Construction and assembly of the more than 2,000-metric-ton structure took place as planned at the Navantia-Fene shipyard. (Courtesy: ALE)

CONSTRUCTION

Transverse load-out supports floating wind farm

The WindFloat Atlantic project is constructing the first floating wind farm on continental Europe, and will generate a capacity of 25 MW; equivalent to the energy consumed by 60,000 homes in a year. Being a floating wind farm, it is secured to the sea bed with chains, and so avoids complex and disruptive offshore operations that might be damaging to the environment and costly.

ALE was chosen by its client Coordinatora to undertake the project, due to its expertise in performing complex load-outs on tight deadlines, as was the case here. Other projects elsewhere in the business had seen ALE perform transverse load-outs of large structures, experience that would be vital.

Construction and assembly of the more than 2,000-metric-ton structure took place as planned at the Navantia-Fene shipyard. Transportation was then required over a distance of several hundred meters to the quayside, and ultimately onto the Heavylift vessel Fjord.

Several factors made this project particularly challenging. The load-out operation was defined as Class 1, meaning strict time limits were in place; the operation was performed transversally, bringing obvious space limitations; the sheer size of the structure was also a factor, at 30 meters tall and with a distance of 50 meters between its columns.

To perform the load-out, ALE installed 236 axle lines of SPMT underneath the three corners of the structure, taking care to synchronize their movements to a high degree of accuracy. Three groups of 54-meter ramps also were installed between the quay and the deck of the Fjord, allowing the ro-ro operation to take place.

The structure was then towed to a position approximately 20 kilometers off the coast of Viana de Castelo, where it was installed. It will be joined by three similar structures in the near future.

This is a landmark project, involving the raising of the largest floating wind turbine on the planet. It is also allowing wind farms to move into deeper waters farther from the coast, where winds are stronger and more reliable than closer to shore.

MORE INFO www.ale-heavylift.com

CONSTRUCTION

Siemens Gamesa project to power offshore platforms

The world's largest floating wind power plant will be installed in Norway, equipped with 11 Siemens Gamesa SG

8.0-167 DD turbines. Scheduled to be commissioned in late 2022, Hywind Tampen will be the first ever floating wind power plant to power offshore oil and gas platforms.

"We are pleased to have received the firm order from Equinor to be the supplier of this ground-breaking project," said Andreas Nauen, CEO of the Siemens Gamesa Offshore Business Unit. "Thanks to our strong collaboration and joint focus on innovation, we are now at the forefront of developing this exciting technology and unlocking the vast potential for floating offshore wind power,"

Hywind Tampen will have a total capacity of 88 MW and be about 140 kilometers from shore in an area with water depths of 260 to 300 meters between the Snorre and Gullfaks oil and gas platforms. Specifically, this wind-power plant will be capable of meeting about 35 percent of the annual power demand of the Snorre and Gullfaks platforms.

By reducing the use of gas turbines on the fields, the project helps cut CO_2 emissions by more than 200,000 metric tons per year, equivalent to the annual emissions from 100,000 passenger cars.

The floating foundations in the Hywind Tampen project are ballast-stabilized and anchored to the seabed with mooring lines. With their lightweight nacelles, Siemens Gamesa large direct drive wind turbines are particularly suited for floating foundations.

The innovative partnership between Siemens Gamesa and Equinor dates back to 2009, when the world's first full-scale floating wind turbine project, Hywind Demo, was successfully installed in Norway. This initiative was followed in 2017 by the 30-MW Hywind Scotland floating wind power plant, currently the world's largest, installed at water depths between 90 and 120 meters. Hywind Scotland is a hugely successful project that has world-class safety performance and the highest capacity factor of any offshore wind farm in the UK. The Hywind Tampen project continues this partnership, bringing industrial-scale floating wind a giant leap forward.

The Hywind Scotland floating wind power plant was installed at water depths between 90 and 120 meters. (Courtesy: Siemens Gamesa)

Offshore wind already has a strong foothold in Europe with close to 18.5 GW installed capacity and a global potential to reach more than 100 GW by 2030. Of this, floating offshore wind is estimated to constitute 10 percent of the market, potentially powering 12 million homes in 2030.

MORE INFO www.siemensgamesa.com

CONSTRUCTION

Montana celebrates grand opening of Stillwater Wind

Montana Gov. Steve Bullock and Sen. John Tester recently were a part of the grand opening ceremony of the state's newest wind power facility—the 79.75 MW Stillwater Wind in Stillwater County, Montana owned by Pattern Energy.

