



Kawailoa Wind is installing NRG Systems' Bat Deterrent System on its 30 turbines. (Courtesy: NRG Systems)

INNOVATION

NRG Systems sells Bat Deterrent System to Hawaii wind farm

NRG Systems, Inc. has announced the first commercial sale of its Bat Deterrent System to Kawailoa Wind, Hawaii's largest wind farm. Located on the island of Oahu, Kawailoa Wind will outfit each of its 30 turbines with a Bat Deterrent System. The adoption of NRG's pioneering technology is part of Kawailoa Wind's ongoing efforts to help conserve the Hawaiian hoary bat, which has been on the United States' list of endangered species since 1970.

"DESRI has a history of adopting innovative technologies and ideas to

mitigate the impacts of renewable energy development," said Bryan Martin, chief executive officer of D. E. Shaw Renewable Investments (DESRI), which owns and operates Kawailoa Wind. "We are excited to partner with NRG Systems at Kawailoa Wind as part of those efforts."

Bat fatalities have been documented in association with wind-farm operations in Hawaii — an occurrence that has been seen at wind farms across the globe. Because of this, conservation of these animals has become one of the most pressing issues facing the renewable energy industry today.

"Wind energy is crucial to providing renewable energy in Hawaii," said Brita Woeck, environmental compliance officer for Kawailoa Wind. "Kawailoa Wind is invested in finding solutions so that clean energy generation and

bat conservation can co-exist."

Kawailoa Wind is curtailing, or turning off turbines in low wind speeds at night, when bats are most active, to minimize Hawaiian hoary bat fatalities. NRG's Bat Deterrent Systems are expected to be used in addition to curtailment.

MORE INFO nrgsystems.com

INNOVATION

Vaisala expands weather radar offering to include X-band

Vaisala, a global leader in weather, environmental, and industrial measurement, recently announced the develop-

ment of an advanced X-band Weather Radar. The smaller size and lower cost of an X-band radar will make it an ideal instrument to enhance the weather detection capabilities of a specific location. In difficult terrain, it fills the gaps to reliably detect snow, rain, and other weather activity. Adding X-band radars to an existing network will also improve the accuracy of precipitation measurement, providing better data for flood warnings or hydro-electric power plants, for example. In airport environments, the radar allows for detection of wind shear, wake vortices, convective weather, even birds.

The new X-band Weather Radar provides accurate measurements for a limited area, filling in a gap in a national radar network or delivering precise information for an airport. Severe weather in mountainous areas and gaps under sparse weather radar networks will be visible when X-band radars are added to the radar networks. Airport safety and efficiency will be improved with accurate detection and nowcasting of hazardous conditions.

“X-band radar will enhance a weather detection arsenal, making it even more reliable and accurate,” said Pekka Utela, director of Weather Radars for Vaisala. “By developing a smaller system allowing simple site selection, as well as providing maximum weather detection sensitivity with automatic and continuous calibration, the new X-band radar will answer the challenges decision-makers face in severe weather situations.”

The intelligence the X-band radar collects will provide significantly improved situational awareness. When integrated with other measurement systems, such as Vaisala C-band Weather Radar or wind Lidar, users will get the most comprehensive, real-time data available. At airports, accurate wind shear detection, complemented by Lidars, helps optimize take-off and landing sequences, as well as enhancing the safety of flight operations.

MORE INFO vaisala.com/weather-radars

INNOVATION

Acciona installs photovoltaic modules on turbine tower

The Energy Division of Acciona has developed a pioneering solution in the field of hybridization between wind and photovoltaic power. It consists of covering a wind-turbine tower with flexible organic panels to produce energy for the internal electricity consumption of the turbine.

The innovative project will allow the study of the performance of the organic panels — an emerging photovoltaic technology — and their application to improve wind-turbine efficiency.

The system has been installed in one of the turbines of the Breña Wind Farm in Albacete, Spain, which Acciona owns and operates. The turbine is an AW77/1500 of Nordex-Acciona Windpower technology, mounted on an 80-meter-high steel tower (hub height).

