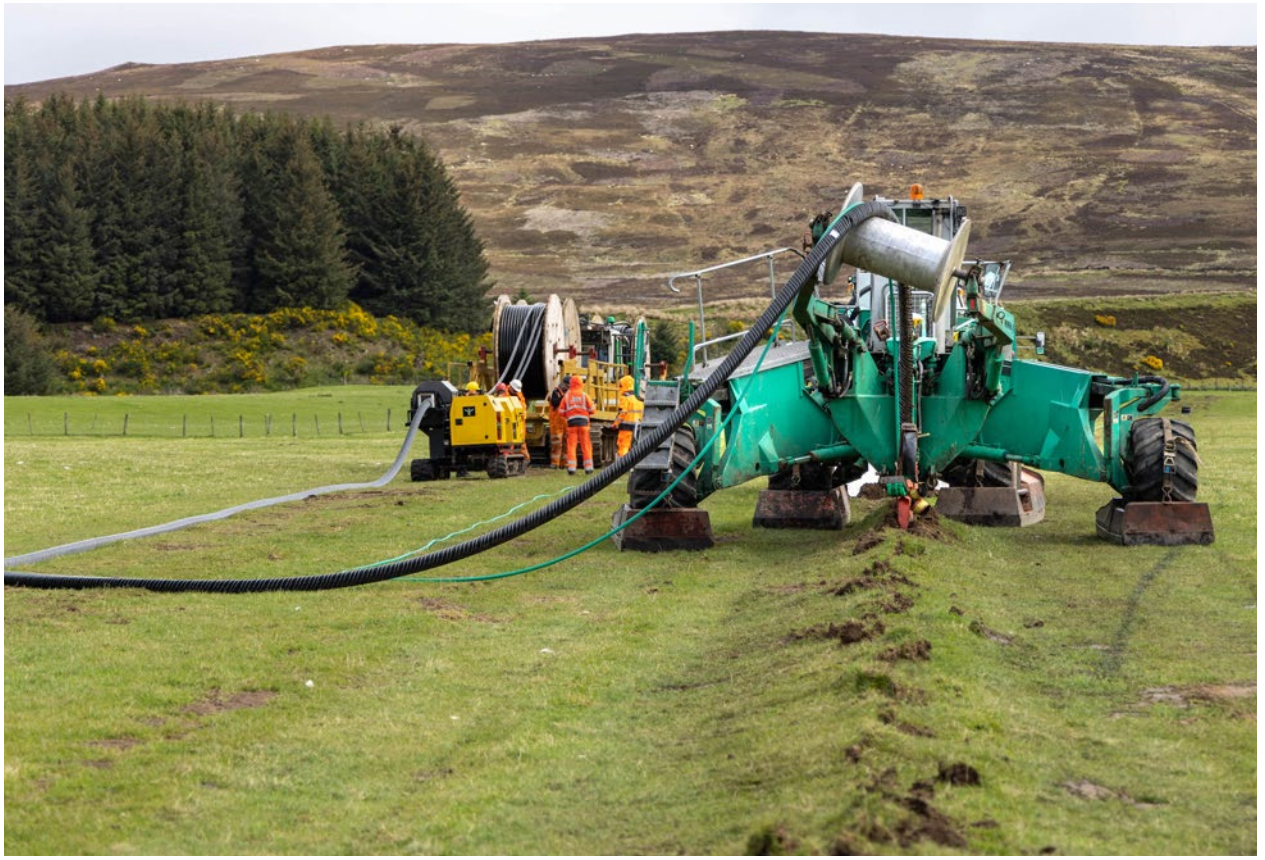


The Eco Cable Protect wrapping system applies an extruded high density polyethylene mesh wrap to power cables, which delivers reduced project costs. (Courtesy: McGowan Environmental Engineering)

CONSTRUCTION

SSEN approves McGowan cable wrap

Scottish and Southern Electricity Networks recently approved McGowan Group's patented Eco Cable Protect for use on future projects. The cable wrapping system applies an extruded high density polyethylene mesh wrap to power cables, which delivers reduced project costs and an 85 percent reduction in CO2e emissions compared to using traditional fine fill surround.

"This is a great example of how thinking sustainably can actually improve traditional project drivers like cost and time," said Shirley Robertson, SSEN head of strategic planning and sustainability. "Planning in enough time to think about the actual problem at the start of a project and all parties being open to doing things differently has delivered impressive results. Proving it's not one or the other, true sustainability thinking drives improvements across the board and for the long term."

The Eco Cable Protect cable wrapping system works with traditional open cut or, more environmentally friendly, trenchless cable burial methods were recently showcased at SSE's Burn of Whilk project. Comprising the installation of 21 kilometers of 33kV circuit in trefoil over predominantly unmade ground, including deep peat, the original design required providing a fine fill sand surround to the cable.

