design a road profile that builds upwards instead of excavating down in an effort to completely remove the topsoil. Not fully stripping the topsoil makes it easier to maintain positive drainage during and after the construction process, while lessening the excavation requirements.

Consider the use of a geo-grid or geo-fabric to limit the amount of rock that has to be reclaimed. In many cases a layer of geo-grid or fabric can reduce your final aggregate thickness by several inches, which then reduces the overall tonnage that will need to be removed. The recycled aggregates can then be scheduled and integrated into the future work stages, or on the final access roads.

One last helpful tip for temporary roads is to limit the size of aggregate used on agricultural areas. Typically aggregate less than one inch will not damage farm equipment that may be accidentally left during the restoration process. However, aggregate larger than three inches has a habit of showing up year after year, and will certainly damage equipment.

As with most engineering efforts, upfront planning will usually result in back-end savings. Incorporating a skilled construction engineer can help to maximize those savings long before the first piece of equipment arrives onsite. ✎

Ron Krizan, P.E., is engineering manager for NAES Corporation, the world’s leading provider of comprehensive services to industries that generate or consume power. He can be reached at ron.krizan@naes.com. Go online to www.naes.com.

Those struggling with achieving consistent quality outcomes will find that there is a profound distinction between education and training. Read on to learn the difference.

I EXPECT WE HAVE ALL HEARD THE MESSAGE:

While placed on hold, a voice says “to ensure quality this call may be recorded.” If ensuring quality meant that you only had to make a recording of a particular conversation, action, or task, then quality and quality results should no longer be an issue today. These companies will likely use our recorded messages as a training tool for new employees, or perhaps find ways to “up-sell” more products. If they are able to provide better customer satisfaction or greater revenue as a result then it isn't quality they're ensuring, it's results.

Quality in maintenance service, safety, and project performance are all difficult to define. They indicate something different for everyone. Quality maintenance may mean that the turbine maintenance tasks were completed within a specified time period and will continue to operate between scheduled cycles without a failure. To some it may mean that it's the best value for the dollar spent, despite the later outcome. Particularly in safety, quality is often measured by metrics related to the reporting of injuries or near misses. Project performance quality is also difficult to express, as a project that maximizes production might be higher on the quality scale than one with a focus entirely on availability.

We write policies and procedures, produce templates, send out checklists, and apply signage. We conduct orientation meetings, refresher training, and issue certifications. Still, when it comes to quality results, we can be reminded time and again that what is common sense isn't always common practice. For those who struggle with achieving consistent quality outcomes, you will find there is a profound distinction between education and training in that education explains the “why,” and training shows the “how.” Both are equally important in service work, especially when technicians working in a wind turbine are expected to think on their own and produce quality results that use creative methods in troubleshooting, overcoming delays, and improving procedures. In wind services, when we speak of quality results we are really speaking of the individual; of how much ownership they have in their work. Quality is directly proportional to the levels of self-accountability and self-directed behavior you have on your team.

For many finding the time to manage, coach, and train the staff in addition to observing their work for quality assurance is very challenging. Status quo for any site manager can be consumed with extinguishing fires rather than preventing them. If you cannot manipulate the actions of the technician and change them at any point in time, you will be hard pressed to guarantee anything. The challenge comes from inherently not

having control over every aspect of the task. Ownership of the outcome is what each technician must bring to the project, and that can be supported through an auditing process that confirms technicians are performing their tasks correctly, and that standards of quality are defined across the team in a consistent way. Peer-to-peer observation can be an effective tool for any organization, but particularly for wind services, as this may be the most simplistic way of getting your hands around both service and safety quality issues.

Observation of an action, feedback, and observation again is a tried and true methodology that helps to verify an expected result. Conducted in thousands of companies today, a peer review can be applied to wind services as a method of field training, and it can improve the consistency of the service outcome. The observer is not responsible for corrective action, but rather is the one person who echoes a perspective of the results through any form of service audit checklist, behavior audit checklist, or in addressing safety, a morning tailgate form. The form isn't used for discipline; rather it is something that is shown to the observee in an open discussion between the peers. For example, two technicians completing a safety tailgate might discuss environmental or turbine conditions that discourage safe behavior and encourage at-risk behavior. They might also consider ways to remove barriers to safe behavior. For their part, the site manager would offer positive words of approval to recognize certain safe behavior, but would not give disapproval statements nor directions related to any observed at risk behavior. For this process to be effective it must be focused on enhancing ownership, not as an authority driven inspection.

At one U.S. wind project, the “total recordable incident rate” dropped by nearly 300 percent in a single 12-month period once a daily tailgate process was initiated. The rate continues to remain at this level due to a peer-led review process. Certainly some complaints were expected, and loopholes were found and quickly plugged during the early stage of the program, but the results show that eventually technicians “got it” and understood the importance of taking a few minutes at the start of the day to assess their safety situation. Expanding on this with peer reviews as part of a scheduled service can open the door to improving the conduit of learning between senior and junior level technicians, faster teaching of troubleshooting practices, and overall enhanced quality and safety. Geared at performance, not discipline, the peer review process cultivates involvement, ownership, and empowerment. ✍

Merritt Brown is vice president of Rev1 Renewables, an energy services company supporting wind, solar, and biomass clients worldwide. To learn more call (866) 738-1669 or go online to www.rev1renewables.com.

An interdisciplinary workforce of engineers is essential for advancements in wind turbine technology, which is being addressed by universities such as Penn State.

JOBS IN WIND ENERGY have been and are currently out there. The wind industry, though, is challenged with filling open positions with qualified candidates that received at least some education in wind energy. There are only a handful of academic institutions in the U.S. that have wind energy in some form integrated into their undergraduate and graduate curricula. Besides a few exceptions there is at most one course offered to engineering students, which presents in general only an overview of wind energy systems without technological depth in any system component. As far as graduate education is concerned, the U.S. is lagging behind flagship institutions in Denmark and The Netherlands. There are efforts underway that aim at developing graduate certificate programs in wind energy, however, and Penn State is one of these institutions.

Nevertheless, the industry is challenged with new hires that have had either little or no exposure at all to wind energy. This is true for all engineering disciplines including mechanical, aerospace, electrical, civil, and material science engineering. While new hires are experts in a certain area of specialization, it is difficult for employees to link and interface different engineering areas together. While the field of wind energy is a true systems engineering discipline, sufficient knowledge of the “other” engineering disciplines relevant to wind energy systems is missing. Consider the following questions: What does an aerodynamicist know about the relation between aerodynamics, rotor speed, and electrical generator technology? What do mechanical engineers designing gearboxes know about a civil engineer’s constraints/limits in weight and an aerospace engineer’s computational modeling of dynamic blade loads? What do all of the engineers mentioned know about turbulence and associated inflow conditions to the rotor disk governed by Atmospheric Boundary Layer (ABL) flow? In turn, what does a meteorologist know about the length and time scales of wind turbine wakes and the wake momentum recovery downstream of a wind turbine, and how that affects power production and prediction of a wind turbine array interacting with the ABL?

The interfaces between the disciplines are not well defined at present. However, the birthplace of innovative technology concepts is exactly here. In a rapidly changing energy market the competitiveness of wind energy as a reliable and affordable source of energy is contingent upon rapid prototyping of new technologies that enhance wind turbine system performance, lifetime, and reliability. New technology comes with an interdisciplinary educated workforce, but the fact of the matter is that we don’t have such a workforce at present. So the question is what can be done now to help the industry in training their engineers for the fast-moving wind energy sector?

Several short courses on wind energy related topics have been offered in the last couple of years. These offerings are either being held at international meetings, academic institutions, and/or other conference venues. While some focus on a specific topic within the wind energy systems envelope—e.g. grid interconnection, tower design and foundation, etc.—others approach the audience with an overview on the energy market and business models for the planning and permitting process of wind power plants. Current courses are not necessarily aimed at an exclusive engineering audience. Consequently, the need for interdisciplinary engineering education in wind energy as a driver for technology innovations is not being addressed.

The Wind Energy Working Group of The Pennsylvania State University developed a course in wind energy that exactly targets a diverse engineering audience. Technical depth for specific topics—e.g. atmospheric boundary layer flow, blade aerodynamics, electrical power generation, turbine towers and foundations, drive trains, experimental methods, energy market analysis, siting, and permitting, etc.—requires individual expert instructors that provide the breadth of knowledge in their area of specialization and at the interface to the “neighboring” engineering disciplines within the wind turbine system components. This course will be offered in the first week of August 2011. For more information, registration, and questions please visit www.wind.psu.edu/shortcourse. Also contact Susan Stewart at ssewart@engr.psu.edu me at the e-mail address listed below. ↵

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PROFILE

NEW YORK STATE ENERGY AND RESEARCH DEVELOPMENT AUTHORITY

By Russ Willcutt



For more than four decades NYSERDA has been steering the state toward a brighter, cleaner, more-sustainable future.