Installed on the tower are 120 solar panels facing southeast-southwest to capture the maximum of the sun's rays throughout the day. They are distributed at eight different heights, occupying around 50 meters of the tower's surface area. The photovoltaic modules, with an overall capacity of

9.36 kilowatts peak (kWp), are of Heliatek technology (HeliaSol 308-5986 model). They are only 1 millimeter thick, and each one has a surface area of 5,986 x 308 mm.

In contrast to the conventional technology used in the manufacture of photovoltaic models based on silicon, these organic panels use carbon as raw material and are characterized by their structural flexibility, which makes them adaptable to different surfaces. Other key features are lower maintenance costs, less energy consumption during manufacture, easier logistics, and the complete recycling of the materials used, although their efficiency is still below that of silicon modules.

“The hybridization project in Breña means the optimization of the use of space for renewable energy production, and it will enable us to test the efficiency of organic photovoltaics, a technology that we believe has one of the best improvement curves in terms of technological efficiency,” said Belén Linares, energy innovation director at Acciona. “That is why we have decided to pilot it.”

The immediate application of the Breña project is to produce part of the energy that the internal systems of the wind turbine need. When the turbine is running, some of the energy generated is used to power the auxiliary systems. In shutdown mode, certain



An X-band Weather Radar antenna. (Courtesy: Vaisala)



The system has been installed in one of the turbines of the Breña Wind Farm in Albacete, Spain. (Courtesy: Acciona)

systems need to continue functioning so they are fed from the grid, which means that the wind turbine is registering a net consumption of energy.

MORE INFO www.acciona.com

INNOVATION

Operators need to invest in disruptive tech, says Onyx Insight

Micro Electro-Mechanical Systems (MEMS) have radically changed the return on investment model for turbine condition monitoring in the United States, helping wind-farm owners make significant OPEX savings. By cutting the cost of condition monitoring systems (CMS), low-cost MEMS sensors have helped wind-farm owners to improve operational planning, cut unscheduled maintenance, and make OPEX savings of up to 8 percent each year, according to ONYX InSight.

First introduced by ONYX InSight in the wind-energy industry, MEMS sensors are used in CMS hardware to measure and report on vibration, temperature, and oil condition in the drive train. With billions of MEMS sensors manufactured every year for use in equipment from mobile phones and pacemakers to automo-

otive and aviation safety systems, the technology is low cost and highly reliable. MEMS equipped CMS have transformed the return on investment for turbine monitoring, particularly for owners of smaller or older models. Lowering the cost of CMS hardware has allowed owners to refine repair and maintenance strategies to realize greater OPEX savings. The latest CMS hardware collects a wide range of wind-turbine performance metrics, allowing wind-farm operators to identify and confirm faults much earlier and to act preventatively to save money on repairs and site visits. The low-cost technology can benefit older and smaller turbine models significantly.

MORE INFO www.onyxinsight.com

MANUFACTURING

Siemens Gamesa reaches 1 GW for EDF Renewables in the U.S.

Siemens Gamesa Renewable Energy has been awarded another order by EDF Renewables to supply 30 SG 4.5-145 and 36 SG 2.7-129 wind turbines for the 232 MW Milligan wind project, in Milligan County, Nebraska. This project marks 1 GW of SG 4.5-145 wind turbines sold world-wide and reinforc-

es Siemens Gamesa's solid position in one of the largest wind power markets in the world.

The contract also includes a service and maintenance agreement for Siemens Gamesa's premium maintenance program, offering the best in scale and flexibility to maximize energy asset returns. Project completion is expected for the end of 2020.

"EDF Renewables is a very strong partner for us, and we are glad to be working with them on a number of projects like Milligan and the recently announced Coyote and Oso Grande wind projects," said José Antonio Miranda, CEO of Onshore Americas at Siemens Gamesa Renewable Energy. "This order again is evidence of our customer's confidence in Siemens Gamesa and our leading technology."

The SG 4.5-145 offers a flexible power rating from 4.2 MW to 4.8 MW depending on site conditions and has a rotor diameter of 145 meters. It is optimized for medium wind onshore locations to maximize energy production with low noise emission levels.