"Montana ought to be in the driver's seat when it comes to realizing renewable energy opportunities — and we can do so with new facilities like

Stillwater Wind," Bullock said. "We have incredible wind potential in this state, and I look forward to how this facility will benefit our clean air and water, grow our economy and local revenue, and support jobs in the community."

"This facility shows that, with responsible energy development, we can have the best of both worlds," Tester said. "We can create new jobs and economic opportunities, while also working to address climate change."

"Our first wind power facility in Montana is now generating strong benefits for the state, including millions of dollars in tax revenue, while producing enough clean energy to power 23,000 homes each year without any emissions," said Mike Garland, CEO of Pattern Energy. "Montana has one of the strongest wind resources in the U.S., and we're proud to be harnessing the power of its wind through this new facility."

Stillwater Wind is using 31 Siemens Gamesa wind turbines comprised of five 2.3-MW turbines with 108-meter rotors and 26 2.625-MW turbines with 120-meter rotors.

Construction of the project created approximately 80 jobs within the local and regional communities and it is employing up to six full-time personnel during operations. The two construction contractors responsible for construction of the Stillwater Wind project, Dick Anderson Construction and EPC Services Company, are both headquartered in Montana.

Over the first 25 years of the facility's operational life, it is expected to produce more than $18 million in tax revenue. The local county will also receive impact-fee payments over the first three years, in addition to royalty payments to participating landowners.

Stillwater Wind has a 25-year power purchase agreement for 100 percent of the energy produced. The facility interconnects to the local transmission provider's 230-kV transmission line via a newly constructed 230-kV switching station.

MORE INFO: www.patternenergy.com

With a capacity of 110,000 pounds in 12 feet and many operator-friendly features, the Low-Profile Hydraulic Detachable Gooseneck (HDG) trailer is ideal for adaptable hauling in commercial and construction applications. (Courtesy: XL Specialized Trailers)

INNOVATION

XL Specialized Trailers introduces new Gooseneck trailer

XL Specialized Trailers is releasing a newly designed Low-Profile Hydraulic Detachable Gooseneck (HDG) trailer to its lineup. The trailer offers a loaded deck height of only 15 inches.

With a capacity of 110,000 pounds in 12 feet and many operator-friendly features, the unit is ideal for adaptable hauling in commercial and construction applications. The 13-foot gooseneck has a swing clearance of 110 inches, and the relief cut out in the gooseneck provides additional space between the truck and trailer.

The hydraulic neck detaches and re-attaches quickly using a power unit or a wet kit. The redesigned sloped nose of the gooseneck protects the air and electric connections from damage.

Additionally, a new front access panel in the base of the gooseneck allows for easy engine maintenance. The neck also offers a five-position ride height. Based on neck position and load, the deck can be leveled as needed with the adjustable wheel area ride height. A work light in the upper deck increases visibility when monitoring the load at night.

With the 15-inch deck height and 4.5-inch ground clearance, this flat deck lowboy can accommodate loads that may otherwise require a dropside trailer. The new three-beam deck design offers an improved strength-to-weight ratio, keeping drivers' payload possibilities high.

The Low-Profile HDG offers enhanced main deck features. The bucket well in the rear provides an area for an excavator bucket to ride safely and a toolbox at the front serves as a storage space. The main deck offers many tie-down points with seven pairs of bent d-rings along the outer beams, 12 chain drops per side on the outer rails, four chain drops around the toolbox, and swing out outriggers on 24-inch centers.

The wheel area's drop bolster height of 37 inches allows for machinery to be loaded on the rear. To decrease wear on the tires, the third axle airlift can lift up when it is not needed. The notched-out tail channel allows easy access to controls at the rear, and the air control valve is conveniently located in the bolster. Additionally, the frame of the XL Low-Profile HDG is prepped

for a flip axle, allowing drivers to add a fourth axle when necessary. Bolt-on wheel covers are available for driving or parking.

MORE INFO www.xlspecializedtrailer.com

INNOVATION

Floating wind digital twin set to accelerate wave impact learnings

U.S. group Principle Power recently announced it would lead a consortium of public and private groups to develop the world's first digital twin software for floating offshore wind applications.

Backed by $3.6 million of funding from the U.S. Department of Energy, the "DigiFloat" project will provide a real-time, high-fidelity numerical model of the 25 MW WindFloat Atlantic (WFA) project being installed off the coast of Portugal.