THE BASIC PHILOSOPHY OF THE NEW YORK STATE

Energy and Research Development Authority (NYSERDA) can be found in the opening words of its vision statement, which reads: “To serve as a catalyst—advancing energy innovation and technology, transforming New York’s economy, empowering people to choose clean and efficient energy as part of their everyday lives.” Advocating for renewable energies and providing an infrastructure in which related companies can thrive has been central to its role since the mid-sixties, according to Francis J. Murray, Jr., president and CEO.

“The authority was formed during the administration of Governor Nelson Rockefeller, and it was originally known as the New York State Atomic and Space Development Authority,” he says. “When the focus shifted to energy efficiency in 1975 the name was changed to the New York State Energy and Research Development Authority, which more accurately describes our mission these days.”

While its early efforts centered on research and development—applied, as opposed to basic-science research—aimed at reducing the state’s petroleum consumption, it has broadened its influence to promote the use of renewable energy sources such as wind, among many other activities. The real boost came in the mid-nineties, when the state’s Public Service Commission restructured the investor-owned utilities in New York State. The commission recognized that utility programs involving renewable energy and energy efficiency were beneficial, but that a more-centralized approach might be even more effective at reducing energy waste and increasing the use of renewable energy sources. It imposed a small charge on the bills of investor-owned utility ratepayers called the System Benefits Charge, and it directed NYSERDA to administer statewide programs to improve energy efficiency and help the state reach its energy goals. Since then a number of other funding sources have been approved. With a total annual budget of some \$650 million, the authority is a major driver of energy efficiency services and incentives for renewable energy projects, among other uses.

Bolstered by the state’s Renewable Portfolio Standard, which requires that 30 percent of New York’s electricity come from renewable sources by 2015, NYSERDA has been proactive in attract-

ing and supporting wind energy companies. In its role as a catalyst, the authority is investing nearly \$3 billion in renewable energy through the RPS program and has helped to encourage the development of 1,175 megawatts of wind capacity in New York State. The organization also funds wind prospecting and site evaluation projects throughout the state, providing that information to communities to use in courting prospective wind-farm developers. In addition, NYSERDA funds wind mapping and forecasting activities, teaming with AWS Truepower—a leader and innovator in renewable energy consulting—to amass detailed information about wind conditions throughout the state, which is also used to develop workshops about the planning, development, and implementation of utility scale wind projects.

Companies interested in locating in New York State will be interested in NYSERDA’s flagship Saratoga Technology + Energy Park (STEP), which is located on 280 acres in Malta. Already home to giants such as GLOBALFOUNDRIES and Lockheed Martin, the clean-tech park is part of a region that also includes the University at Albany, with its NanoTech Complex, and GE’s wind and solar energy research center in nearby Schenectady.

Not only does NYSERDA encourage renewable energy projects, it also notifies interested parties through its “program opportunity notices,” which are sent to those who sign up to receive them or are found by visiting the authority’s Web site and clicking on the “funding opportunities” link. Doing so is well worth the time, according to Murray. “Approximately 98 percent of all the funding we provide is awarded competitively,” he says, “and largely through these program opportunity notices.”

A true advocate of renewable energy development—Murray was the state’s energy commissioner when Mario Cuomo was governor—he is proud of New York’s continuing commitment. “From Governor Andrew Cuomo on down, we are committed to bringing new clean-tech jobs to the state,” he says, adding that the Empire State Development Corp. is New York State’s development arm. “I would encourage anyone who’s interested in joining our effort to get in touch. Whether they’re a turbine blade manufacturer, a wind-farm developer, or an O&M service provider, I think they’ll find that we really roll out the welcome wagon!” ✨

FAVORABLE WINDS IN MISSOURI

Steady winds, a healthy business infrastructure, and an educated workforce create an ideal environment for wind farms and component manufacturing.

By Christopher Chung



Christopher Chung is CEO of the Missouri Partnership, a public private non-profit corporation working with the Missouri Department of Economic Development and related state organizations. Learn more at www.missouripartnership.com.

MISSOURI MAY NOT BE THE FIRST PLACE you think of for wind energy, but turbines are skirting the highways and farmland as the state builds its case for farming wind: geographic location, green energy legislation, highly skilled workers, and a business-friendly environment. Missouri is poised to help address the planet's ongoing need for clean, sustainable energy.

Wind energy is gaining prominence in the state, thanks in part to Missouri's proximity to the U.S. Wind Corridor and original equipment manufacturers (OEMs). Missouri's wind speed is 10.0 mph, higher than Texas, Colo-

rado, Ohio, and California—states that normally jump to the top of mind (and lists) as being wind friendly. In terms of wind generation, four of the top 20 states for existing capacity are Missouri's neighbors: Oklahoma, Kansas, Iowa, and Nebraska. Along with Missouri, these states have a combined existing capacity of 8,976 megawatts, or more than 22 percent of the current national wind power capacity.

According to Gary Stacey, Ph.D.—director of the Center for Sustainable Energy in Columbia, Missouri—"The state has tremendous potential to build on the northwest

As more companies use inventory pre-positioning techniques to reduce component delivery cost and limit risk, it is critical to balance site selection criteria against the needs of the project site.

INBOUND SUPPLY CHAINS are becoming increasingly complex. While many OEM turbine manufacturers have or are planning North American assembly plants, most new plants are being designed to use rail for outbound deliveries. For some components, such as towers, the lowest total landed cost of the component may mean sourcing products from overseas and shipping in bulk via ocean vessel and transloading to rail. When products are consolidated and moved in mass, risk can be reduced through easier tracking and increased assurance that all product will arrive together. On the other hand, when components are moved en masse inventory accumulates. In all cases, the final movement for the component is done by truck to the wind farm. At the very least, wind farms must have an inventory collection point near the wind farm so that final deliveries can be coordinated based on the construction schedule. Logistics managers must understand the various site selection tradeoffs to determine the most appropriate inventory pre-staging areas.

Location is a key selection criterion, and generally it is best to select an inventory pre-staging site closest to the final destination to ensure economical truck shuttle deliveries. Distance to the wind farm is not the only consideration, however, and it may make sense to locate a pre-staging area farther from the wind farm if the site has other key criteria, including infrastructure, suitable land, access to transportation infrastructure, reduced seasonal restrictions, and reduced delivery complexity.

All pre-staging sites will need cranes to transload product from one conveyance to the next. Ideally it is best to share cranes with another operation to save both cost and time. For example, established ocean port and rail transload facilities may have cranes suitable for wind components. On the other hand, locations with established infrastructure may be too far away from the wind farm to consider as a final pre-staging area and may only be suitable for part of the delivery cycle. A second possibility is sharing private infrastructure with another counter-cyclical organization. For instance, a company or a group of companies in a logistics park that move large bulky products such as scrap yards or manufacturing operations for dimensional products. In some cases, access to rail infrastructure may be possible but cranes are unavailable. Cranes may need to be mobilized and demobilized on a project-by-project basis, but at a higher cost.

Another key criterion is available and suitable land, including space for a component laydown area, a maintenance area, and enough room to move cranes and trucks with ease. Land

must be graded, and compacted to absorb the weight of the components. Ports and rail transload sites generally have land at or nearby the facility, but availability of land is subject to business cycles. Also, land costs at ports tend to be higher relative to other land costs. Some railroads have identified a need to help wind companies pre-stage inventory for project sites and have opened up strategically located sites to be used by multiple wind companies. These sites offer general proximity to the “wind belt,” access to rail infrastructure, and land. In many cases each participating company outfits their own cranes.

It is critical that any pre-staging area has access and ability to utilize transportation infrastructure. For instance, some ports such as Houston and Duluth have the capability to transload products from ocean vessels to rail cars, increasing efficiency and lowering costs. Any final staging area will need to efficiently flow product to the final site using roadways. Entrances to and from the staging area must be free of obstruction and the site must have easy access to roadways that can handle dimensional cargo.

In some cases, seasonal restrictions limit travel. For instance, the inland waterways are restricted by season and by the height of the water. Many northern ports close during the winter months. Public roadways in some northern states, such as Michigan, are restricted during frost season. North Dakota limits use of roadways when the ambient temperature exceeds 82 degrees. It is important to understand limitations so that delivery schedules can be planned.

For dimensional loads, all states require permits. The rules and requirements vary by state. If components are pre-staged in a nearby location, it may be possible to negotiate consolidated permits. For instance, a state may issue an open permit for a volume of similar loads to be delivered during a specified time. Streamlined permitting increases administration efficiency and can reduce costs. It is more likely that consolidated permits can be obtained if travel is within a single state. Therefore, an inventory consolidation location within 10 miles of the project site but across a state border may be more complicated, less cost effective, and more difficult to permit than a consolidation site located 100 miles from the project site but within a single state.

Determining the most appropriate sites for transloading and pre-staging inventories requires careful consideration of competing priorities. Each project has different needs, and the cost benefits of potential locations need to be systematically balanced against costs and risk. ↴

Anne Puhlovich is project manager with Professional Logistics Group. For more information go online to www.prologisticsgroup.com.



corner. Our geographical location makes us close enough to be a player. We can also provide resources and building materials for the industry. We have major utilities that project into other states in wind energy.”