MORE INFO www.siemensgamesa.com

MANUFACTURING

Vestas introduces the V138-3.0 MW to reduce LCOE

Following the launch of the EnVentus platform in January, including the V162-5.6 MW and V150-5.6 MW turbines, Vestas recently introduced the V138-3.0 MW turbine at AWEA WIND-POWER in Houston, Texas. Based on the scalable EnVentus platform architecture, the V138-3.0 MW's 138-meter rotor provides a large rotor-size-to-generator-rating ratio, strengthening Vestas' portfolio of turbines through superior park level energy production, higher certainty in performance, and reduced leveled cost of energy.

The V138-3.0 MW is globally applicable but purposely designed to maximize performance under mar-

ket specific constraint conditions. By combining the V138-3.0 MW turbine's 138-meter rotor with an 83-meter tower, the new turbine offers the industry's largest swept area under 152.4 meters (500 feet), a relevant height constraint in the United States. At the same time, the turbine's leading sound power levels makes it highly suitable for low wind sites in sound sensitive markets such as France.

"The V138-3.0 MW underlines Vestas' ability to continuously innovate and lead the industry in developing customizable and sustainable energy solutions that meet our customers' needs," said Chris Brown, president of Vestas' sales and service division in the United States and Canada. "This turbine is a perfect match for the North American market where higher certainty in Annual Energy Production at park level will become increasingly important for our customers to secure project financing and ensure profitability in a post-PTC market."

With the introduction of the V138-3.0 MW, EnVentus now covers a wide spectrum of turbine generator ratings and rotor sizes, underlining the scalability of EnVentus' platform architecture. Prototype installation is expected by the second half of 2020, while serial production is scheduled for the first half of 2021.

MORE INFO www.vestas.com

MANUFACTURING

Siemens Gamesa to supply offshore project in Taiwan

Following its selection as preferred supplier in May 2018, Siemens Gamesa Renewable Energy has received the firm order by wpd offshore to supply the 640 MW Yunlin offshore wind power plant in Taiwan. Located approximately six kilometers from shore in the Taiwan Strait, the plant will feature 80 SG 8.0-167 DD offshore wind turbines. This first firm order in

Asia Pacific (APAC) for the SG 8.0-167 DD also includes a 15-year long-term service agreement. Construction is expected to start in 2019, with turbine installation beginning in 2020.

As announced in October 2018, the project will feature localized towers in 2021, via CS Wind and Chin Fong Machine Industrial's partnership in Taichung harbor. It thereby satisfies official localization requirements on turbine components.

The SG 8.0-167 DD wind turbine has a rated capacity of 8.0 MW, and a rotor with a 167-meter diameter. It has a swept area of 21,900 square meters and uses the SGRE B81 blade, which measure 81.4 meters.

MORE INFO www.siemensgamesa.com

MAINTENANCE

Shell launches 10-year warranty gearbox oil to U.S. market

Shell Lubricants unveiled a new synthetic gearbox oil for wind turbines in the U.S. market at AWEA WINDPOWER 2019 in Houston, Texas.

With a 10-year warranty, Shell Omala S5 Wind can help to extend operational uptime and reduce unplanned breakdown by offering enhanced protection.

"70 percent of U.S. power businesses don't realize that effective lubrication can lead to shorter periods of equipment downtime, having negative ramifications on the bottom-line," said Warren Cates, senior research scientist at Shell. "Improving this aspect of equipment maintenance can make a significant impact on profitability. Shell's range of wind turbine gearbox lubricants are designed specifically for exceptional oil life under various extreme conditions, as is demanded by America's varied climate."

Gearbox operations and management can be particularly demanding, often in remote locations and challenging weather conditions. They must



Gearbox operations and management can be particularly demanding, often in remote locations and challenging weather conditions. (Courtesy: Shell Lubricants)

withstand extremes of hot and/or cold climates, water, dust, and fluctuating wind speeds. These severe conditions and varying loads can cause damage to the gearboxes, including micro-pitting. If a gearbox failure occurs, it can cause significant equipment downtime, leading to monetary loss. With more than 56,600 wind turbines now active across 41 states, with a combined capacity of 97,223 MW, operational efficiency has never been of more importance in the U.S.