Wave modeling at the 25-MW WindFloat Atlantic floating wind farm will support design and operations improvements. (Courtesy: New Energy Update/Dimitri66)

The WFA project consists of three 8 MW MHI Vestas offshore wind turbines, the largest ever used for a floating wind farm, attached to Principle Power's semi-submersible floating wind base.

The digital twin software will be developed in 2020 and validated by the first quarter of 2021. Following a retrofit of a WFA hull in summer 2021, the software will be operational at the facility by the first quarter of 2022.

DigiFloat was among 13 floating wind research projects allocated a total of $28 million under the DOE's Atlantis funding program.

Onshore and offshore wind developers are increasingly turning to digital solutions to improve design and operational efficiency.

Floating wind developers are targeting the deep-water offshore wind market, estimated to host 80 percent of offshore wind resource, equivalent to 4 TW of capacity. Floating wind groups must tackle the additional environmental challenges of open sea areas while also maximizing economies of series and operational savings.

The DigiFloat project will provide a design feedback loop on a real-world project, helping to improve design efficiency and durability of the Principle

Power technology, Sam Kanner, R&D lead at Principle Power and principal investigator of the project, told *New Energy Update*.

"We will install instrumentation in key hotspot areas to measure the structural response of the floating platform. By using these data in our high-fidelity digital twin model, we can generate a real-time estimate of the wear on the structure," Kanner said.

The digital twin will also alert the operator to issues and support preventative maintenance actions to reduce downtimes, he said.

MORE INFO analysis.newenergyupdate.com

INNOVATION

All-Test Pro releases new motor testing products

All-Test Pro, LLC recently announced a new series of Motor Circuit Analysis™ (MCATM) instruments that deliver a total view into the condition of an electric motor, transformer, or generator. They represent the seventh generation in product innovation that ensures the reliability of motors in the field and helps to maximize the productivity of maintenance teams everywhere.

All-Test Pro has provided many industries with the most advanced handheld, battery-operated predictive maintenance testing and troubleshooting instruments for AC and DC motors, transformers, and generators since 1985.

"Managers and engineers responsible for the reliability of motors will appreciate the enhancements we added because it empowers their technicians to efficiently and accurately evaluate motors in the field or on the shop floor; thereby, improving motor reliability, increasing technician and asset productivity, and reducing energy consumption,"said ALL-TEST Pro's CEO.

All-Test Pro Motor Circuit Analysis (MCA) instruments are based on proven electrical theory. MCA is a deenergized, non-destructive testing method to assess the complete electrical health of a motor.

All-Test Pro has been offering a full line of testing instruments, software, accessories and training programs to perform advanced non-destructive motor testing and analysis for both deenergized motor circuit analysis and energized electrical signature and power analysis for more than 30 years.

MORE INFO www.alltestpro.com

INNOVATION

Brüel & Kjær Vibro releases loop-powered transmitter

In order to fulfill the need for economical displacement transmitters with simplified installation, Brüel & Kjær Vibro (B&K Vibro) recently announced its DT-12x series of transmitters. These fully integrated, loop-powered displacement transmitters offer a unique streamlined solution for shaft displacement and vibration monitoring capability for a wide range of industrial machines.

The DT-12x series are fully integrated transmitters, which means the driver (oscillator) and signal conditioning electronics (vibration monitor) are built directly into the sensor. This greatly simplifies installation by eliminating the need and space requirements for a driver, vibration monitor, and, eventually, a protective housing. Due to this innovative design, the transmitter can be connected directly to a DCS or PLC using its standardized 4-20 mA output. The transmitter is loop-powered, so its 4-20 mA signal is not affected by long wiring distances, voltage drops, or noise. This greatly simplifies installation even more when connecting to a DCS or PLC, since only two wires have to be connected in the current loop.

The DT-12x series displacement transmitters are also versatile from a monitoring perspective. In addition to the 4-20 mA outputs, there are also buffered output wires for transferring voltage signals to portable monitoring instruments for analysis and data storage. The transmitters are also built for harsh industrial environments.

The DT-12x series are fully integrated transmitters, which means the driver (oscillator) and signal conditioning electronics (vibration monitor) are built directly into the sensor. (Courtesy: Brüel & Kjær Vibro)

"We made a strategic decision to reduce the number of components in the displacement transmitter measurement chain and reduce the overall installation and operational costs, but still maintain a high level of precision and quality," said Florian Endres, sensor product manager at B&K Vibro. "DT-12x was the answer. I believe it was actually the world's first such development, but it wasn't such a technological hurdle. We have already gained considerable experience over the years with integrated sensor technology in our IN-08x series of displacement sensors." .