Another factor leading to increased production and use of wind as an energy source is Missouri’s Clean Energy Initiative. Adopted in 2008, the initiative requires utility companies to increase usage of renewable energy to 15 percent by 2021, using wind energy as one possible source. But it takes more than location and legislation to make the state a player in green energy technologies.

It also takes a business-friendly and manufacturing-focused environment. Missouri fits the bill on both counts with a strong manufacturing base and low business costs. A highly skilled, specifically trained workforce and plentiful training centers generate a steady stream of engineers, machinists, and millwrights to feed the industry. Missouri has all the elements needed to lead future interests in clean energy.

HEALTHY INFRASTRUCTURE

Missouri’s business climate is ideal for wind energy, in many respects. Tax credits are in place for companies that draw part of their energy from wind. Missouri businesses also enjoy the fifth lowest corporate income tax index in the United States and the fifth lowest business costs, making the state attractive to business in general and manufacturing in particular. Manufacturing has long been a mainstay of Missouri business. According to the Bureau of Labor Statistics, nearly 250,000 Missourians are currently employed in the field, making the state’s manufacturing workforce one of the largest in the Midwest.

“Missouri has a track record of successful wind farm development with broad community support,” according to Joe Gillman, acting director of the Missouri Department of Natural Resources’ Division of Energy. “We are seeing tremendous interest in this market. Wind farms create a variety of jobs ranging from construction to manufacturing, and they promote economic growth in rural Missouri.”

And at a time when much of the country is anticipating labor shortages, Missouri has workers in good supply. The state’s workforce of 3 million is actually greater than the entire populations of 20 other states, and this workforce is up to the challenges of the renewable sector. State institutes of education awarded more than 1,800 engineering degrees in 2009, with the majority of them in mechanical and electrical engineering.

The state of Missouri is dedicated to keeping the best and brightest in the state for tomorrow’s alternative energy projects. The “Show Me JOBS” program, which qualifies employers for tax credits for pre-employment training, assures the workforce businesses will need in the future.

Specialized programs at Missouri schools are also paving the way for future projects. The Energy Research and Development Center at the University of Science and Technology in Rolla—also known as Missouri S&T—is involved in grid stabilization and storage for green energy technologies, while the Center for Sustainable Energy on the campus of the University of Missouri-Columbia coordinates research, education, and commercialization for all renewables. Washington University in St. Louis has the country’s only depart-

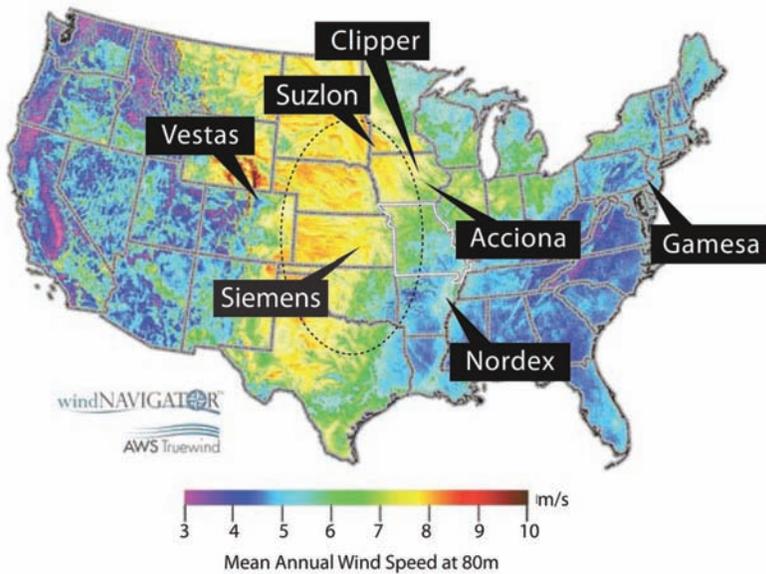


Fig. 1: One of Missouri's advantages is its proximity to the U.S. Wind Corridor and major component manufacturers.

ment of Energy, Environmental, and Chemical Engineering, and it is also home to the International Center for Advanced Renewable Energy and Sustainability (I-CARES); a center founded in 2007 to foster research on energy, environment, and sustainability across several disciplines through collaborations with the international business community. Finally, Crowder College in Neosho is home to the Missouri Alternative and Renewable Energy Technology (MARET) Center, recognized internationally for its contributions to the energy field. Crowder also offers an associate degree in alternative energy.

GREEN BUSINESS

Leaders in the global wind energy industry have caught the updraft of Missouri's green enterprise. In July 2010 Iberdrola Renewables established the state's newest and largest commercial-scale wind farm, the Farmers City Wind Power Project in Tarkio, which produces enough homegrown energy to power 33,000 average size homes a year. Wind Capital Group of St. Louis has completed four projects in the state, for

a total of 163 megawatts. Through collaboration with an international partner, Wind Capital has also developed a pipeline of more than 2,000 megawatts in eight other states.

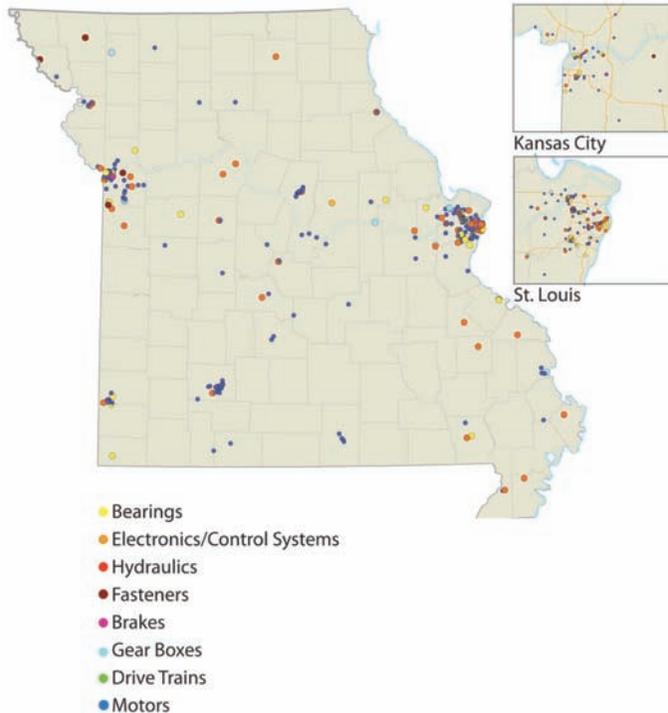
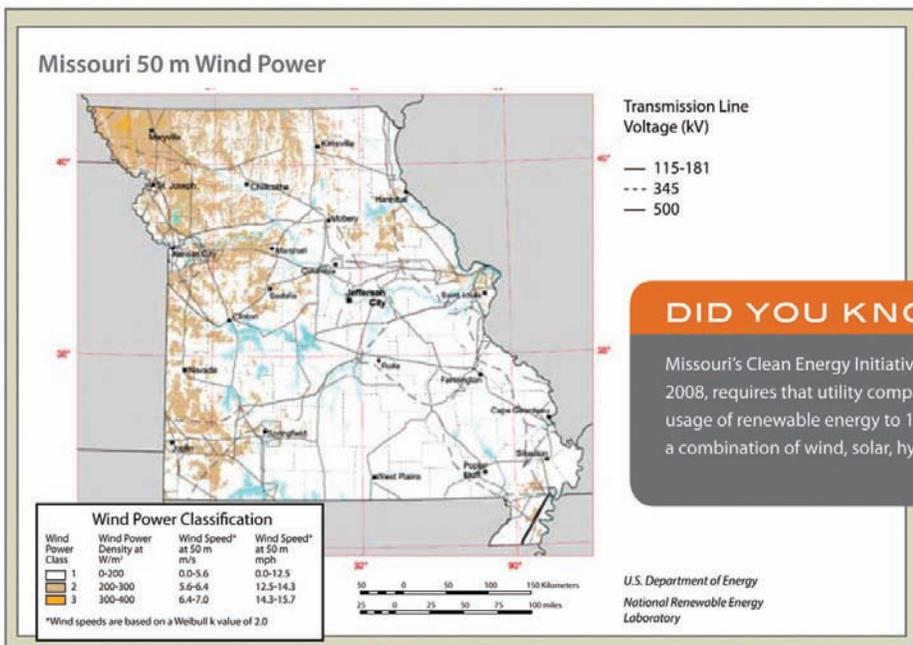


Fig. 2: Missouri boasts a healthy manufacturing base and skilled workforce.

Missouri companies such as Zoltek and Emerson are key contributors to the state's wind industry, as they provide necessary carbon fiber and control systems. In addition, Able Manufacturing, automatic technology group ABB, and other makers of wind turbine components form a growing wind energy supply chain. These companies make it possible for the state's businesses and citizens to "go green," but they also provide competition to foreign companies making similar clean energy hardware. Several of these companies are headquartered in Missouri. Other companies from around the world are taking advantage of Missouri's business assets by bringing operations here. California-based Nordic Windpower—developer of the two-blade community wind turbine—and Vest-Fiber, the Danish producer of fiberglass wind turbine assemblies, both moved operations to Missouri in 2010.

