DIRECTION

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INDUSTRY AT LARGE

THREE BIG TAKEAWAYS FROM WINDPOWER 2014 YOU SHOULD KNOW

Industry shifts focus toward sustainable growth, climate change, and the advent of U.S. offshore development

By Carl Levesque
American Wind Energy Association

Every year news is made at the WINDPOWER Conference & Exhibition, and that was as true as ever this time around. If you were at WINDPOWER 2014, which happened May 5-8 in Las Vegas, Nev., hopefully you took in much of the news, not to mention got a little business done and perhaps even socialized with some of the nearly 8,000 other participants.

But organizing the massive amount of information and happenings that come participants' way during North America's largest wind industry gathering can be tough. So for both those who were in Vegas and those who couldn't make it, here are three key industry developments and takeaways from WINDPOWER 2014.

NEW WIND VISION

The U.S. Department of Energy (DOE) shared details for the first time of its Wind Vision initiative, launched last year at WINDPOWER. The key benchmarks announced: 10 percent wind energy on the U.S. power grid by 2020; 20 percent by 2030; and 35 percent by 2050.

More than doubling wind's penetration from 4 percent to 10 percent by 2020 will require as much growth in the next six years as the past 40. Jose Zayas, Director of the Wind and Water Power Technologies Office at DOE, outlined the benefits: $520 billion saved for electric consumers between now and 2050 (when electricity will cost 3 percent less than it otherwise would); 336 billion gallons of water saved by 2050; 140,000 industry jobs by 2020 and 400,000 jobs by 2050, plus spinoff jobs benefits.

The Wind Vision calls for approximately 10,000 MW a year to be deployed over the next several years, including substantial offshore wind starting to come online by the latter part of this decade.

WIND AS LEADING SOLUTION TO CLIMATE CHANGE

With recent reports underscoring the urgency of tackling climate change, industry leadership underscored its readiness to be a top solution. "The urgent need to dramatically reduce global carbon emissions brings incredible opportunity to our industry," said Susan Reilly, CEO of RES Americas, and new Chair of the AWEA Board of Directors.

Forty percent of all carbon emissions in the U.S. come from the electric power sector. Scientists say "decarbonizing" electricity is critical to holding carbon dioxide to a safer level in the atmosphere, and avoiding the worst impacts of climate change cost effectively, Reilly said.

"The facts are clear: After energy efficiency, wind energy is the fastest, cheapest way to get the biggest carbon reductions in our energy portfolio," Reilly said. "So wind energy is no longer an 'alternative'—it is an imperative."

DOE ADVANCES THREE DEMO OFFSHORE PROJECTS

DOE announced the three winning offshore projects for Phase 2 of its Advanced Technology Demonstration Project Initiative. The winners, chosen from a group of seven projects that comprised the initial phase of the program, are now eligible to receive up to an additional $46.7 million each to advance their projects, all of which are focused on next-generation offshore technology. The winners include projects from Dominion Virginia Power, Fishermen's Energy of New Jersey, and Principle Power of Washington. All three projects use direct-drive turbines. Proposals from the University of Maine and the Lake Erie Energy Development Corp. were named as alternates for Phase 2.

The demonstration projects are part of an effort at accelerating the deployment of more efficient offshore wind power technologies by improving performance and lowering cost. The projects are slated to be deployed as grid-connected systems in federal and state waters by 2017.

More on the three projects: Fishermen's Energy will install five XEMC 5-MW direct-drive wind

turbines approximately three miles off the coast of Atlantic City, N.J. The project will feature an innovative twisted-jacket foundation that is simpler and less expensive to manufacture and install than traditional offshore wind foundations.

Principle Power will install five 6-MW direct-drive wind turbines approximately 18 miles off the coast of Coos Bay, Ore. The U.S.-developed WindFloat semi-submersible floating foundation will be installed in water more than 1,000 feet deep, demonstrating an innovative solution for deep water wind turbine projects and lowering costs by simplifying installation and eliminating the need for highly specialized ships.

Dominion Virginia Power will install two 6-MW direct-drive wind turbines 26 miles off the coast of Virginia Beach, utilizing a U.S.-designed twisted jacket foundation. Dominion's project will demonstrate installation, operation, and maintenance methods for wind turbines located far from shore. Additionally, the Dominion project will install and test a hurricane-resilient design.

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Vestas releases 1Q 2014 financials

In the first quarter of 2014, Vestas generated revenue of EUR 1,283 million—an increase of 17 percent over the year-earlier period. EBIT before special items increased by EUR 148 million to EUR 40 million due to improved project margins, higher revenue, lower fixed capacity costs and lower depreciation. The EBIT margin before special items was 3.1 percent and the free cash flow increased by EUR 36 million to EUR (24) million compared to the first quarter of 2013. During the last 12 months, Vestas has generated a free cash flow of EUR 1,045 million.