MORE INFO www.bkvibro.com

MAINTENANCE

NextEra donates borescopes to Northeastern program

Northeastern Junior College's Wind Technology program has received a pair of borescopes donated by NextEra

Energy Resources, one of the largest energy generation companies in the United States.

The borescopes, each valued in the thousands of dollars, allow Northeastern students to use modern remote visual inspection techniques to learn how wind-generation equipment works, said Jim Lenzen, assistant director of renewable energy at Northeastern.

"This generous donation by NextEra not only enables us to improve our students' learning experience, it will make it much safer to learn how to perform wind equipment diagnostics," Lenzen said. "We won't have to tear down and reassemble defective components each semester, which allows us more time to focus on other hands-on learning experiences."

The borescopes allow students to use modern remote visual inspection techniques to learn how wind-generation equipment works. (Courtesy: NextEra)

A typical borescope is a device with a tiny camera and light source at the end of a long flexible thin probe. It is designed to gain visibility into otherwise hard-to-access spaces. Operators can manipulate the camera remotely via manual or electronic controls. Just as a physician uses an endoscope to peer into areas of the body for signs of injury or infection without major surgery, a borescope is used by wind-generation maintenance technicians to inspect the insides of gearboxes for de-

The nacelle donated by NextEra Energy Resources includes the driveline, gearboxes, generator, and braking systems that comprise a wind turbine. (Courtesy: NextEra)

fects or extensive wear, such as cracks in gear teeth, breaks and wear patterns, and pits in bearings. Borescopes capture pictures and information during inspections that can be logged and sent to a team of engineers for further analysis in a process known as preventative maintenance. The borescopes donated to Northeastern by NextEra are equipped with the same types of cameras used in real-world wind industry applications.

NextEra operates a large wind farm near Peetz, Colorado, where a number of Northeastern alumni work as maintenance technicians.

"This is a win-win for us to have NextEra as an industry partner," Lenzen said. "The folks we work with appreciate the dedicated, hands-on program we offer students here and see the benefit of hiring technicians experienced at using the donated equipment NextEra also uses in its day-to-day operations."

NextEra spokesperson Roxanne Reyes said the company is proud to be part of the Logan County, Colorado, community.

"Since 2007 we've operated the Logan Wind Energy Center, a 201-MW wind site that brings clean and reliable energy to the Centennial State," she said. "Our partnership with Northeastern Junior College is mutually beneficial, and the program has our continued support for its efforts to teach the next generation of wind technicians in this rapidly-growing field of renewable energy."

MORE INFO www.NextEraEnergyResources.com

MAINTENANCE

NextEra donates functional nacelle to Northeastern program

NextEra Energy Resources is donating a fully-functional decommissioned wind-turbine nacelle to Northeastern Junior College's Wind Technology program as a learning tool for one of the nation's top wind technology education programs.

A nacelle is the protective shell that houses all of the turbine machinery atop a wind generation tower. The nacelle donated by NextEra Energy Resources includes the driveline, gearboxes, generator, and braking systems that comprise a wind turbine.

NextEra Energy Resources, one of the largest energy generation companies in the United States, is a major supporter of the college's wind program. Northeastern is ranked among the top eight schools in the country for its wind technician academic program and is the only fully accredited wind technology college in Colorado. NextEra Energy Resources recently delivered the nacelle to the college's Applied Technology Campus in Sterling, where it will be used as yet another hands-on learning laboratory tool.

"We're very appreciative of NextEra Energy Resources' generous support through these types of equipment donations," said Jim Lenzen, assistant director of Renewable Energy at Northeastern. "It's a win-win situation for both parties. Students benefit from the real-world experience they acquire from work they are tasked to perform on these donations, and NextEra Energy Resources reaps the benefits from our pipeline of graduating knowledgeable, highly skilled, work-ready technicians."

NextEra Energy Resources operates more than 180 wind farms in the U.S., including the Logan Wind Energy Center, a 201-MW wind site near Peetz, Colorado, where several Northeastern alumni work as maintenance technicians.

MORE INFO njc.edu

MAINTENANCE

Mobil turbine oil approved for GE turbines worldwide

ExxonMobil's Mobil SHCTM Gear 320 WT advanced turbine gear oil has been approved by GE for use in all of its wind turbines worldwide. This approval applies to all of the more than 50,000 GE wind turbines in operation today.