The wind power pride of Missouri is Rock Port, located in the northwest corner of the state. In



DID YOU KNOW?

Missouri's Clean Energy Initiative, enacted in 2008, requires that utility companies increase usage of renewable energy to 11% by 2020, using a combination of wind, solar, hydro and biomass.

Fig. 3: The state's northwest corner is especially amenable to wind farm siting

2008 it became the first U.S. city to operate solely on wind energy. All the electricity for this town of 1,300 is produced by four wind turbines at Loess Hills Farm.

A map published by the U.S. Department of Energy indicates that Missouri's northwest has the state's highest concentration of wind resources and contains a number of locations potentially suitable for utility-scale wind development. Local farmers and ranchers enjoy another source of income by leasing their land to local utilities. A recent green travel Web site described the town of Rock Port as follows: "This family-friendly green travel destination showcases how renewable energy makes it possible to enjoy all the modern conveniences you've come to expect. From the city's street lights to the electricity running local restaurants and stores, you'll feel at ease knowing the town's electricity is generated from a renewable resource instead of fossil fuels."

WINDS OF CHANGE

Missouri enjoys a high quality of life, in both its small communities and major metropolitan areas such as St. Louis and Kansas City. With affordable housing, a low cost of living, quality education, and access to exceptional health care, Missouri is on the short list of businesses looking to relocate.

All the pieces of the wind energy puzzle are coming together in Missouri: proximity to the wind corridor, "green" legislative initiatives, a highly skilled and educated workforce, a supportive business en-

vironment, and an overall high quality of life. The winds of change are blowing through Missouri, and the state is acting. ✨

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NEW ENERGY IN NORTHWEST IOWA

This region shares an exciting future with that of the wind energy industry, offering opportunities and attributes that are truly beyond expectations.

By Bob Henningsen



Bob Henningsen is president of Smart Solutions Group, a site location and economic development consulting firm based in Iowa. For more information on Northwest Iowa Development go to www.northwestiowa.org.

YOU ALREADY KNOW THIS REGION as a major diversified agricultural center, but did you know that Northwest Iowa boasts some of the nation's most abundant wind resources? In addition, Northwest Iowa boasts strong, safe communities where education is a priority and sets the tone for a robust and consistent quality of life. Strong community life equals a strong business atmosphere in rural America.

While visiting Northwest Iowa, it will not be long before you realize that you are in the heart of rural America. You'll know it when you experience the vibrant, close-knit communities built on long traditions of hard work. You'll feel it in

the quality of life matched with the reasonable cost of living and a comfortable pace of life. But the Northwest Iowa region has positioned itself to become a high capacity location for all aspects of the wind energy industry. Northwest Iowa can deliver a set of features that are beyond expectations: a region with some of the nation's most abundant wind resources, easy access to major markets supported by a first-class transportation infrastructure, a welcoming business environment, and outstanding workforce development programs.

"The attributes that are necessary to make an economic region strategically attractive are all here," says Kirk Grau, di-



Fig. 1: Turbines at the Next Era Endeavor Wind Energy Center in Osceola County.

falls into the Class 4 category of wind resources. Class 4 wind resources are suitable for wind power generation with large wind turbines. Over 500 wind turbines are either currently in operation or proposed in the Northwest Iowa region. The broad impacts and long-term economic potential for the region from current and proposed wind energy projects in Northwest Iowa is far-reaching. For example, the wind generation project in Osceola County will generate enough electricity to power 45,000 homes.

The current and proposed wind generation projects appear to be only scratching the surface of what will be coming to this region. The abundant wind resources have captured the attention of industry investors, and important key success factors will lay the foundation for continued wind industry growth. Those factors that have proven to drive the growth of the emerging wind energy industry include abundant available and affordable land and business parks for large scale wind farms and supply chain operations (fig. 2), access to a multi-modal system supported by a strategic location, customized skills training programs, and a business climate and political environment that supports the wind industry. The State of Iowa has proven to be a national leader in the wind industry and ranks second in the nation in current wind generation output. In addition, Iowa leads the nation in wind generation as a percentage of total power output.

STRATEGIC LOCATION

The region known as Northwest Iowa encompasses six counties—Cherokee, Lyon, O'Brien, Osceola, Plymouth, and Sioux—with a total population of just over 100,000. The six counties have a long reach, all within a day's drive to Minneapolis, Chicago, Denver, St. Louis, Omaha, and Kansas City (fig. 3).

Highways in the region offer timely access to Interstates 29, 35, 80, and 90. The most recent upgrade to the four-lane transportation network is the Highway 60 Expressway, a diagonal route bisecting Northwest Iowa and connecting Sioux City with the Twin Cities in Minnesota. "Highway 60 creates an efficient corridor so we can serve hubs in the region that serve as outbound freight points," according to Dave Van Wyk, president of Van Wyk Trucking in Sheldon, Iowa. The company operates power units based in Sheldon as well as Kansas and Northern Virginia, and it serves the Midwest, New England, the mid-Atlantic states, and the northwestern United States. Another highway slated to be complete within five years is U.S. 20, which runs along the southern border of the Northwest Iowa region. When complete, a trip from Northwest Iowa to Chicago will be nearly two hours shorter via U.S. 20 than I-80.

Northwest Iowa is also at the center of the country's railroad network. Union Pacific (UP), Burlington Northern Santa Fe (BNSF), and the Canadian National (CN) all serve

rector of economic development for Osceola County, which is home to a 150MW wind farm developed by Next Era Energy Resources. "What is starting to occur in the wind energy industry in this region is quite exciting. Simply stated, there is unequalled appreciation for the revitalization that wind development offers the region."

WIND-RICH REGION

The six-county Northwest Iowa region is one of the most wind-rich areas in the United States. Although wind speeds vary slightly throughout the region, most of Northwest Iowa



Fig. 2: Business parks are found throughout Northwest Iowa.

the region, as do the Iowa Chicago and Eastern Railway and the regional D&I Railroad.

TRAINED WORKFORCE

The efficiency of the transportation network to support the wind industry supply chain is a critical component for a region to be competitive. Delivering a competitive pipeline of skilled workers is important, as well. Northwest Iowa workers are renowned for reliability, loyalty, adaptability, and overall productivity. The Northwest Iowa region can deliver a wide variety of customized training and specialized education opportunities to the wind energy industry. Northwest Iowa Community College (NCC), Western Iowa Technical Community College, Dordt College, and Northwestern College offer customized training and continuing education tailored to the needs of the industry and the individual. In addition to customized training, the NCC Business and Industry Training Center offers courses in lean manufacturing, computer skills, quality assurance, and safety, plus “soft skills” training in areas such as management and teamwork.

At nearby Iowa Lakes Community College, the nationally recognized Wind Energy and Turbine Technology Program was established to meet the growing demand in Iowa. This “first in the nation” program focuses on training and educating skilled technicians to install, maintain, and service modern wind turbines. Upon establishing a cooperative agreement with the University of Iowa’s (UI) College of Engineering in 2009, the

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dean of engineering, Barry Butler, said “The Iowa Lakes Wind Energy and Turbine Technology Program is viewed as one of the best in the nation at educating students in this field.”

VISION FOR GROWTH

The six counties that make up the Northwest Iowa region collaborate and coordinate economic development strategies through Northwest Iowa Development (NWID), a formal regional economic development partnership. NWID is responsible for cooperative efforts to establish a common strategic focus, attract and retain new business and skilled talent to the region, and position the region for future growth. The NWID board has established growth in the wind energy industry as the top priority for the region, and consistent with that decision they have adopted the Northwest Iowa Wind Energy Industry Strategy. A strategic vision was established, stating that “NWID will position the area as one of the premier high capacity regions in the United States for wind energy production.” NWID is focusing on all aspects of the wind energy industry including further wind farm developments, wind transmission projects, supply chain/component manufacturing, and repair and maintenance facilities. Key action items in the strategy include the following:

- Continued development of a searchable database of current and potential wind energy supply chain companies (a wind-industry business directory);
- Development of regional cooperative concepts such as foreign trade zones and joint development areas;
- Establishment of a regional investor group to review and

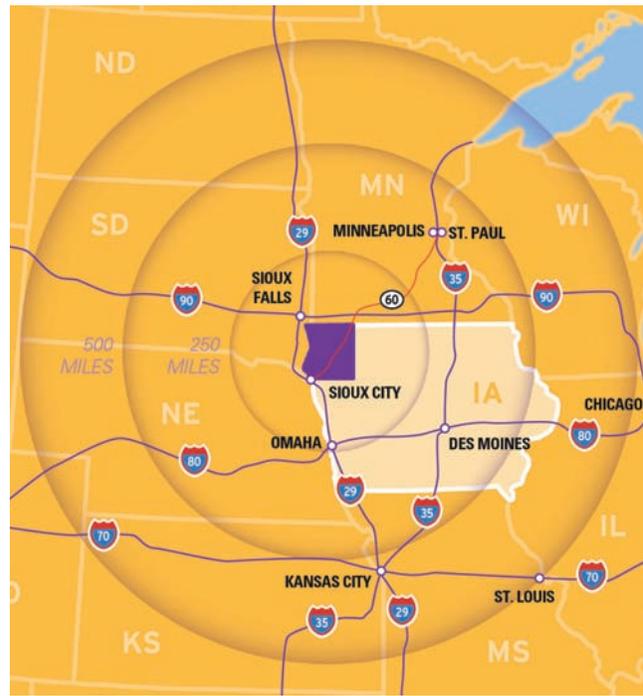


Fig. 3: Northwest Iowa encompasses six counties, all within a day's drive to major cities in the region.