MORE INFO www.shell.us

MAINTENANCE

Crawler cranes use tandem lifts to remove blades from turbine

On behalf of Enercon, Belgian crane service provider Aertssen removed the 72-metric-ton, 58-meter-long rotor blades from an Enercon E-126 wind turbine at a height of approximately 136 meters for maintenance. However, what may sound like a routine job was actually a tricky challenge, and it was only the team's extensive experience and two CC 3800 lattice boom crawler cranes that enabled them to successfully carry out the corresponding lifts.

"Before anything else, we had to decide which crane to use for the job," said Aertssen Project Manager Peter Bertels.

There were two options available: either a large crane that would be able to take care of the lifts by itself or two, more compact, cranes that would tackle the lift in tandem. Ultimately, the team decided on using its two CC 3800 cranes, as they were more cost-effective, would be powerful enough when used together, and had the required reliability and precision characteristics for the lifts. However, it was first necessary to make sure that the ground bearing capacities at the work site in Estinnes would be sufficient for the two crawler cranes, as they had originally been calculated back when the wind turbine had first been erected, for the use of a single crane only.

A total of 52 truck runs across a distance of about 130 kilometers were needed in order to get the two cranes from the Aertssen branch in Stabroek to the work site. Once there, a five-member Aertssen team set up the cranes within a week. The team started by setting up the first crane, which was placed a bit farther away from the wind turbine, on the corresponding access road, and then proceeded to set up the second one, which was closer to the tower. For the configuration, the team decided on the main boom variant with a 141-meter LSL and 12-meter LF4 arrangement with an offset of 20 degrees. The Superlift mast had a length of 36 meters, and the crane was set up with 165 metric tons of counterweight and 50 metric tons of Superlift counterweight.

Once all these steps were completed, the two cranes and the Aertssen team were ready for the technically ambitious lifts: The 72-metric-ton rotor blades not only had to be taken from a height of 136 meters and safely lowered to the ground, but they also had to remain perfectly balanced while being lowered. To achieve this, the operator of the CC 3800 that was closer to the tower first guided a sling, which was hanging from a spreader beam with four-part reeving, around the tip of the rotor blade. The operator of the other crane then repeated this same procedure. When “lassoing” the rotor blades with the slings, the two



The 72-metric-ton, 58-meter-long rotor blades from an Enercon E-126 wind turbine at a height of approximately 136 meters are removed for maintenance. (Courtesy: Aertssen)

crane operators depended on the instructions of Enercon employees who were also on-site for the job.

“The reason is that even though we’d installed cameras on the spreader beams, our crane operators were operating remotely, and were therefore unable to determine whether the slings were at the right height,” Bertels said. “It was kind of like lassoing a tiny animal.”

Once the two slings had “lassoed” the rotor blade, the cranes swung them to the intended rigging points, at which point it was time for the tricky part of the job: First off, the cranes needed to rotate parallel to each other in order to get the blade out of the rotor. Once this happened, crane 1 had a gross load of 46 metric tons on its hook, while crane 2 had a load of 36 metric tons. After this, the operators were able to set down the blade at a radius of about 22 meters. However, the blade had to be kept in a perfectly horizontal position at all times in order to prevent it from sliding off the slings, which is why digital spirit levels with wireless transmission capabilities were installed on the blades in advance to let the operators know, at all times, that the blades were level.

It was only necessary to make two

brief corrections throughout all three lifts, which totaled a distance of about 400 meters. One week later, after the required maintenance was complete, the rotor blades were reinstalled on the wind turbine.

MORE INFO www.aertssen.com

MAINTENANCE

Airway Services announces ISO 9001:2016 Certificate

Airway Services recently announced the successful completion of its International Organization for Standardization (ISO) 9001:2015 audit for its corporate office in San Angelo, Texas. The audit’s objective is to set international requirements for quality management systems.

The audit was performed by QAS International (QAS) on April 23, 2019, and Airway Services passed the most recent version of the audit. The internationally recognized ISO 9001 standard is applicable to any manufacturing or service industry.