Using traditional fine fill surround would have generated an estimated 244 tons of CO2e with more than 13,500 metric tons of fine fill required, equating to well over 700 HGV tipper movements, 21 kilometers of temporary roads required and large excavators and dumpers operating continuously to distribute the fine fill.

In contrast, the manufacture, delivery to site, and application of McGowan's proprietary cable wrap system generated just 37 metric tons of CO2e with the wrap applied by a single machine similar in size to a 3-ton mini excavator and one operator and no requirement for temporary roads. By opting for Eco Cable Protect cable wrapping system, emissions at Burn of Whilk were reduced by 207 metric tons of CO2e, or 85 percent.

Following the success of recent projects for SSEN, McGowan Group director Derek Mackay, was invited to deliver a presentation on the cable wrapping system at SSEN Distribution Sustainability supplier conferences in Reading and Perth.

"We love nothing more than working with partners like SSEN who share our passion for reducing the environmental impact of their projects and to have our new cable wrap technology accepted by SSEN for use on future projects is a game changer for both McGowans and how the industry approaches power line cabling in the future," Mackay said.

With more than 80 kilometers of cable installed to date, CO2e emissions on these projects have been reduced by hundreds of metric tons and cost savings in the millions of pounds, and there have been no in-service cable faults and the cable wrap has had no negative impact on cable performance. Sheath faults are almost eliminated when cable wrap system is used.

MORE INFO mcgowanltd.co.uk

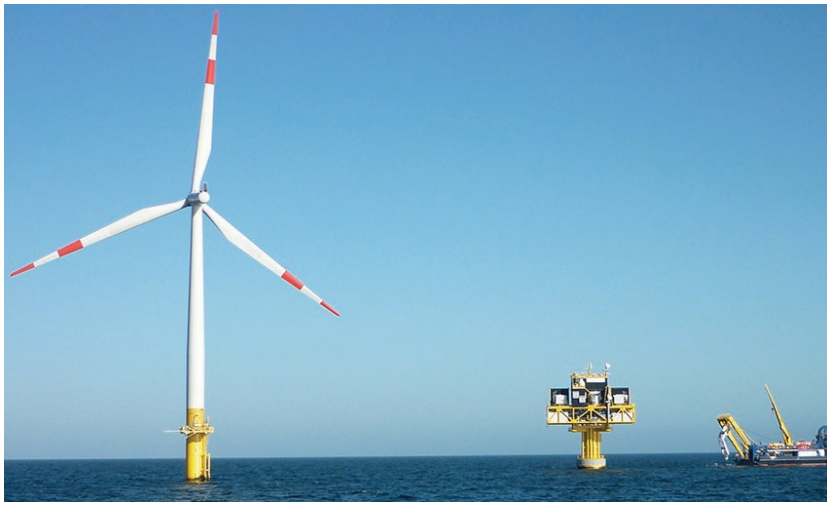
CONSTRUCTION

DNV concludes first phase of joint industry project

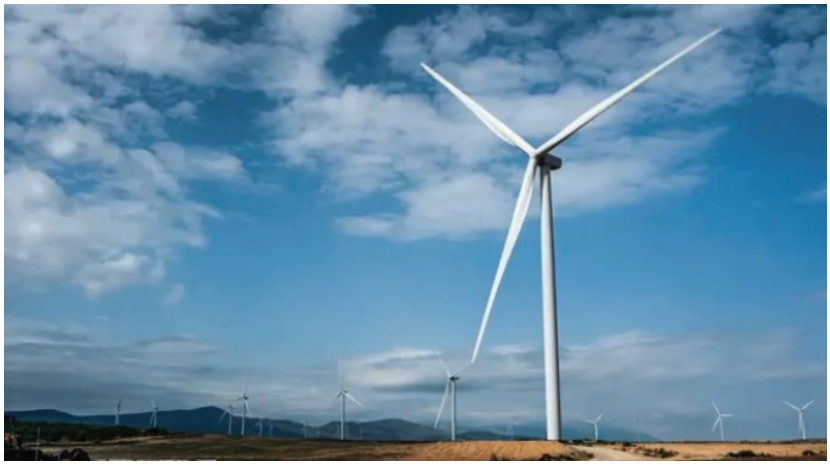
DNV, the independent energy expert and assurance provider, has concluded Phase 1 of its joint industry project (JIP) aimed at establishing offshore substation standards for the floating wind sector. The collaborative industry effort has brought together 38 participating companies (including transmission operators, developers, component suppliers, engineering, procurement, construction and installation contractors, and yards) to tackle the challenges associated with floating offshore substations.

With a focus on closing gaps in existing technology and standards applicable to floating substations, the JIP will help the wind industry meet its potential and contribute to the evolution of the global energy system.