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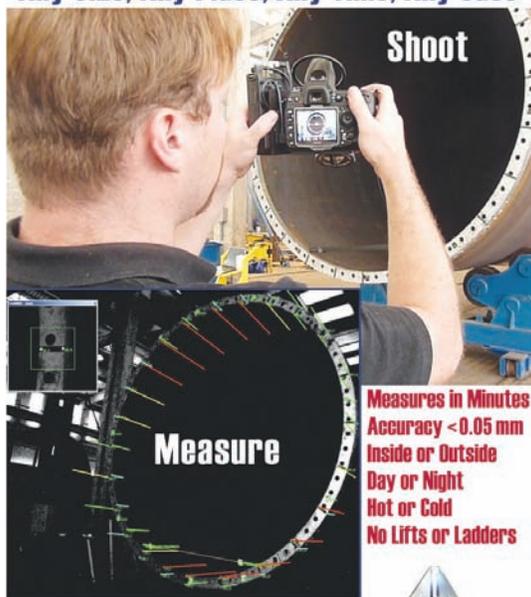
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Fig. 4: A nacelle is lifted into place at the Endeavor Wind Energy Center.

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- participate in new, innovative wind energy business concepts;
- Strengthening business recruitment and retention teams focused on the wind energy industry;
 - Establishing a public policy advocacy agenda that will support the continued growth of the wind industry;
 - Identification and development of preliminary information, including economic and fiscal impact analysis tools, on potential wind farm development areas and support for proposed site development.

“NWID recognizes the long-term strategic importance that the wind industry holds for our nation and, more specifically, for our economic region,” says Kiana Johnson, executive director for O’Brien County Economic Development and NWID board member. “When we look at the big picture, we understand the exponential possibilities that continue to unfold and how important it is for our region to be prepared.”

TRANSMISSION PLANS

As the construction of new wind turbines continues to occur across Northwest Iowa, momentum is growing behind plans to build high-voltage transmission lines that will move the region’s wind-generated electricity to major metropolitan areas to the east of Iowa. New transmission capacity will make these wind resources a more-valuable commodity.

One of the transmission projects under discussion is being developed by Clean Line Energy Partners of Houston, Texas. The Rock Island Clean Line would transport 3,500MW of renewable energy originating in Northwest Iowa through Iowa via an overhead high-voltage direct current (HVDC) line to the east. A proposed converter plant—conversion from alternating current from wind farms to direct current—would be built somewhere in Northwest Iowa.

“We know we are putting a converter station in the middle of the

windy corridor in Northwest Iowa,” stated Hans Detweiler, director of development for Rock Island Clean Line in a recent article in the Le Mars, Iowa *Daily Sentinel*. “There is a high probability it will be mostly local Iowa wind that will supply the energy used on the transmission line.”

The additional economic and fiscal impacts over the next five years, in terms of new wind farms and poten-

tial supply chain manufacturing activities, would be substantial. Clean Line could be seeking regulatory approval by the end of this year, with project completion projected to be four to five years after final approval.

Northwest Iowa shares an exciting future with that of the wind energy industry, offering opportunities and attributes that are truly beyond expectations. ✎

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ONTARIO EMBRACES A CLEANER FUTURE

With legislation dictating a forced phase out of coal by 2014, Ontario has created a new demand for renewable power and a rapidly growing wind power industry cluster.

By Mike Moen



Mike Moen is senior economic officer (New York) for the Ontario Ministry of Economic Development and Trade. Visit online at www.ontario.ca/economy.

YOU CAN'T TALK ABOUT WIND POWER without talking about coal—not in Ontario, Canada, anyway. As concerns about North America's dependence on fossil fuels have increased over time, legislation is beginning to catch up. But no legislation has yet matched the ambitious goals of Ontario's 2009 Green Energy Act (GEA). Focusing on the creation of a consistent supply of energy from non-coal sources, the GEA paints a picture of how the province will meet their own forced deadline for eliminating the use of coal for power generation by 2014. Stated simply, Ontario is kicking the

coal habit, and wind power has already become a core component of the new power supply mix.

Dr. Hermann Scheer—the former general chairman of the World Council for Renewable Energy who passed away in 2010—noted when the legislation passed that “Ontario's Green Energy Act represents North America's most ambitious and far reaching enabling legislation and will place Ontario as a world leader in renewable energy development, industrial innovation and climate protection.”

This leadership created a high growth market for



Fig. 1: With passage of the 2009 Green Energy Act, Ontario has committed to phasing out coal-generated power by 2014.

homegrown demand fueling new factories and the innovation necessary to reach these ambitious goals, Ontario is leading the effort to find new ways to produce and deliver energy from wind and other clean sources of power. This includes manufacturing the components needed to do so, and in transforming a power delivery grid to work with the new renewable power source mix.

A KINDER, GENTLER APPROACH

Taking away coal as a fuel to generate electrical power without replacement energy sources in place would have been akin to “going cold turkey” to cure an addiction. Ontario is providing the government the support necessary to create a viable market for green energy producers and affiliated manufacturers. The 50,000 jobs expected to be created by these utilities and manufacturing enterprises are also expected to contribute substantially to the economic development of the region.

Broadly, bringing on new sources of clean energy and attracting new investment is part of the province’s “Open Ontario Plan” to create jobs and strengthen the economy. Ontario’s clean energy plan is getting Ontario off smog-producing coal and onto cleaner energy sources like wind, solar, and bio-energy. These projects are an important part of the plan, which is making Ontario a global clean energy leader and has sparked a new industry within the province. On the ground this means job creation to build, connect, and create the new infrastructure that will produce and deliver electrical power from clean and green sources such as wind power.

To make this transformation from coal to green power a less painful journey, the GEA combines a “Feed-In Tariff” (FIT) system that strives to make renewable energy production profitable for private sector organizations; to create opportunities for communities to build, own, and operate their own renewable energy projects; and to enact a streamlined approval system for renewable energy projects. As a result, investment from other countries is flowing into Ontario, to build the necessary infrastructure, improve the grid, and manufacture components for energy production.

This transformation is no small undertaking. It is important to note that Ontario is Canada’s largest economy, and the seventh-largest economy in North America, with only six U.S. states producing a higher GDP. Overall economic growth is expected to become increasingly strong every year for at least the next

wind power generation nearly overnight. Already close to a million homes and businesses are powered by electricity created from wind across Canada. Ontario itself currently produces enough electricity to power more than 300,000 homes—a figure that is expected to be surpassed by 2014, once the GEA’s impact has come to fruition.

With the clock loudly ticking, energy producers and manufacturers including WindTronics are flocking to the province to help build the infrastructure that will deliver the new, renewable power supply mix. With this



Fig. 2: Ontario's long-term energy plan forecasts 10,700MW of renewable energy by 2018, equivalent to meeting the annual electricity requirements of two-million homes.

three years, with projections at 2.2 percent growth for 2011, 2.5 percent for 2012, and 2.7 percent for 2013, according to the Ontario Ministry of Finance in 2010.

THE ONTARIO OPPORTUNITY

Some of the largest investments in Canadian history were negotiated and confirmed within the first year since the signing of the GEA. Green energy companies across the spectrum began examining the opportunities offered by the GEA, particularly in combination with Ontario's strategic advantages as a North American center for advanced manufacturing.

In March of 2010, the Ontario Power Authority (OPA) announced 510 projects for mid-scale FIT projects (10kW-500kW) with a total generating capacity of 112MW. That announcement was quickly followed by another in April 2010, when the OPA awarded the first FIT contracts for large-scale projects (those exceeding 500 kilowatts). Of the 184 projects, 48 are related to wind power. The remaining awarded contracts include 76 ground-mounted solar photovoltaic programs as well as various biogas, biomass, landfill gas, and rooftop solar projects.

ACCELERATING ACTIVITY

The economic benefits from these projects, many still in launch phases, are just now beginning to filter down to sub-contracting companies. This scale of opportunity is unprecedented in the renewable energy sector.

For the private sector, the legislation has resulted in the award of almost 700 clean energy contracts. For example, in January 2010 Samsung C&T, together with a South Korean consortium, announced they would make the largest renewable energy investment of its kind in the world, and they would do so in Ontario. This agreement consisted of \$7 billion to build 2,500MW of wind and solar generating capacity and four manufacturing plants. In return the province guarantees the consortium will receive FIT rates for 20 years, plus additional incentives contingent on the plants meeting operational schedules beginning in 2013. These projects will triple Ontario's output from renewable wind and solar sources and provide clean electricity to more than 580,000 households. The consortium chose Ontario because the province's Green Energy Act guarantees stable rates for renewable energy.