The intake of firm and unconditional wind turbine orders was 1,188 MW in the first quarter of 2014. The value of the combined backlog of wind turbine orders and service agreements stood at EUR 13.8 billion—an improvement of EUR 1.4 billion compared to the year-earlier period.

Group president & CEO Anders Runevad said: "As we expected, first quarter showed improvements in all major areas. This is a result of a lot of hard work from my colleagues and we remain focused on executing on our strategy—profitable growth for Vestas."

CanWEA to Ontario PC party: Reconsider wind

The Canadian Wind Energy Association (CanWEA) recently urged the Ontario PC Party to reassess its energy policy platform, and to acknowledge that affordable energy for Ontario should include wind energy—a clean, renewable and cost-competitive source of electricity supply.

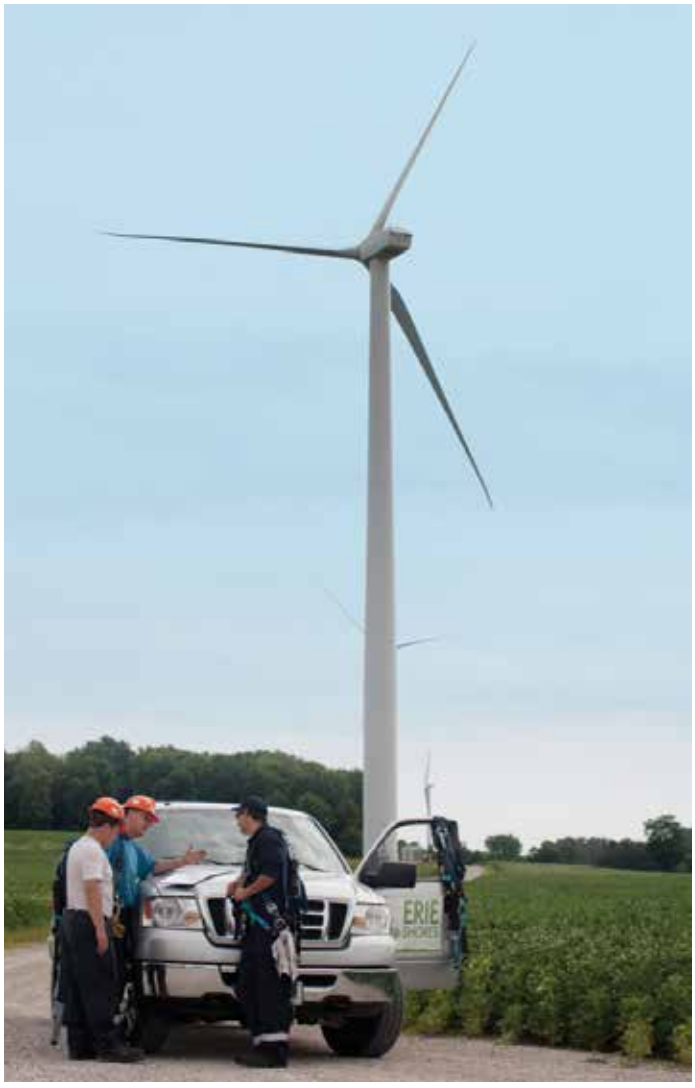
"Independent analyses by the energy consulting firm Power Advisory LLC show that wind energy was responsible for only 5 percent of the increase in electricity bills between 2009 and 2012. The bulk of rising electricity prices comes from expensive upgrades to decades-old power plants and transmission systems," said CanWEA President Robert Hornung. "The PC Party is mistaken when claiming renewable sources like wind energy are the key driver of rising electricity bills."

Hornung added that the PC Party is confusing facts and logic by declaring wind energy is subsidized. "Wind energy can provide electricity more cheaply than new nuclear power and is cost-competitive with new hydro developments," he says. "Wind energy developers absorb almost all of the upfront costs in developing their projects, which means no front-end or long-term risks to taxpayers and ratepayers. New wind-driven electricity is being secured through long-term, pre-set contracts that contribute to price certainty and to keeping Ontario electricity rates stable and competitive across North America."

Wind energy projects continue to see falling costs as new turbine technology boosts output, and economies of scale reduce production and supply costs. Requiring no fuel costs to maintain the flow of electricity, wind energy is not subject to variable market pricing for fuel supplies bought outside Ontario.