The JIP's Phase 1 outcomes include affirming the feasibility of floating offshore substations (FOSS) and export cables, identifying technology gaps requiring attention, and highlighting the maturity of AC solutions compared to DC. The project also carried out a feasibility analysis for generic floater types and dynamic export cable concepts. Emphasizing a robust design process for integrated floating substations, DNV plans to incorporate the JIP's findings in the next update of DNV-ST-0145 for floating substations



A collaborative industry effort has brought together 38 participating companies to tackle challenges associated with floating offshore substations. (Courtesy: DNV)



CIP manages 11 funds and has to date raised around 26 billion euros for investments in energy and associated infrastructure. (Courtesy: Copenhagen Infrastructure Partners)

and of DNV-ST-0359 for dynamic cables, both scheduled for 2024.

"Standards are important in emerging industries as they encourage innovation and competition while ensuring safety and reliability," said Claus Christensen, Ørsted senior chief specialist. "It has been very valuable to work alongside 38 leading companies covering all scopes and disciplines in this project, and we look forward to floating substations being integrated to DNV-ST-0145. As the industry gains real project experience from designing and building floating substations, lessons learned need to be incorporated into the standard."

"DNV, in collaboration with industry partners, had previously developed the widely used standard DNV-ST-0145 for offshore substations, primarily focusing on bottom-fixed installations," said Kim Sandgaard-Mørk, executive vice president, Renewables Certification, Energy Systems at DNV. "During the past 10 years, this standard had played a crucial role, serving as a foundation for certifying electrical offshore substations. Through our predictive ETO research models, we recognized the growing trend toward floating wind. DNV initiated this joint industry project to develop standards specifically applicable to floating substations."

"The JIP contributed to a joint understanding of the challenges in floating offshore substations, which are key components for the evolving renewable energy landscape," said Kristin Berg, senior principal consultant, energy systems at DNV. "Our call for partners garnered significant interest, meeting the objective of establishing a joint understanding of best industry practice and technical requirements. Collaboration among industry experts is always instrumental in technology and standards development, and this will ultimately be beneficial for the whole renewables sector, as we facilitate the scaling of floating offshore wind projects."

DNV is now initiating Phase 2 of this JIP, where Phase 1 participants and new participants will be invited to join. Phase 2 will build on Phase 1 deliverables and input received from the contributors.

MORE INFO www.dnv.com

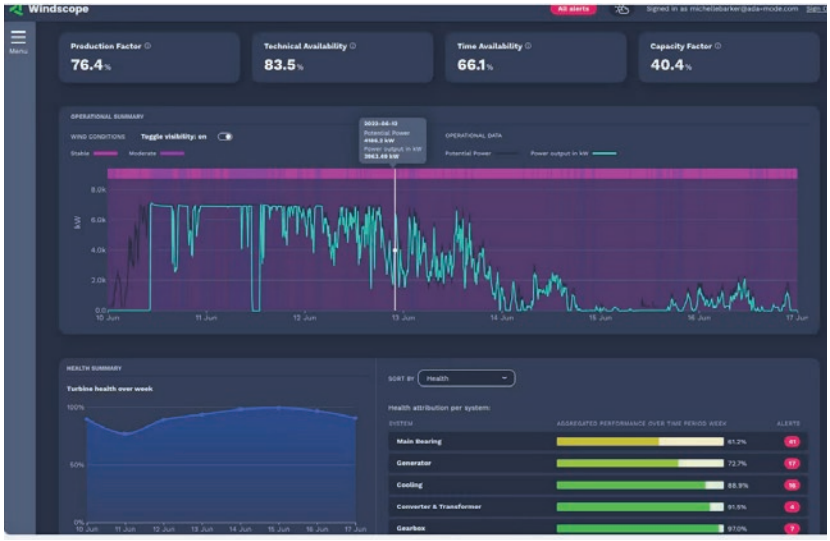
CONSTRUCTION

Copenhagen begins Buffalo Plains construction

Copenhagen Infrastructure Partners (CIP), on behalf of its Copenhagen Infrastructure IV (CI IV) fund, has begun construction on Buffalo Plains, a 495-MW wind farm consisting of 83 Siemens Gamesa turbines in Vulcan County, Alberta.

CIP acquired Buffalo Plains in 2022 from ABO Wind. During construction, the project will create about 250 full-time jobs and, once operational, will produce enough clean energy to power more than 240,000 homes, providing economic and environmental benefits to the province of Alberta.

Borea, a leading Canadian renewable energy construction company, will be responsible for the construction of the project. Amazon, the technology company based in Seattle, Washington, has signed a power pur-



Windscope is developing tools to enable asset managers to pair their inventory data with predictive maintenance data. (Courtesy: Windscope)

chase agreement to procure 415 MW of output from Buffalo Plains.

"We are pleased to announce the start of construction on the Buffalo Plains wind project, an important step in expanding our portfolio of best-in-class renewable energy projects in North America," said Tim Evans, partner and Head of North America at CIP. "This premier project demonstrates CIP's unique ability to execute on large and complex infrastructure projects that will provide local jobs and clean, renewable wind energy for many years to come."