Later in 2010, the province announced the creation of two new wind power-related manufacturing facilities resulting from the commitment of Samsung and its consortium. The first, Ontario's newest wind tower manufacturing plant, is bringing 300 new full-time jobs and up to 400 construction and indirect service jobs to Windsor. The plant will be built and run by a new Ontario-based subsidiary of CS Wind.

GETTING A GOOD FIT

Ontario's FIT program is generally thought of as the cornerstone of the GEA as it sets stable pricing for suppliers, resulting in the confidence necessary to make large-scale, long-term investments in a market like Ontario.

"The feed-in tariff program is continuing to meet its objective to encourage more renewable energy to be developed in Ontario," said Colin Andersen, CEO of Ontario Power Authority, in late 2010. "Interest in the program continues to be strong, and Ontario will benefit from the new clean renewable energy that these projects will deliver."

The GEA was specifically designed to accelerate renewable energy production by offering generous FIT rates. The FIT is a core component of the value proposition for investment from the private sector. FIT payments for wind power, for example, are 13.5 cents per kilowatt-hour (c/kWh) for onshore and 19.0 c/kWh for offshore projects. The FIT also includes both a price escalation clause linked to inflation over the 20-year contract and a "price adder" to encourage the development of Aboriginal and community projects. Domestic content requirements were incorporated to fuel the

growth of green energy component manufacturing and service sector in Ontario. Wind developers, for example, will be required to have a percentage of their costs come from Ontario goods and labor by the time the projects become operational. The requirement starts at 25 percent, and it increases to 50 percent on January 1, 2012.

SUPPORTING THE SUPPLY CHAIN

Ontario's many tax advantages apply not only to the large corporations generating power and manufacturing large-scale components, but also to the many middle-market companies that comprise the supply chain. In fact, there is a powerful "one-two" punch that the wind power industry operating in Ontario benefits from: stable pricing plus tax reform legislation. Also in 2009, to further stimulate business investment Ontario launched a com-



Fig. 3: Ontario now has more than 1,500MW of wind power online generated by more than 800 wind turbines, a number expected to rise to more than 950 by 2012.

prehensive multi-year tax reform program that covers corporate, personal, and sales taxes. As a result, the marginal effective tax rate on new investment plummeted from 32.8 percent in 2009 to 18.6 percent in 2010 and will continue to drop to

16.2 percent by 2018. These tax cuts are making Ontario one of the most tax-competitive jurisdictions in the world for new investment.

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of Ontario is determined to leverage the economic winds of climate change, innovative energy technologies, and globalization to fuel long-term, sustainable job creation and growth. The strategy hinged on winning the support of global investors, whose interest has demonstrated itself in the influx of investment since the legislation took effect.

AGGRESSIVE INNOVATION

The investments by energy producers and manufacturers are expected to significantly expand market opportunities all along the green energy supply chain. They will encourage major manufacturers to begin tooling up for a sustained commitment to supplying the growing sector with parts and technologies.

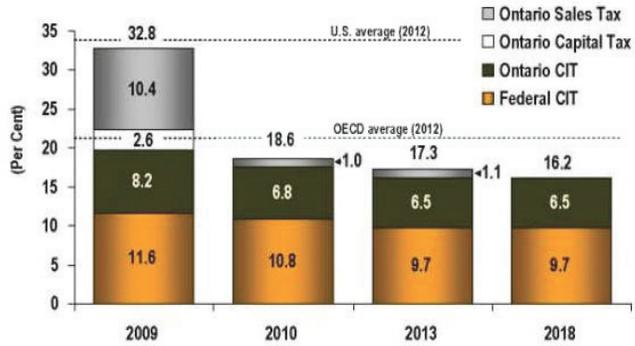
Renewable energy market-focused R&D is also growing in locations like Ontario with strong environmental legislation. The newly-created demand for renewable power fuels

growth and investment, which in turn requires R&D in order to maintain industry leadership and meet growth targets. Across the province there are publicly funded R&D labs

specializing in advanced materials, engineering, and other fields related to renewable energy. World-leading companies from Magna International, to Goodrich, to Research In

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*Includes the Ontario Corporate Income Tax (CIT) rate cuts and harmonized sales tax proposed in the 2009 Budget, the phase-out of Ontario's capital tax by July, 2010 and the reduction in the general federal CIT rate to 15% by 2012

Fig. 4: The Ontario government is cutting the marginal effective tax rate on new investment by 50 percent, from 32.8 percent in 2009 to 16.2 percent in 2018.

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A WORK IN PROGRESS

While Ontario's Green Energy Act was crafted with programs and tax incentives that are unique to Ontario's economy and needs, the approach has proven itself to be strong enough for replication in other jurisdictions with an interest in creating a market for wind power, and an industry to support that market. The principal that strong legislation, particularly in combination with stabilized pricing for renewable energy, can result in economic growth is a sound proposition, worthy of consideration by communities striving to achieve job growth and environmental leadership.

Consider the change that has already been impacted in Ontario between 2009 and 2011. The number of wind turbines in Ontario has grown from 10 in 2003 to more than 670 by the time the GEA regulations were announced in 2009. Wind output from Ontario's commercial wind farms reached 2.3TWh in 2009—a 60-percent increase over the previous year.

Ontario now has more than 1,500MW of wind power online generated by more than 800 wind turbines, and that number is expected to reach more than 950 by 2012. In 2003 there were only 15MW of wind power generated by 10 turbines. This is a hundredfold increase in wind power capacity. Ontario coal generation was two-thirds less in 2010 compared to 2003 levels. Ontario's long-term energy plan forecasts 10,700MW of renewable energy—wind, solar, and biomass—by 2018. This is equivalent to meeting the annual electricity requirements of two million homes.

"More and more clean energy businesses are investing in Ontario and creating jobs," according to Brad Duguid, minister of energy. "These projects create good jobs and power our homes, businesses, hospitals, and schools while cleaning up the air we breathe."

The GEA legislation has created more than a market for renewable energy, it's created a new center of industry. When coupled with the Ontario tax reform package and the province's general business-friendly culture, Ontario has become not just a place that creates renewable energy for its own consumption, but a business destination for companies that aspire to worldwide leadership. Increasingly, innovation in the delivery, and operations of wind and other forms of renewable power are taking place in Ontario, and not just in production and manufacturing. The province's public, private, and academic sectors are working together to demonstrate to the rest of the world how to rid a population of its dependence on coal and other fossil fuels and move into an era of clean green power. ✨



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WE LISTEN.



POTENTIAL IN THE PANHANDLE

In its earliest stages of development, Pampa offers wind developers and manufacturing site seekers a host of amenities along with powerful Texas winds.

By Clay Rice



Clay Rice is executive director of the Pampa Economic Development Corporation. He can be reached at (806) 665-0800 or info@pampaedc.com. Go online to www.pampaedc.com.

PAMPA IS A COMMUNITY OF APPROXIMATELY

18,000 people located in the eastern Texas Panhandle. Excellent transportation systems are a distinguishing characteristic of the Pampa area, as it is located at the intersection of U.S. Highway 60 and Texas Highway 70, with I-40 just a few minutes to the south.

Air transportation includes Pampa's Perry-Lefors General Aviation Airport, and Amarillo's Rick Husband International Airport is less than an hour away. Pampa is also located on the main Burlington Northern Santa Fe Railway line between Chicago and Los Angeles.

The area is also known for having 300-plus days of sunshine each year, as well as beautiful sunrises and sunsets. Of particular interest to wind professionals, Pampa is located in the wind corridor of the great plains, with Class 4 to Class 4+ winds as one of our great advantages.

Also of interest to developers seeking excellent sites for both wind farms and manufacturing facilities is the fact that we are in the very earliest stages of developing our wind potential, so opportunities are plentiful. Here's our story.



operate, and maintain over 200 miles of double-circuit 345kv transmission lines and associated equipment located in the eastern Texas Panhandle. The state's plan, called CREZ (Competitive Renewable Energy Zones), is scheduled for completion by the end of 2013. This should provide a means for our area to deliver renewable energy from wind, solar, and other sources to many electricity customers in Texas. Several hundred thousand acres of land have been leased in area counties including Gray County, where Pampa is located. Our area appears to be poised for dynamic growth in the wind energy sector, beginning very soon.

Pampa's economy is based on agriculture, manufacturing, oil and gas production, medical, and retail. Wind energy will soon be added to that list. We think that solar and possibly other renewables will play a role in our local economy as well. The Pampa Economic Development Corporation is working to grow our existing industry, but we are also committed to seeking additional diversification. For this reason the EDC is in the process of purchasing a site to develop an industrial park, as described in the following press release of March 1, 2011.