Wind energy companies have spent over $5 billion since 2009 to develop Ontario's wind energy industry. Every megawatt of new wind energy represents an investment of approximately $2 million; a large portion of which is spent in the local community. Largely through these efforts, wind energy today has supported new manufacturing facilities and new jobs for graduates—and now meets over 3 percent of the province's electricity demand, doubling over the past four years to 5.2 terawatt hours, about what 550,000 average homes use each year.

Any energy platform should be more in step with how modern electricity systems are evolving around the world, Mr. Hornung adds. "Progressive governments are seeing how wind energy reduces carbon emissions, improve grid reliability, and leads to more predictable and stable electricity prices."



HEADLINES

Xcel Energy achieves wind energy milestone

Xcel Energy achieved a milestone recently, when wind power met 46 percent of customers' electricity needs in the company's Upper Midwest service territory.

At the time the company's Upper Midwest record was set, wind resources provided 1,622 megawatts of the 3,512 megawatts Xcel Energy's customers were using in Minnesota and neighboring states. The previous record was set in April 2013, when wind generation met 42 percent of customer demand.

Xcel Energy is currently adding 750 megawatts of wind resources in its Upper Midwest territory. Four wind projects have been approved by Minnesota regulators, representing a 42 percent increase in the company's wind power capacity in the Upper Midwest. All four projects—two in Minnesota and two in North Dakota—are scheduled to be in service by the end of 2015.

Wind generation produces 12 percent of the energy used by Xcel Energy's Upper Midwest customers.

We put all of our energy into helping you make the most of yours.

Learn more about the ITW WindGroup. Experienced manufacturing companies working together to help power the wind turbine industry. With unique expertise in a number of categories, we provide innovative solutions to solve various challenges. It's an offering that's making the ITW WindGroup a strong force in the wind energy market.

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ITW WindGroup

NREL HOSTS RACE TO ZERO-ENERGY HOMES

In efforts to promote energy efficient building practices, collegiate teams compete in the Challenge Home Student Design Competition

By David Glickson
National Renewable Energy Laboratory

Teams and judges participating in the Challenge Home Student Design Competition stand in front of the LEED Platinum CAFÉ at the National Renewable Energy Laboratory in Golden, Colorado. The event, which took place April 26 and 26, featured 28 collegiate teams presenting their cost-effective, zero energy ready home designs.

The campus of the Energy Department's National Renewable Energy Laboratory (NREL) sprang to life on a late April weekend as 28 teams of university students and building industry experts converged at the lab for the Challenge Home Student Design Competition.

During the inaugural competition, funded by the Energy Department's Building Technologies Office, teams of students presented their zero-energy-ready home design and construction plans to juries of national experts including the leading high-performance builders in the industry, building science professionals, and researchers.

"Buildings are critically important when it comes to reducing U.S. energy use, as they represent more than 70 percent of our electricity consumption and about 40 percent of our carbon emissions," said NREL Center Director for Buildings and Thermal Systems Chuck Kutscher. "How we build in the future will determine how successful we are at addressing climate change. NREL is very pleased to host and support this design competition because it is a way for students to learn the techniques and strategies that will be necessary to make sure that the buildings of the future get designed and built properly."

PREPARING THE SUSTAINABLE BUILDING LEADERS OF THE FUTURE

The Challenge Home Student Design Competition aims to inspire the next generation of architects, engineers, and construction managers to be able to design and construct zero-energy-ready homes that are affordable and market ready. Each team included students and their faculty advisors. Teams were encouraged to be multidisciplinary in makeup and to work as closely as possible with industry professionals to help inform their decision-making process.

On the Energy.gov blog, Chief Architect for the Building Technolo-

gies Office Sam Rashkin noted: "Each year, thousands of college and university students major in construction-related fields, including architecture, engineering, and construction management. These students enter into a competitive workforce that is increasingly demanding advanced knowledge and skills essential to delivering high-performance homes and buildings.

"The Challenge Home Student Design Competition will provide students with the skills and experience to start careers in clean energy and make them leaders in the movement to create truly sustainable homes."