Buffalo Plains represents CIP's second successful investment in Canada, following its investment in Travers Solar, Canada's largest solar project, which completed construction in 2022. Buffalo Plains is an important part of the 29-GW-plus portfolio of renewable generating assets (including offshore wind, onshore wind, solar PV, battery storage, pumped storage hydro, and transmission) that CIP has in development, construction or operation across North America.

Founded in 2012, Copenhagen Infrastructure Partners P/S (CIP) is a dedicated fund manager within greenfield renewable energy investments and a global leader in offshore wind. The funds managed by CIP focus on investments in offshore and onshore wind, solar PV, biomass and energy-from-waste, transmission and distribution, reserve capacity, storage, advanced bioenergy, and Power-to-X.

MORE INFO www.cip.com

INNOVATION

Windscope: More data integration will help with supply chain

More effective integration of predictive maintenance data and inventory data from component suppliers will be central to mitigating the impact of supply chain challenges on operational wind-energy projects. This is according to Windscope — a hardware-free platform for maximizing wind-turbine health and availability. At present, the wind industry faces a multitude of pressures in the face of inflation and the after-effects of the COVID-19 pandemic, which has disrupted manufacturing and stretched supply chains.

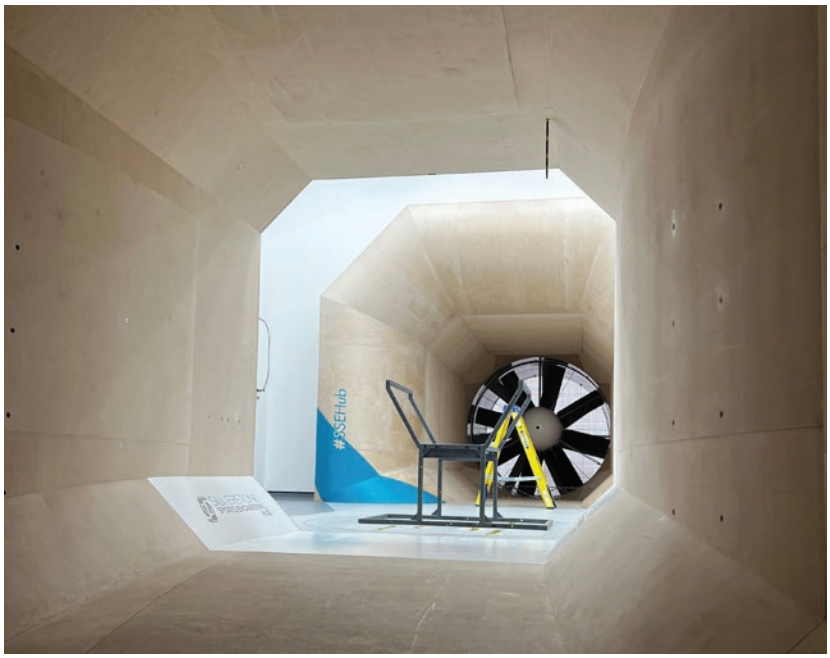
"To further the goals of the industry in a challenging economic climate, we need to create a more transparent environment in which predictive analytics can be used to optimize maintenance of assets, taking into account lead times for components and supply shortages," said Joe Donnelly, Windscope CEO. "Ability to understand component condition is the keystone around which an optimized supply chain can start to form."

"The immediate benefits of such an approach are clear, but there is also huge potential for exciting innovations, such as live tracking of component prices for asset owners, enabling them to make well-informed procurement decisions and secure components at the most favorable pricing," he said. "In the future, we could even see automated ordering of components based on condition, further streamlining the procurement process, and reducing the administrative burden on stretched asset management and engineering teams." Windscope is developing tools to enable asset managers to pair their inventory data with predictive maintenance data.

"By creating stronger connections between operators and their supply chain, we can help overcome the challenges posed by aging fleets, increased lead times, and rising costs, ultimately ensuring the continued growth of renewable energy," Donnelly said. To address these challenges and promote efficient management of tight inventory schedules, Windscope has called for closer partnerships in the third party and OEM supply chains, in particular between asset managers and their component suppliers, facilitated by predictive maintenance software platforms.

By gaining access to component health data from operational fleets, suppliers will be able to anticipate when these components require replacement, enabling more efficient inventory management and procurement planning. In turn, keeping asset owners updated on a live basis about component stocks and their availability can help to reduce unplanned downtime, and enable asset managers to better prioritize maintenance.

MORE INFO www.windscope.com



Katrick's Wind Panels can be fitted to existing structures, greenfield sites, and microgrids. (Courtesy: Katrick Technologies)

INNOVATION

Katrick wind panel tech shows promising energy capture results

Glasgow-based greentech company Katrick Technologies has developed a new form of wind-power technology that does not use rotary parts. Katrick Technologies' Wind Panel instead uses the ducting effect and converts mechanical oscillations into clean energy. The principles of the ducting effect used to develop DWTs apply to the Wind Panel and have been instrumental in the development, patenting, and validation of the technology.