The Pampa Economic Development Corporation board of directors has approved a resolution to enter into an agreement by and among Pampa Energy Center LLC, Babcock & Brown Infrastructure Group US LLC, and Pampa Economic Development Corporation. Pending approval by the City Commission of the City of Pampa, the Pampa EDC will acquire 100 percent of the membership interest of Pampa Energy Center LLC, pursuant to a Membership Interest Purchase Agreement with Babcock & Brown Infrastructure Group US LLC. The Pampa Energy Center LLC assets include the site of the former Celanese plant located west of the City of Pampa, approximately 4,000 acres of land, 5,500 acres of water rights, power generation plant, heavy capacity bulk liquid storage tanks, and spheres. The assets include over 40 medium to large buildings including laboratories, general offices, crane-served manufacturing facilities, and general warehouse facilities. The main administration building has over 47,000 square-feet of office space, and approximately 30,000 square-feet of crane-served manufacturing/shop space. The site also has approximately five miles of rail service and rail car storage.

This action by the Pampa EDC was reached after an extensive investigation and search for an appropriate site to develop a rail-served industrial park facility. This site will provide an excellent opportunity to attract a wide range of commercial development and employment to our immediate area. The Pampa EDC is hopeful that this unique location could become one of the finest industrial parks in the area. The Pampa EDC has already been contacted by several groups interested in

INCREASED CURRENTS

We expect to be able to start taking advantage of our great winds soon, as new electric power transmission lines are planned for the entire Panhandle region. These lines will carry electricity from our region, where wind is plentiful, downstate to highly populated areas such as the DFW Metroplex, Austin, and San Antonio, where the demand for electricity continues to grow with the expanding population. Cross Texas Transmission, LLC, has been selected by the Public Utility Commission of Texas to construct,



immediate commercial development at the site.

The Pampa EDC plans to close this transaction in early May, 2011. To finance this project, local lenders have committed to loaning the Pampa EDC \$2,500,000.00. The Pampa EDC will contribute cash in the amount of \$1,100,000.00 toward the purchase price and a capital contribution for operating expenses.

As you can see, the groundwork is being laid, and those with foresight will soon have the opportunity to take advantage of the many resources our region provides.

RENEWABLE RELATIONSHIPS

To assist us in growing our local economy, we have joined forces with several organizations that have been very beneficial to our mission. The High Ground of Texas is a coalition of over 75 communities and organizations that are working together to market the West Texas region. The High Ground of Texas' main purpose is to help the region create jobs and add to the tax base by marketing to prospective new industry, networking, economic development, educa-

tion, and providing a common voice on issues that affect the region. We are also members of the World Economic Development Alliance (WEDA), which works to connect expanding or relocating companies with their alliance of economic development professionals.

In our pursuit of wind energy-related development we have joined Class 4 Winds and Renewables. This organization "is dedicated to providing educational opportunities and information to stakeholders as they seek to capitalize on the enduring benefits to be gained from promoting the region's vast wind energy resources." In addition, we are members of the Texas Wind Energy Clearinghouse, which "serves as an informational exchange for land owners issues, industrial development, workforce recruitment and skills development, wind energy operations recruitment and enhancement, and many other topics." We have also recently become members of the National Institute for Renewable Energy (NIRE), which is a not-for-profit organization designed to further research and technology commercialization in the renewable energy sector.

AN ENTREPRENEURIAL ATTITUDE

The Pampa EDC is not only dedicated to recruiting new business and industry, but also to assisting local businesses and prospective businesses. For this reason we have contracted with the Entrepreneur Alliance to provide counseling to aspiring entrepreneurs, new business owners, and established enterprises at no cost. The Entrepreneur Alliance has provided us with an exceptional business facilitator who advises clients in many aspects of business including starting, buying, or selling a business, growing and expanding a business, financing a business, and managing and training employees. These are just a few examples of the areas of expertise offered. We have also contracted with TIP Strategies, Inc., to work with us

and the community in developing an innovative economic development strategic plan.

Our staff will provide information and assistance in the application process for incentives from the Pampa EDC. We will be glad to help prospects pursue state and federal incentives that they may qualify for. Tax abatements are available from the Gray County Commissioners Court, subject to their approval, on a project-by-project basis.

Education is taken very seriously in the area. Pampa High School has recently been expanded and remodeled, and Pampa Junior High is about to finish its very first school year in its new building. Our community college, Clarendon College-Pampa Center is experiencing new growth and development after obtaining 55 additional acres of land to build on. The first two buildings on this new property were dedicated in March 2011. The Pampa EDC contributed funds to purchase new equipment for both the wind energy and EMT training programs that are housed in the new buildings, and other new programs are in the works.

CONCLUSION

Life is not all about work, however, and a quality standard of living is available to locals and visitors alike. Pampa is home to youth sports, softball leagues, two beautiful golf courses, rodeos, car events, museums, a movie theater, and an outstanding new aquatic park scheduled to open Memorial Day weekend 2011. Hunting, fishing, birding, and bike riding are also favorite activities. Pampa is a certified retirement community with over 50 churches, a very active VFW, and multiple social and civic organizations available.

As one can see Pampa, Texas, provides a host of benefits that are appealing to people of all ages, and wind professionals seeking to locate a farm or business here will find much to appreciate and a great deal of existing support for their endeavors. ✨



WIND

S Y S T E M S

Just as its name implies, *Wind Systems* magazine addresses all aspects of this booming industry, providing information pertinent to landowners and managers, site developers, maintenance workers, economic development professionals, construction companies, tower and component-parts designers and manufacturers—in short, everyone involved in the systems central to and surrounding wind power generation. Brought to you by Media Solutions, Inc., publishers of *Gear Solutions* magazine (www.gearsolutions.com).

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GREENING THE COLUMBIA GORGE

The Columbia Gorge Bi-state Renewable Energy Zone, or CG-BREZ, is sowing the seeds of renewable energy, resulting in a healthier local economy.

By Mike Canon

Mike Canon is director of the Economic Development Department for Klickitat County, Washington. Call (509) 773 7060, e-mail mikec@co.klickitat.wa.us, or go to www.klickitatcounty.org. Contact the Columbia Gorge Bi-state Renewable Energy Zone at www.cgbrez.org

WHEN MOST PEOPLE THINK OF THE PACIFIC

Northwest they envision lush green forests and majestic mountain ranges. The region is “green” in more than one way. The forests and mountains of much of the Pacific Northwest are wonderfully green, but so is an increasing amount of the energy flowing from that region. Thousands of megawatts of green energy are being produced by wind farms in the Columbia Gorge Bi-state Regional Energy Zone (CG-BREZ); a six-county region straddling the Columbia River in both Oregon and Washington. The Oregon counties of Sherman, Gilliam, Wasco, and Hood

River and two Washington counties—Klickitat and Skamania—make up this renewable energy zone. The Mid-Columbia Economic Development District (MCEDD) has responsibility for administration and direction of CG-BREZ activities.

A COLLECTION OF COUNTIES

Wind farms include some of the largest developments in the U.S.: Shepherds Flat (General Electric Renewables and Caithness Energy); Biglow Canyon (Portland General Electric); Klondike I, II, and III (Iberdrola), and Can-



Fig. 1: The six counties of CG-BREZ are amazingly diverse in climate and terrain, with the eastern counties largely classified as high desert prairie land.

al opportunities. In the Columbia Gorge you can enjoy four-season outdoor recreation: fishing, hiking, camping, cycling, kayaking, year-round skiing and snowboarding, sailing, windsurfing, kite boarding, rock and mountain climbing, waterskiing and wakeboarding, biking—even spelunking. Long-established small communities offer great schools and quaint, small-town flavor.

A broad inventory of industrial property, multi-modal transportation, renewable energy technology training, a favorable business climate, and high-speed data services complement this high quality of life. The Columbia Gorge offers market access by interstate highway, river, rail, and air. Both states are considered business-friendly and are highly ranked for business recruitment. The area boasts a strong regional economy. Companies like Google, Insitu (a Boeing subsidiary), many green technology businesses, and clusters of small companies create a dynamic environment.

HARNESSING THE WIND

Windy it is, especially as the mile-wide Columbia River creates a nearly sea-level cut through the Cascades, drawing thermals between two distinct climates: the warm, arid east and the cool, damp west, creating ideal conditions for windsurfing and paragliding.

Sports enthusiasts aren't the only ones excited about the reliable and consistently strong winds that blow through the Columbia Gorge. As a renewable resource, the winds have brought billions of dollars in private investment in wind energy projects. Winds have always blown in the Gorge, but now they are making a genuine contribution to the nation's energy independence.

The region's long-established hydroelectric dams and abundance of high-capacity electrical transmission lines produce and distribute energy to the surrounding western U.S. energy markets. Reliable winds, transmission capacity, and growing national demand for green energy to replace fossil fuels are key elements for a thriving wind industry.

Bonneville Power Administration (BPA), a key facilitator of energy production for many decades, integrates wind in concert with hydropower. Additional transmission capacity is being pursued. Local public utilities also partner in wind energy projects.

REGIONAL RESOURCES

An essential element to the wind industry's success is premier workforce training by Columbia Gorge Community College (CGCC) in The Dalles, Oregon. An initial assessment in 2006 indicated local wind projects would need 360 technicians by 2011. This has now jumped to

non Energy's Windy Point/Windy Flat, Big Horn, and Big Horn II are among projects ranging in size from 75MW to 600MW. CG-BREZ members represent the highest wind energy producers in both Oregon and Washington.