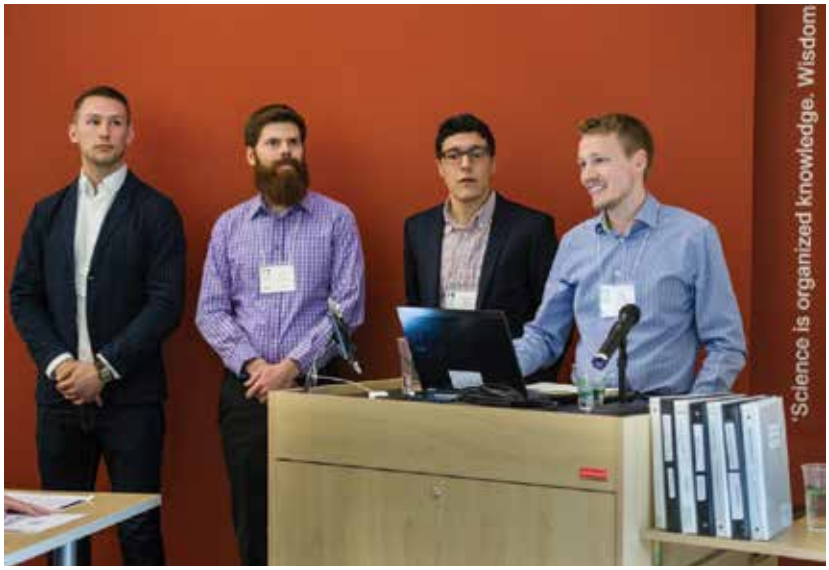
Student teams were asked to develop cost-effective designs that mainstream homebuilders can start using and homebuyers can start buying today.

"As an engineer in this field, I only wish that there had been a program like this available to me when I was a student," said NREL Residential Buildings Research and Outreach Coordinator Cheryn Metzger. "The team concept has them working on a project, with different disciplines collaborating just as they will in the real world, all while working closely with experienced industry partners to help guide them through the process. The experience and knowledge gained by these students through their participation is priceless."

The Montage Builders Northern Forest team (SUNY College of Environmental Science and Forestry, Syracuse University, and Onondaga Community College) presents its craftsman-style, sustainable design to a panel of judges during the Challenge Home Student Design Competition. The team won the grand award in the single family detached category.

Montage Builders Northern Forest team's winning design in the single family detached category. [Courtesy of Montage Builders Northern Forest]

The Urban Harvest team from Ryerson University presents its design for an urban, high-performance townhome to judges during the Challenge Home Student Design Competition. The team won the grand award in the single family attached category.



The Urban Harvest team from Ryerson University presents its design for an urban, high-performance townhome to judges during the Challenge Home Student Design Competition. The team won the grand award in the single family attached category.

And the winners are...

The team design presentations were followed by intense deliberation by the jurors. The industry experts judging the competition then presented two Grand Awards to the best overall designs.

The first award was given to the Montage Builders Northern Forest team. Montage Builders was a collaborative effort of students from three Syracuse, New York, area schools: Onondaga Community College, SUNY College of Environmental Science, and Syracuse University.

The Montage team developed an adaptable and accessible craftsman-style single-family detached home that embodied responsible development. The team demonstrated leadership in the sustainable redevelopment of a community in Syracuse by presenting an affordable design based on the median family household income for the area.

"We had an amazing experience participating in this competition," said team member Michelle Tinner, a graduate student in Sustainable Construction Management at SUNY College of Environmental Science. "It was a unique collaboration, building a team with diverse backgrounds from three different schools. But it was that diversity of experience and perspective that was the key to our success."

The Urban Harvest team from Ryerson University in Toronto, Ontario, was presented with the second Grand Award. The team developed a high-performance single-family attached townhome design that would fit well in any urban environment. The team addressed every aspect of the design requirements and integrated all systems artfully and effectively.

The Urban Harvest design was also recently selected to be a part of the Denver Super-Efficient Housing Challenge, and boasts a 90 percent reduction in annual energy consumption compared to an average Colorado residence. The design—along with homes by four other Challenge Home Student Design Competition teams—is slated to be constructed at the Denver Sustainability Park in Denver's Curtis Park neighborhood in late 2014.

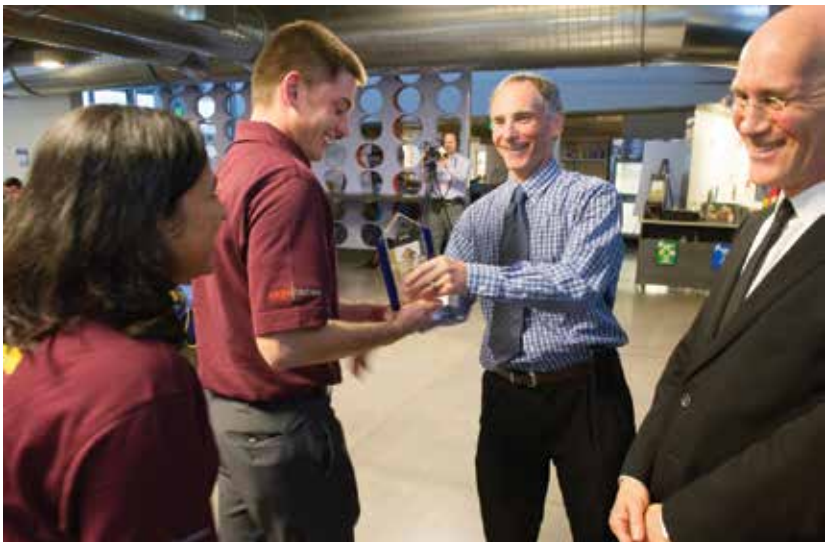
"The opportunity to do this design in a real-world environment, on a building that is likely to actually be built, was an invaluable experience for us," said team member Antonio Cunha, a graduate student in Ryerson's Department of Architectural Science. "In academia, most projects stay in the conceptual realm and never progress beyond a poster or a model. This process required us to apply what we have learned in the classroom with a much more realistic approach where we had to consider the same challenges and implications that we will use throughout our careers."