The Wind Panel uses several channeling ducts containing aerofoils. These aerofoils convert the kinetic energy of wind to mechanical oscillations, which are then converted to energy.

The aerofoils operate independently from one another, in contrast to the rotary blades of a turbine. Energy is collected in smaller pockets, meaning that unlike traditional rotary technology, the Wind Panel can capture instantaneous changes in wind speed and direction. This makes the panels sensitive to gust winds and a higher range of speeds and frequencies than turbines. Thanks to the unique design and ability to capture a wider variety of winds, the panels can be fitted to existing structures, greenfield sites, and microgrids. They can be installed at ground level to capture ground-effect winds and benefit from the increased flow rate found in previous research.

The Wind Panels provide a new solution for wind energy in locations where traditional turbines are not viable.

MORE INFO www.katricktechnologies.com

INNOVATION

Airborne Motorworks' turbine design moves forward

Airborne Motorworks, Inc., (AMW) an innovator in sustainable technology, recently announced the success of software developer Maya HTT's independent analysis of its patented wind-turbine design. This technology marks a leap forward in the quest for high efficiency, clean and localized wind-power generation.

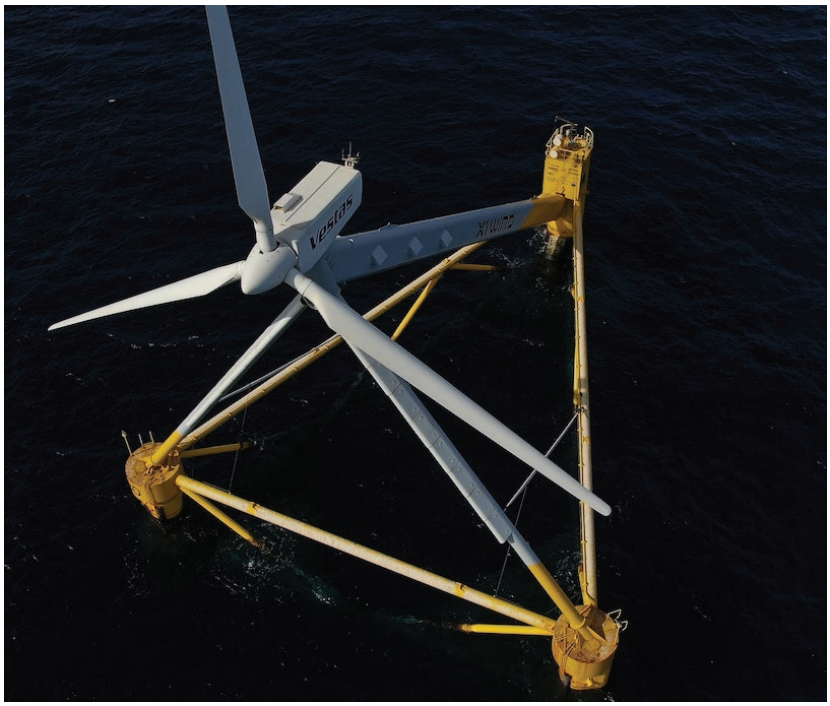
AMW's Wind Turbine offers a host of features that promises to reshape the emerging renewable energy landscape:

With an innovative aerodynamic design and advanced materials, the AMW Wind Turbine captures more wind energy through its airfoil designs, circumferential shroud, and two-stage contra-rotating rotors to generate electricity with remarkable efficiency.

Using low friction technology, AMW has prioritized noise and vibration reduction in its wind turbine. By using noise-reduction technology, the wind turbine produces minimal noise disturbance in the 40-50 dB range at a distance of 25 meters making it an ideal choice for virtually any environment, e.g., high density urban and suburban environments as well as rural applications. The sleek and modern design of the AMW Wind Turbine allows for easy integration into various landscapes. Its compact and low-profile features ensure minimal impact on the environment while delivering maximum energy output.

While AMW is focused on the fast-growing microgrid market, the product confirmation analysis by Maya HTT suggests a broad spectrum of turbine sizes and potential applications giving way to future expansion of this technology into additional markets.

Built to withstand harsh weather and corrosive conditions, the AMW Wind Turbine is engineered with durable materials such as carbon fiber, titanium, and stainless steel. Its low friction design ensures longevity, consistent performance, and its low maintenance costs are enabled by the absence of a gearbox and traditional power generator module often found in legacy designed wind turbines. Also, the AMW design is air washed thereby eliminating the need for oil-based lubricant and coolant systems that



X1 Wind reports successful PivotBuoy project results that boost new commercial interests. (Courtesy: X1 Wind)

hold 400 to 700 gallons of oil in large wind turbines and require scheduled replacement.