GE's lubricant approval process is one of the industry's most demanding and includes more than 300 itemized testing parameters built around ASTM, DIN, and GE specifications. To obtain this approval, Mobil SHC Gear 320 WT gear oil underwent more than two

years of field trials and inspections.

The approval follows ExxonMobil's recent extension of Mobil SHC Gear 320 WT gear oil's warranty from seven years to 10 years, which represents one of the longest warranties on the market. Any turbine operator who uses this product can now take advantage of this extended warranty protection.

"GE's approval is a testament to the performance of Mobil SHC Gear 320 WT gear oil — GE is one of the top-three turbine manufacturers in the world, and they have one of the most stringent lubricant standards in the industry," said Mike Galloway, industrial equipment builder engineer at ExxonMobil. "Backed by our industry-leading warranty, operators can rest easy knowing that this oil can help protect against the extreme conditions wind turbines face all around the world, helping them achieve their long-term reliability and productivity goals."

Mobil SHC Gear 320 WT was developed in collaboration with leading global original equipment manufacturers and features a proprietary additive technology designed to provide excellent protection against common types of wear such as scuffing and micro-pitting fatigue. The oil also does not contribute to white etching cracks, which are costly to repair.

MORE INFO www.mobil.com/wind

MANUFACTURING

Vestas wins 359-MW order of V120-2.2 MW turbines in U.S.

Vestas has secured an order for 359 MW of V120-2.2 MW turbines for a wind project in the U.S. Including previously purchased V112-3.45 MW components, the project has a total nameplate capacity of 400 MW.

The mixed platform site configuration demonstrates both the flexibility of Vestas' 2 and 4 MW platforms and Vestas' ability to create tailor-made site layouts designed to optimize the site's wind resources.

The order includes supply and commissioning of the turbines as well as a 10-year service agreement, designed to ensure optimized performance for the lifetime of the project. Turbine delivery is planned for the first quarter of 2020 with commissioning scheduled for the third quarter of 2020. The project and customer are undisclosed.

MORE INFO www.vestas.com

MANUFACTURING

Wind turbine prices to recover 5% in next two years

After several years of steady decline in onshore wind turbine prices globally, projects that are expected to be completed in 2021 — 22 are set to drive some modest price increases into the global market.

The global market has seen a weighted average 6.41 percent per year reduction in prices over the past five-year period, but IntelStor's Wind Turbine Price Index indicates the weighted average wind turbine price will increase 1.7 percent in 2020 to $1.11 million per MW and another 3.15 percent in 2021 to $1.15 million per MW.

There is the potential for another increase of 10 percent leading toward 2022, but many projects that are scheduled for completion that year have yet to be confirmed and reach their final investment decision.

These increases are a result of a combination of factors including some commodity cost increases, tariffs on some major components such as permanent magnets and wind-turbine towers, as well as a perceived reduction in the number of wind-turbine suppliers as Senvion's likely market exit looms.

Globally, the cost of towers is seeing an increase weighed down by import tariffs in the United States from several Asian countries. Additionally, permanent magnet costs have increased recently thanks to China withholding some supply to western markets as part of the ongoing trade dispute with the United States.

The Americas region will see some of the lowest prices globally, bottoming out at just more than $550,000 per MW in Brazil for a few projects. Contrary to popular belief, the Asia Pacific region will not be the lowest prices in the world, but they will see prices ranging mainly from $1 million per MW to $1.68 million per MW with a few outliers.

Africa and the Middle Eastern region will see some reductions from years past with the bulk of their projects coming in at $1 million per MW to $1.25 million per MW. Europe will remain soft compared to the rest of the world with most onshore wind farm project sites at between $750,000 per MW up to $1.1 million per MW.

Companies that have a lower overall turbine price and more margin flexibility relative to their bill of materials cost are able to build projects further away from load centers where wind resource may be better. The extra cost is absorbed in the transmission and distribution system to evacuate the power to the load centers.

New transmission capacity is being installed in 77 active wind-energy markets around the world within the next five years, which should make project CapEx costs and the corresponding turbine prices gain more bang for their bucks. Additional power evacuation capacity provides price stability by ensuring there is sufficient interconnection available for projects. This means more of the project CapEx allocation can go to turbine price as well as OpEx costs.

Nevertheless, some wind turbine OEMs are still using a lower turbine price as leverage in their commercial negotiations to obtain more favorable rates on their long-term service contracts.

MORE INFO www.intelstor.com