In addition to the two Grand Awards, the judges presented 12 subject area awards as well as technical awards recognizing teams for best design solution, best technical integration, best production home adaptation, and best presentation.

More Than Just a Competition

A critical goal of the Challenge Home Student Design Competition is to facilitate the creation of a strong future workforce that can support the development of, and demand for,

zero-energy-ready homes. To that end, students were provided with an opportunity to hear from industry thought leaders who presented their visions for the future of sustainable housing along with a series of technical presentations critical to advancing the students' knowledge of high-performance home design, engineering, and construction.

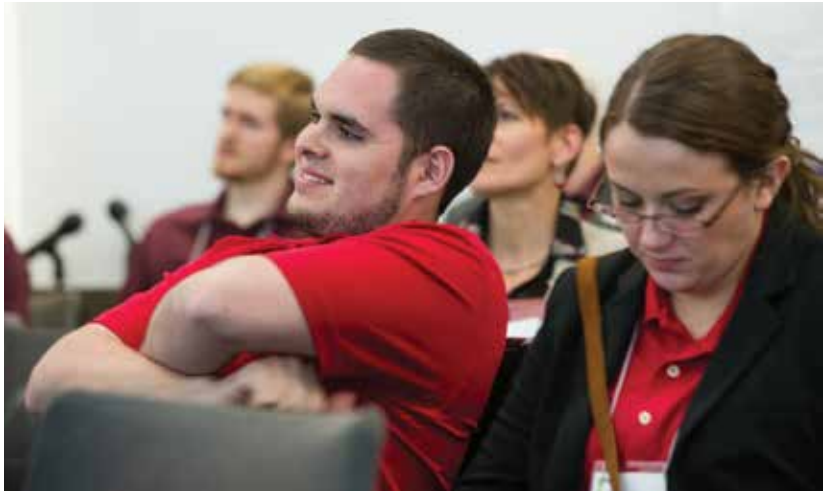


The Urban Harvest team from Ryerson University presents its design for an urban, high-performance townhome to judges during the Challenge Home Student Design Competition. The team won the grand award in the single family attached category.

"This is the future of our industry," said Gene Myers, CEO of New Town Builders, a Denver-based builder of energy-efficient homes who served as a juror for the competition and also presented to the students. "It is important that we make this effort to develop a qualified workforce for the building industry. We need to nurture students who choose to engage in this topic, support the institutions that have made that possible, and encourage others to follow suit. A program such as this one is a great step in that direction."

The full attention and engaged participation of the students throughout the program indicated that their thirst for more knowledge continued even after having completed their designs and presentations.

"We may end up knowing more than our future employers do about green building design as a result of going through this process and the information we are receiving," said



Jake Kern from Illinois State University listens to a speaker during the Challenge Home Student Design Competition at National Renewable Energy Laboratory.

Members of the Opti-MN University of Minnesota team shake hands with the panel of judges during the Challenge Home Student Design Competition.

participant Martha Merzig, a graduate student in Integrated Design and Construction at Auburn University. "It's an exciting thing to be equipped with that knowledge at such an early stage in our careers, and I have high hopes for what we are going to be able to do with it going forward into the future."

A Perfect Setting

The student teams had the opportunity to present their concepts for zero-energy-ready homes inside the award-winning LEED Platinum and net-zero-energy Research Support Facility on NREL's sustainable campus. And they were supported by the world-class staff from NREL's buildings research teams who have dedicated their careers to energy-efficient and zero-energy buildings. This synergy provided an ideal backdrop for the competition, one that provided inspiration and motivation to the students and staff alike.

"Our campus is a showcase for the right way to build buildings, and there's no other place where we could have held this competition and have the students be as engaged as they have been here," said Metzger. "They've gotten to see this type of design in action, and their interest is piqued even further by that opportunity. They are truly excited to have the chance to be here."