The AMW Wind Turbine is equipped with advanced smart grid digital AI technology in accordance with the International Energy Agency's (IEA) Smart Grid initiative. This global initiative is aimed at introducing sustainable economic development, energy security and interdependence-enabling seamless integration into existing energy infrastructures, thus improving grid stability at a local level, and expanding the collective of renewable energy sources.

AMW is committed to sustainability throughout the product lifecycle. The AMW Wind Turbine is manufactured using eco-friendly recyclable materials and processes, reducing its carbon footprint.

"Our goal is to contribute to high efficiency electric power generation, and greater power generation diversity through microgrids to achieve a cleaner more sustainable and reliable energy future; with the AMW Wind Turbine now validated, we believe we have taken a significant step toward achieving that goal," said AMW executive chairman and CEO Hugh McElroy.

"This groundbreaking technology is expected to play a vital role in increasing the availability of primary and backup power generation in the 100 KW to 500 KW range with the ability to extend power output above 1 MW by synchronizing a bank of our units to power key industrial infrastructure, large buildings, universities, government facilities, and residential communities.

The AMW microgrid wind turbines' close proximity to the energy user can significantly reduce wasteful transmission line loss, while its highly efficient design minimizes global dependence on fossil fuels and produces virtually no greenhouse gases."

The AMW Wind Turbine is soon to enter the final stages of its durability testing and is expected to be ready for production manufacturing by the end of 2024.

MORE INFO www.airbornemotorworks.com

INNOVATION

X1 Wind platform reports testing success

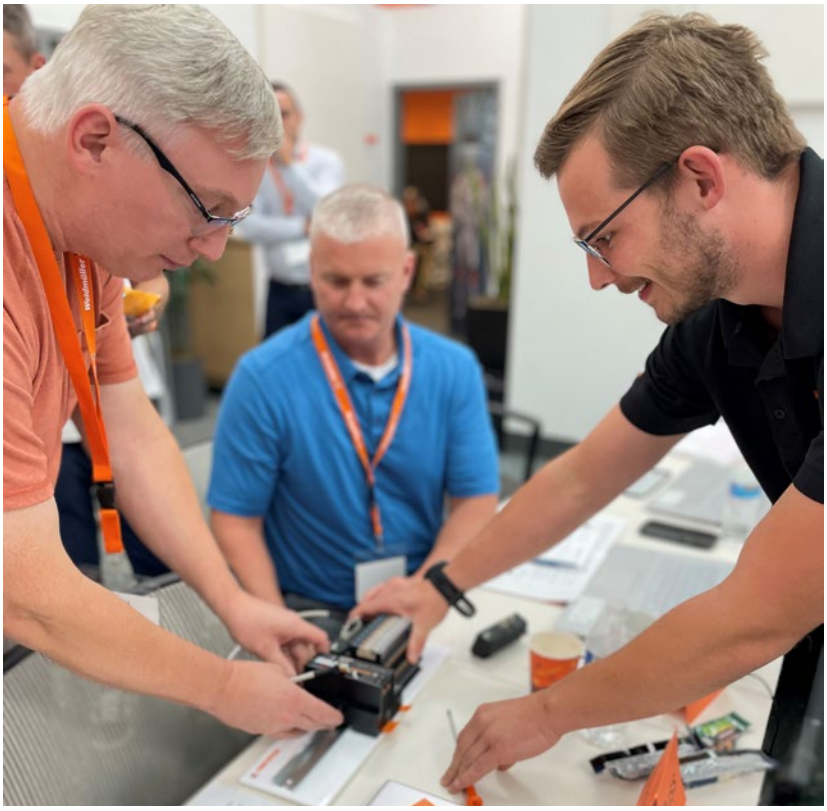
The PivotBuoy project, developed by X1 Wind in collaboration with nine industry and R&D leaders, finalized its offshore demonstration with results that promise to revolutionize the floating wind industry.

The Spanish firm's X30 platform was tested in full operational conditions at PLOCAN from October 2022 to May 2023. During the seven-month demonstration, the device became the world's first fully functional floating wind TLP (Tension Leg Platform). The unit fed its electricity to PLOCAN's Platform via a 1.4-kilometer 20kV subsea cable.

"The PivotBuoy Project marked an important phase in the development of our innovative technology," said X1 Wind CEO Alex Raventos. "It allowed us to retrieve large amounts of data for a sustained period of time in full operational conditions. These findings have provided crucial insights, which are now being incorporated into X1 Wind's ongoing commercial-scale projects, including the NextFloat Project."

The most striking result is that data showed very good alignment with the wind using its passive orientation system. The platform showed better alignment than publicly available data for traditional active yaw systems for strong winds (>7.5m/s) and similar alignment for lower wind speeds (<7.5m/s). In terms of power production, energy generated by the modified Vestas V29, which operates in a downwind configuration, was well aligned with theoretical models, with no sign of power loss or increased 3P vibration due to the tripod shadow. The results confirm that X1 Wind's streamlined tripod arrangement eliminates the known drawbacks typically associated with downwind operation.