The newest version of the ISO 9001 certification contains key updates including an emphasis on risk-based thinking to enhance the application of the process approach, improved applicability for services and increased leadership requirements.

MORE INFO www.airwayservicesinc.com

CONSTRUCTION

Chartwell Marine wins design contract for hybrid catamaran

Chartwell Marine, a pioneer in next-generation vessel design, has been selected to design and specify build for a U.S. hybrid vessel. The 65-foot catamaran has been designed to meet EPA Tier 4 emission standards

and will set a benchmark for vessel operators and boat builders in the U.S. and further afield.

Driven by the emergence of new industries such as offshore wind, the diversity and scope of workboat operations off the U.S. East Coast is increasing rapidly. Simultaneously, offshore wind vessel operators, public institutions, and port authorities must begin to adapt to increasingly stringent emissions regulations. As these stakeholders in the U.S. maritime market look to reduce their carbon footprints, vessel design and hybridization is becoming an increasing area of focus.

In order to provide operators with these next generation hybrid craft, however, there are a number of design challenges to overcome, requiring specialist naval architecture and design expertise.

Chartwell Marine and its partners won this design project following a competitive tender launched by a leading New England institution. The firm was selected on the basis of its industry-leading track record in developing high-performance catamarans and hull forms for the offshore wind sector, and low emission, hybrid architecture.

These design considerations will be made possible by an advanced new catamaran hull form that has been optimized via Computational Flow Dynamics (CFD) modeling, enabling maximum maneuverability and stability resulting in a smoother and safer ride.

MORE INFO www.chartwellmarine.com

CONSTRUCTION

Top safety technologies to watch out for

Safety training is critical in the construction industry because it's a high-risk workplace with hazardous work. Dangerous situations are part of the everyday working environment. The constant challenge for construction companies is to create and deliver ef-



Chartwell Marine will design a 65-foot catamaran that meets EPA Tier 4 emission standards. (Courtesy: Chartwell Marine)

fective safety training.

“The traditional way of handling safety training tends to be boring and doesn’t take into account the natural learning style of construction workers,” said Abby Ferri, vice president, national construction practice, Hays Companies, a Minneapolis, Minnesota-based risk management, insurance and employee benefits adviser. “It is more effective to provide hands-on training, and if this can’t be done in the immediate workplace, the training should be done in some sort of a simulation of the workplace or at least do meaningful activities that bring the workplace into the classroom.”

Ferri, who has been involved in construction safety for more than 16 years, has found that, rather than building a PowerPoint presentation for a particular topic, it is more effective to determine the learning objectives for the particular training, identify learning activities that can be facilitated with the students (workers), and then guide them through the training.

“It is important that the training be interactive, because this helps to keep everyone involved,” she said.

The trainer needs to digest what is being shared, understand the group that is taking the training, and, if necessary, adjust the learning activities to make it applicable, she said.

Ferri is conducting an “in the field” Safety Tech Trek at ICUEE, October 1-3, 2019, in Louisville, Kentucky.

These are some of the top construction safety technologies to keep an eye on:

► **Wearables and Embedded Technology:** This technology involves attaching various types of mobile electronics and embedded sensors to the body and personal protective equipment for a wide range of purposes.

► **IoT (Internet of Things):** By combining the real-time data generated by wearables, embedded technology, and GPS tracking with the IoT, Big Data can be used to monitor and measure a wide variety of safety performance metrics within the construction industry.

► **Enterprise Solutions:** These are designed to integrate multiple facets of jobsite safety through the interchange of information from “connected” workers and a “connected” jobsite.

► **Collision Avoidance Systems:** Technologies will continue to evolve to further improve blind-spot coverage, proximity detection alerts, detecting the presence of workers, collision avoidance systems, and systems that monitor equipment operators and keep a record of their performance.

► **Microlearning:** This involves breaking down information into compact, focused learning segments — usually three to five minutes long — that are designed to meet a specific learning outcome. The training, which can be viewed on a smartphone or tablet in the field, is easier to process, and knowledge retention is increased.

► **Apps:** Mobile applications are making it easier to get safety training to workers, plus they help safety managers be more productive. ↵

MORE INFO www.aem.org