While developing and preparing their designs, the student teams regularly used research published by the laboratory as well as NREL-developed tools. This connection further demonstrated the synergistic relationship between the work of the students in this competition and the buildings research being done at NREL.

"We've got huge energy challenges in front of us, and it is a great opportunity to be able to engage directly with the next generation who will be tasked with helping us to innovate the future solutions to those challenges," said NREL Senior Engineer for Residential Buildings Dane Christensen. "Hosting this event gave us the chance to show off the work that we are doing here, work that we are very proud of, and it also gave us an opportunity to hear from the students and see the very talented work that they are doing. It was very exciting to be able to witness their passion, dedication, and skill firsthand."

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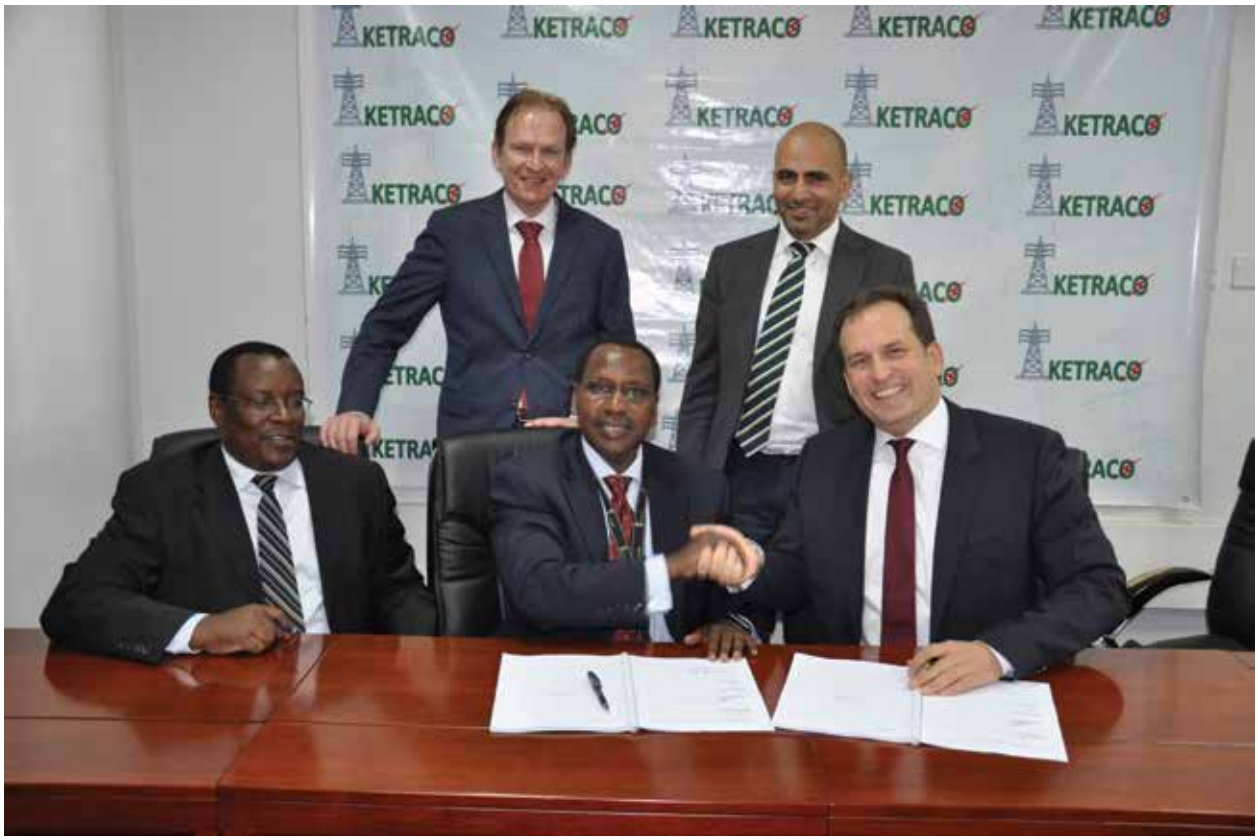
Nordex targets further growth and improvement in earnings in 2014

On the basis of its audited consolidated financial statements, Nordex confirms the preliminary figures for 2013 which it had reported in February. Thus, consolidated sales rose by around 33 percent to EUR 1,429.3 million (previous year: EUR 1,075.3 million), with return on sales widening to 3.1 percent. Consolidated profit after interest and taxes amounted to EUR 10.3 million, compared with a loss of EUR 94.4 million in the previous year, which arose mainly as a result of exceptional expenses in connection with the strategic realignment of the Group.