In addition, the platform overcame several harsh storms, with maximum wave heights reaching 6.7 meters,



Lars Hohmeier (right), a cabinet products manager at Weidmuller USA, provides hands-on instruction about cabinet box products for attendees at a Distributor Connect training session. (Courtesy: Weidmuller USA)

equivalent to more than 20 meters in full-scale. During these extreme events, the unit behaved well with motions and accelerations matching the predictions in simulation models.

"This is another milestone for the industry, especially taking into account that we use a TLP mooring (which provides many advantages but historically was very difficult to hook and unhook)," Raventos said.

"By proving that our PivotBuoy mooring system can be easily hooked and unhooked, we've shown that TLPs can easily be installed, decommissioned, or maintained at port in case a tow-to-port maintenance operation is needed." The PivotBuoy Consortium comprised of nine partners from five different countries (X1 Wind, EDP, DNV, INTECSEA, DTU, WavEC, PLOCAN, ESM, and DEGIMA).

The project aimed to demonstrate the innovative PivotBuoy mooring system configuration, which combines the advantages of a SPM (single point mooring) with a small TLP (Tension-Leg Platform) mooring system, allowing the platform to reach deeper waters and minimizing the footprint and impact on the seabed.

MORE INFO www.x1wind.com

MAINTENANCE

Weidmuller debuts distributor training program

Weidmuller USA recently introduced Distributor Connect, a highly customized distributor training experience. This program is designed to elevate training for Weidmuller USA's partner distributors to an unprecedented level of immersion into the company's extensive lines of smart industrial connectivity products and solutions.

Distributor Connect sessions are at The Weidmuller Application & Training Center at the company's U.S. headquarters in Richmond, Virginia.

The monthly, multi-day interactive training experience is structured to provide distributors with a deeper understanding of Weidmuller's products, automation technology and solutions.

"The distributors meet and interact in-depth with our product managers and skilled trainers who present all the products and solutions their customers need," said Caroline March-Long, director of marketing and market intelligence for Weidmuller USA. "Attendees participate in hands-on demonstrations of our automation and connectivity products. Also, this unique master class for distributors simulates real-world problem solving that will enhance their knowledge and professionalism."

"The Distributor Connect training program adds tremendous value to the relationship that we have with our distributors in North America," said Tom Neff, director of distribution sales. "We want them to experience for themselves that Richmond, Virginia, is the destination for a deep dive into the application-specific solutions and future-oriented products that have made Weidmuller a pioneer and global leader in smart industrial connectivity and automation technology."

March-Long said a new advanced track will be launching in 2024 as part of the company's investment in providing opportunities for product training.

"The Advanced track is even more technical and will focus on automation and Industrial IIoT for automation engineers," she said.

The Weidmuller Application and Training Center is a smart connectivity and automation training program for employees, customers, and other partners across North America.

MORE INFO www.weidmuller.com/en/index.jsp

MAINTENANCE

KASK releases safety helmets for U.S., Canada markets

KASK, a designer and manufacturer of head protection, recently introduced its Primero series of safety helmets for the U.S. and Canadian markets.

After the successful launch to the EU market, KASK introduced two new Primero versions, one compliant with the American National Standard for Industrial Head Protection ANSI/ISEA Z89.1-2014 and the other with the Canadian standard for Industrial Protective Headwear CSA Z94.1-15.

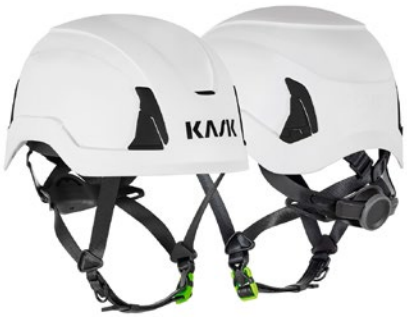
"The strategic launch of Primero expands our product portfolio, allowing KASK to support even more users' needs for upgraded head protection," said Fabio Cardarelli, KASK America CEO. "As we move forward, Primero will be an important part of the KASK mission to enhance safety and performance in the workplace."

The new Primero series is the result of 20 years of KASK helmet design and manufacturing innovations. This history enabled KASK to develop a helmet that optimized key components, making manufacturing more efficient, while maintaining comfort and safety that has become the brand's calling card.

Primero was developed to provide advanced head protection that was easy to use for a wide variety of wearers in a wide variety of applications. To aid in this goal, Primero series helmets are ready-made to accept a range of KASK safety accessories, including many that are used with the well-known Zenith X series helmets. Primero safety helmets are available in vented and closed shell and in a variety of colors.

"Companies told us they wanted a helmet that provided an easy path to upgrade their level of protection from a hardhat," said Alex Dabelstein, VP of Sales, KASK America.