The counties comprising CG-BREZ are developing a world-class renewable energy region emphasizing research and development, innovation, education, workforce training, and business development. The Columbia River Gorge contains virtually everything that makes the Pacific Northwest desirable: unrivaled scenic beauty that includes mountains, rivers, and plains, coupled with abundant recreation-



Fig. 2: The American Wind Energy Association recognized the pioneering Renewable Energy Technology Program at CGCC with one of its first three Seals of Approval.

1,200 or more technicians, and training in other Oregon and Washington community colleges and universities also helps fulfill the growing demand.

The American Wind Energy Association recognized the pioneering Renewable Energy Technology Program at CGCC with one of its first three Seals of Approval in January 2011. The present program includes a nine-month certificate that qualifies a student as a wind turbine technician, emphasizing safety, electronics, mechanics, and hydraulics, with a foundation in math and real-world problem solving. A two-year associate degree of applied science (AAS) broadens career options with greater depth and expertise. CGCC credits are transferable, and students can pursue higher-level four-year university degrees. The industry-endorsed skills training is supported by industry partners, the State of Oregon, and a U.S. Department of Labor training grant, with additional funds directed by Congress through the U.S. Department of Energy.

The six counties of CG-BREZ are amazingly diverse in climate and terrain. The western counties receive nearly 50 inches of rain annually and have lush forests, tumbling rivers, abundant fishing and hunting. Eastern counties are largely classified as high desert prairie land. Rainfall is less than 10 inches in most areas and much of the farming is dry-land.

The region's diversity is also reflected in its crops, ranging from cher-

ries, apples, and pears to thousands of acres of wheat, along with cattle, horses, and sheep. The bi-state region boasts some of the best vineyards and wineries in the Northwest.

ECONOMIC BENEFITS

Before wind energy projects began to appear around the U.S., rural counties along the Columbia River in Oregon and Washington were for the most part sparsely populated, not particularly wealthy, and all were looking for ways to improve local economic conditions. The economic shocks suffered by one county were often felt by the others, due to proximity and a shared workforce.

One county that was looking for a way to overcome severe economic shocks was Klickitat County, Washington. Some 12 years ago, when the county was struggling to find ways to overcome two devastating economic setbacks to its local economy (closure of a large aluminum smelter and federal restrictions on timber harvest to protect the Spotted Owl), county leaders decided to aggressively encourage wind energy development. Local ranchers welcomed some of the earliest wind studies and proudly displayed turbines on their fields.

Reductions in the timber industry were regional and all counties with timber resources immediately realized sharp losses in traditional revenues. Privately owned as well as government-owned forests became dormant, but the cost and work to maintain once-thriving timberlands continue to this day. This places a heavy economic burden on heavily forested Skamania County, Washington. Local economies were disrupted and have been very slow to recover from such a sudden and heavy loss of family-wage jobs. Chronic economic hardship became commonplace in most CG-BREZ member counties long before the renewable energy zone was organized.

Even before wind projects arrived, economically distressed Klickitat County invested \$1,000,000 to de-

velop a unique Energy Overlay Zone that addressed most permit requirements for wind projects in advance. This facilitated reliable and consistent permitting without lengthy bureaucratic delays. The effort succeeded: more than 1,000 megawatts of power are being generated at present and additional projects are planned. Farsighted leaders in a chronically poor rural county took those bold steps to improve the possibilities for attracting a new industry, and it worked very well.

New county tax revenues being generated by wind projects in these rural Oregon and Washington counties are having a positive impact on landowners and local schools, hospitals, libraries, and fire districts. Tax incentives that facilitated development of energy projects have local benefit. Families and communities that have struggled for generations to make a living on farms or ranches, often under harsh drought conditions, are now beginning to prosper from energy lease payments and energy generation royalties.

HEAVY HITTERS

The region is clearly united in its effort to grow wind projects, and all the major energy companies are working actively on projects large and small. Several projects are into their second and third build-out phase, collectively providing a "Who's Who" list of companies including Iberdrola, Vestas, Siemens, enXco, General Electric, Cannon Energy, Repower, Puget Sound Energy, Suzlon, Portland General Electric, Horizon, and Mitsubishi, among others.

Prospects are changing for counties in the Pacific Northwest, including members of the Columbia Gorge Bi-state Renewable Energy Zone. Efforts are being made as a region and by individual counties to attract wind energy related manufacturing. Residents of the CGBREZ counties are also beginning to realize wind energy is here to stay, and many elements of the energy industry have yet to arrive.



Fig. 3: There's a bright future ahead for the wind industry in the Columbia Gorge region.

The present turbines, blades, and towers will require routine repairs, maintenance, inspection, and certification services, and property security services, as well as equipment updating and replacement. Many of these services will be provided by homegrown service companies and regional ser-

vice centers structured to respond to the industry's needs.

CONCLUSION

The positive attitude and good-neighbor efforts exhibited by wind energy developers toward local communities and counties has built a partnership

for further economic development. More and more wind jobs are being filled by locally trained wind technicians, and families that would have had to move away from their home communities are often finding there are great opportunities growing all around them in the wind farms. 🌬️



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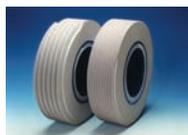
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WHAT ARE SOME OF THE WIND-SPECIFIC CAPABILITIES YOU MENTION?

When we decided to focus on the wind industry back around 1999 we put a great deal of thought into its projected growth, and how we could grow along with it. Just to give you an example, nacelles were only around 19 metric tons apiece at that time, and now they weigh as much as 95 metric tons. We invested in two Liebherr 500S mobile harbor cranes. These do away with the need to turn a vessel during discharge, creating even greater assurance that delays and expensive standby charges for longshoremen are avoided. The cranes are extremely mobile and move from dockside to staging or storage with ease. They are able to lift heavy nacelles from the offshore side of a vessel, saving time and added expense. For even larger loads, such as long tower sections, the cranes can be used in tandem. We are the only port in the Pacific Northwest with two heavy lift cranes, with crane operators that have received specialized oversize and heavy lift training on the Liebherr cranes. We have also purchased additional land specifically for our wind operations. Wind energy imports require significant land for secure storage and staging. Components cannot be stacked on top of each other as is done with containers. The heavy equipment that lifts and repositions wind cargo also requires space, as do the specialized trucks that haul these huge pieces to storage and staging areas. We recently developed our new Terminal 5, which includes a dual BNSF and UP rail service loop track capable of handling unit trains of wind energy with the ability to load as many as 33 cars at a time. We expect to increase our wind laydown space at Terminal 5 from 30 to 70 acres within the next few months, and it will ultimately provide 100 acres of storage space at full build out, which is enough for 700 towers on the ground at one time. These investments will speed up loading, ultimately decreasing costs for customers.

TELL US A LITTLE ABOUT THE PORT'S HISTORY AND CAPABILITIES.

The Port of Vancouver was incorporated in 1912, so next year marks our hundredth year in operation. Vancouver was the third port established by the State of Washington, with the Port of Seattle first and Grays Harbor second. The reason the state purchased this land was to ensure fair market access to the waterfront by avoiding monopolization by other transportation service companies, like the railways. But the railroad systems now play a critical role in helping define the territory we cover. We are serviced by both BNSF Railroad Company and Union Pacific Railroad, with direct access to main lines that run from British Columbia to San Diego and eastward as far as Houston, Chicago, and beyond. We can service Washington, Oregon, Montana, Idaho, the Dakotas, Illinois, Ohio, and Canada. Before we began investing in our wind-specific capabilities we assessed the market, which indicated that the five areas poised for growth in the United States are the Pacific Northwest, the Midwest, the Southwest, California, and Texas. We are well positioned to ship to three of those areas. In addition, the Port of Vancouver is located 104 miles inland at the end of a navigation channel for oceangoing vessels on the Columbia River, where the water is 43 feet deep. It really helps with overland shipping costs to be that far inland by water. Finally, we're only two miles from the major interstate system, leading in all directions, and we've worked closely with engineers designing a new Interstate 5 bridge to include ramp and interchange designs that will accommodate oversized loads.

MANY WIND MANUFACTURERS BASED OVERSEAS ARE BUILDING FACILITIES IN THE STATES. BUT WHAT ELSE DO YOU OFFER THOSE STILL SHIPPING COMPONENTS FROM ASIA?

Three of the top wind manufacturers are located in China, which wasn't the case only a few years ago, and while we're a natural choice for anyone shipping to the Pacific Northwest and surrounding regions, we can also help them save a great deal when reaching wind-rich states in the Midwest. To ship from China straight to Gulf ports or Texas can be up to a 30-day trip. The distinct pricing advantage of bringing a project through the Pacific Northwest is a reduction in voyage time. It only takes about 15 days to reach Vancouver, which slashes transportation costs—including the ship and the fuel to run it—basically in half. One thing we learned when we were researching the wind industry is that you can't do anything halfway. You've got to make the investments, provide the equipment, and streamline the delivery process to get the business. And that's exactly the commitment we've made here at the Port of Vancouver USA. ✌

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