The gross margin expanded from 21.4 percent to the planned level of 22.6 percent in 2013. This substantial improvement reflects operating measures such as cuts in



the cost of materials of an average of around EUR 100,000 per turbine, more profitable contracts with new products and more professional execution of projects.

This development was particularly encouraging as Nordex's production and installation output simultaneously reached a new record. Thus, turbine assembly output rose by 48 percent to 1,342 MW, while installations of new wind turbines increased by 36 percent to 1,254 MW.

In this way, Nordex was able to outperform industry trends and double its market share to almost eleven percent in its core EMEA region. In addition, Nordex installed wind power systems in South Africa and Uruguay for the first time. Consequently, Nordex is once again amongst the world's ten largest producers of onshore wind turbines.

DNV GL ADVISES ON TRANSMISSION LINE PROJECT IN KENYA

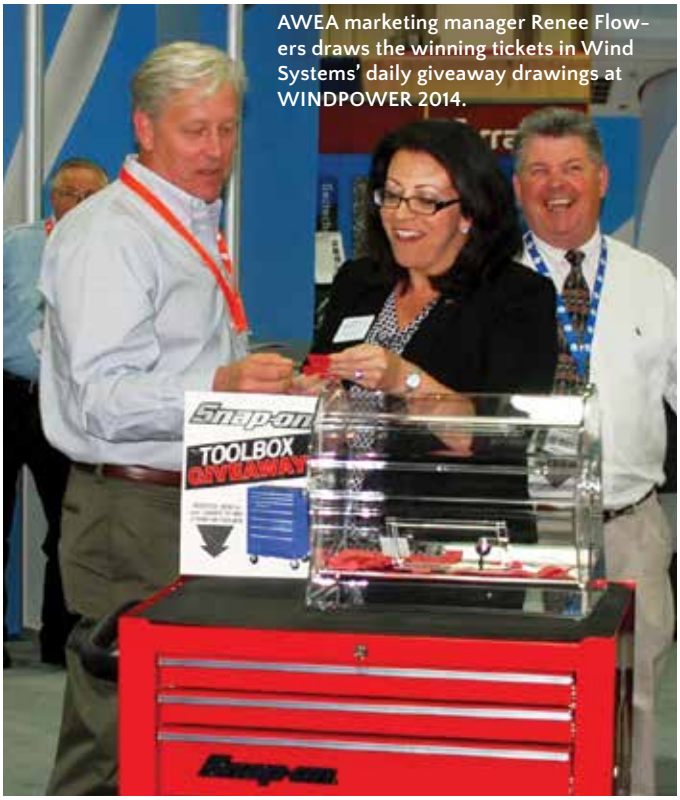
DNV GL recently demonstrated its commitment to modernizing and developing power in Africa by advising on the construction of a 400kV high voltage overhead transmission line and substations in Kenya. Designed to strengthen the Kenyan grid and build a connection between the capital, Nairobi, and one of the largest wind farms in Africa, Lake Turkana Wind Power, the 420 kV AC transmission line runs from the national grid at Suswa to Loiyangalani.

The 400kV Kenyan transmission line is supporting the government initiative to harness the country's rich renewable resources to boost the economy and respond to consumption needs in the capital. Without transmission lines such as this one, the future development of reliable wind and geothermal sources will be limited and Kenya will be forced to rely on more expensive fossil fuels serving power plants in the coastal region.

DNV GL was selected to advise on the transmission line by Kenya Electricity Transmission Company Limited (KETRACO), a government owned organization established to develop new high voltage electricity transmission infrastructure. DNV GL provides in-depth technical expertise and critical insights to KETRACO, in addition to developing the specification for the project, supervising construction work and providing training on asset management.

The project also involves advice for the construction of a power transmission substation at the Loiyangalani project site and a terminal substation at Suswa.

THANKS FOR MAKING WINDPOWER 2014 A SUCCESS!



AWEA marketing manager Renee Flowers draws the winning tickets in Wind Systems' daily giveaway drawings at WINDPOWER 2014.

Wind Systems would like to thank all WINDPOWER 2014 attendees who helped make our conference a success by visiting our booth in Las Vegas. Our staff was working diligently to answer your questions and share our vision of becoming your primary source for the latest, most insightful wind energy industry information available.

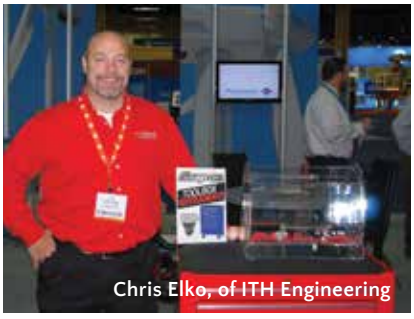
In what has become a longstanding tradition at WINDPOWER, *Wind Systems* held daily giveaway drawings on May 6-8. Visitors to the booth who singed up for a free subscription to *Wind Systems* were automatically entered to win either a DBI-SALA ExoFit NEX harness from Capital Safety, or a Snap-on toolbox.