"The Primero provides this path, in a lightweight helmet that utilizes proven KASK comfort and design technologies, while maintaining KASK's commitment to worker safety and performance."



The new Primero series is the result of 20 years of KASK helmet design and manufacturing innovations. (Courtesy: KASK)

MORE INFO www.kask-safety.com

RIGCOM will operate with a global footprint across four continents and a field workforce in excess of 500 technicians. (Courtesy: GEV)

MAINTENANCE

GEV acquires height safety specialist Rigcom

GEV Wind Power, a wind-turbine repair and maintenance provider, recently acquired Australia-based Rigcom Group. Australia's largest domestic independent service provider, RIGCOM, specializes in field deployed rotor blade maintenance, together with a range of height safety services. The current management team, led by Chairman Gary Flowers and CEO Michael Biddle, will continue to lead RIGCOM, supported by the existing team.

GEV provides high-value blade repair and maintenance services to wind-

The order for Vestas consists of 60 V163-4.5 MW wind turbines. (Courtesy: ENGIE North America)

farm manufacturers and operators in the U.K., Europe and the U.S., operating both onshore and in complex offshore environments. With wind-turbine blades being susceptible to erosion and weather damage, which affects aerodynamic efficiency and reduces energy production (and sometimes stops the turbine operating altogether), GEV provides turnkey solutions to repair blades, reducing downtime and maximizing production.

The company has repaired and installed retrofit solutions to more than 5,000 turbines to date — and with turbines increasing in size and rotating faster, making them more prone to damage, GEV has a vital role to play in supporting the growth and resilience of the sector.

RIGCOM is the Australian ISP providing in-field rotor blade solutions, which is complementary to the existing GEV business. The organization will operate with a global footprint across four continents and a field workforce in excess of 500 technicians. The group will be able to deploy resources for blade-maintenance solutions and provide services to a client base that operates globally, ensuring alignment across all markets in key areas such as health and safety, quality, and project execution. "Over the last few years GEV has established itself as a global market-leader in wind-turbine blade repair and maintenance," said David Fletcher, Group CEO of GEV.

"We are excited to be partnering with Gary, Michael, and the RIGCOM team, as we look to lead the consolidation in our sector and provide clients with a consistent and reliable globally delivered solution. We're also looking forward to learning more about RIGCOM's wider expertise in the at height safety market and supporting the growth in this business by leveraging GEV's global footprint."

"Our enhanced ability to deliver global blade repair knowledge, coupled with dedicated local services and support, will ensure our customers get the very best outcomes for their projects," said Michael Biddle, RIGCOM CEO. "The ability to leverage our height safety expertise further into the wind sector will also provide clients with world class statutory inspection capabilities and solutions to common height safety problems."

MORE INFO www.gevgroup.com

MANUFACTURING

Vestas wins 67-MW order in Sweden

Vestas recently received a firm order from Vattenfall Vindkraft AB, part of the Vattenfall AB group, to power the 67-MW Velinga wind project in Sweden. The order consists of 12 V150-6.0 MW wind turbines in 5.6 MW operating mode and includes supply, delivery, and commissioning of the turbines. Upon completion, Vestas will service the turbines under a long-term Active Output Management 5000 (AOM 5000) service agreement designed to ensure performance of the assets.

"Vestas have been working closely together with Vattenfall on this project from an early stage, and we are happy to see the Velinga project now being built, delivering clean energy in the south of Sweden," said Anna Schlasberg Wachtmeister, vice president NCE Sales North and West at Vestas. "We are grateful for the partnership we have with Vattenfall, and now we look forward to deliver the turbines so they can start producing fossil-free electricity."

The project site is in the municipality of Tidaholm in Västra Götaland County. Turbine delivery is expected to begin in the second quarter of 2025 with commissioning scheduled for completion in the second half of 2025.

MORE INFO www.vestas.com/en

MANUFACTURING

Vestas gets order for 60 wind turbines

Vestas has received a 270-MW order to power an undisclosed wind project owned by a subsidiary of ENGIE North America in the U.S. The order consists of 60 V163-4.5 MW wind turbines.

The order includes supply, delivery, and commissioning of the turbines, as well as a 20-year Active Output Management 5000 (AOM 5000) service agreement, designed to ensure optimized performance of the asset.

"We look forward to working with ENGIE as it expands its wind energy portfolio across the United States and continues to advance the clean energy transition," said Laura Beane, president of Vestas North America. "The V163-4.5 MW is our newest high-capacity factor turbine and is optimized for low to medium wind speeds making it ideally suited for the U.S. market."

"We are excited to collaborate with Vestas as we both focus on the acceleration of the energy transition in North America," said Dave Carroll, chief renewables officer and country head, ENGIE North America. Turbine delivery is expected to begin in the third quarter of 2024 with commissioning scheduled for the first quarter of 2025.

MORE INFO www.vestas.com