Toolbox winners were GE's Daniel Olson, and Chris Elko of ITH Engineering. ExoFit NEX harnesses went to Mark Winward of GE, David Fuller of EDF Renewable Energy, and Moiseis Pineda, a student at Oklahoma State University–Oklahoma City.

Congratulations, winners! Thank you for coming by and participating in our drawing. If you came by our booth during the conference, but weren't one of our lucky winners, please visit us next year at WINDPOWER 2015 in Orlando!


Mark Winward, of GE

Capital Safety's Dustin Schneider, left, congratulates EDF Renewable Energy's David Fuller on winning a DBI-SALA ExoFit NEX harness as part of Wind Systems' daily giveaway drawings at WINDPOWER 2014 in Las Vegas.


Chris Elko, of ITH Engineering


Daniel Olson, of GE


Moiseis Pineda, OSU-OKC

Women of Wind Energy recognizes award winners

Three industry leaders celebrated at annual luncheon at WINDPOWER 2014 in Las Vegas

The winners of the Women of Wind Energy (WoWE) Awards were announced on Thursday May 8 at the annual luncheon held at AWEA's WINDPOWER 2014 Conference & Exhibition in Las Vegas. The awards put the spotlight on professionals at the pinnacle of the industry as well as on the up-and-coming next generation of leaders. All three winners provide examples of achievement, creativity and courage.

"Highlighting and recognizing the stories of incredible women and men like this year's WoWE Annual Award winners is critical not only to recognizing and appreciating their successes but also to help other women in the sector see role models and new career pathways," said Kristen Graf, WoWE Executive Director.

2014 WoWE Award Winners

Rising Star award—Kylah McNabb is currently a program manager and wind development specialist at the Oklahoma State Department of Commerce/State Energy Office. She started her career working for the Oklahoma Wind Power Initiative, and then worked as a project manager for Horizon Wind Energy before achieving her current post. She is a very directed, determined person, building this unique career upon her roots of a Bachelor's in geography and an MBA—both from the University of Oklahoma. She is a 2011 graduate of the National Renewable Energy Laboratory's Executive Energy Leadership Program, which she claims among her proudest accomplishments.

McNabb has experience in private wind development, wind industry research and development, oversight, and financial management of over $70 million in federal funding programs, loan program development and management, and policy analysis.

Champion award—Dr. James Walker is vice chairman of the board of EDF Renewable Energy, a leading developer, owner, and operator of wind projects, which is a wholly owned subsidiary of EDF Energies Nouvelles. Walker has more than 30 years of experience in energy in public and private entities, including positions at MCR Geothermal and Edison Mission Energy. He pioneered wind project development in Greece, Turkey and Mexico.

"Jim has provided true vision and leadership not only for the wind industry, but for each individual he comes across. His endless energy for new ideas is contagious, and his drive for constant evolution on how to approach challenges is an inspiration to those around him. He can wear many hats from a mentor to professor to leader to excellent dinner seatmate," said WoWE Board Member, Liz Salerno. "After meeting Jim, you will quickly find out there is always a great story behind his knowledge and experiences. Despite the amazing accomplishments and stature Jim has earned over the years, he never fails to be incredibly generous with his time and knowledge."

Woman of the Year award—Trudy Forsyth has been a leader in wind energy and renewable energy for the past two decades. She was the U.S. Department of Energy's Golden Field Office liaison and coordinator of NREL's technical support for the Small Wind Turbine Field Verification Project, overseeing testing of small turbines to International Electrotechnical Commission (IEC) standards. She co-authored the IEC technical standards and served as an IEC secretary for the second and third revisions of the IEC small wind design and safety standards. Forsyth led the development of AWEA's Small Wind Roadmap—published in 2002.

For many years, she was a leading NREL voice on the Wind Powering America initiative (now called Wind Exchange) working to break down barriers to installing wind turbines.

Forsyth has served on the Boards of the Small Wind Certification Council, the American Solar Energy Society, the North American Board of Certified Energy Practitioners, and the Distributed Wind Energy Association. She has also been a true champion and mentor for other women and girls in the industry and in science technology and life in general; the range of her activities include being the first "official" Board Chair for Women of Wind Energy for the past four years and working with the Girls Scouts. Forsyth has worked tirelessly throughout many years to foster the engagement of girls and women in engineering, aerospace, and the renewable energy sector.