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HOW TO REFRESH OFFSHORE WIND'S HIRING STRATEGY

Across the renewables industry, creating an ample pipeline of talent remains a work in progress, with the pressure set to increase as markets grow in line with global ambitions.





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THE BUSINESS OF WIND

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BLADE, SITE, AND











FROM THE EDITOR

Exploring blades, repowering, and more

ith an ambitious plan to ensure the U.S. achieves a 100 percent clean-energy economy and reach net-zero emissions by or before 2050, it's important that we all do our part to ensure this becomes a reality sooner rather than later. Not only might the fate of the planet depend on it, but it just makes good business sense.

With that in mind, the October issue of *Wind Systems* tackles some important topics, many of which will be important to help the U.S. reach that goal, not to mention the rest of the world.



This issue focuses on blades and repowering — vital subjects that run the gamut from the micro to the macro.

With turbines growing in size and complexity as technology advances, maintenance becomes more of a challenge. In our cover article from ONYX Insight's Dr. John Coultate, he shares his expertise on how predictive maintenance strategies can deliver benefits beyond those of a typical drivetrain condition monitoring system.

As turbines age, repowering becomes an important tool to keep wind farms at peak efficiency, but many owner-operators may be asking the same question: When is it time to repower a wind site?

Brian Tri and Wes Karras from Barr Engineering tackle that question by looking at repowering as an investment opportunity that can enable owners to retrofit power plants of existing sites with new and/or refurbished technology.

To reach green initiatives, other aspects of investing in the power of wind come into focus. Case in point: The creation of green hydrogen from wind power.

In this month's company profile, I spoke with EverWind Fuels CEO and founder Trent Vichie about how his company is using global renewable energy resources to create sustainable power solutions with not only green hydrogen, but green ammonia as well.

You'll find all that and much more in our October issue. I hope you enjoy it. As always, thanks for reading!

Kenneth Carter, editor Wind Systems magazine editor@windsystemsmag.com (800) 366-2185, ext. 204



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FYI

Kelly Darnell joins ACP as COO

From American Clean Power

The American Clean Power Association recently announced the appointment of Kelly Darnell as its incoming chief operating officer (COO) and president of the Clean Power Institute, ACP's educational c(3) non-profit. Darnell brings a diverse range of experience from sectors such as nonprofit, banking, government, legal, and politics as she takes on her fifth role as a COO at ACP.

Darnell will steer the operational functions of the association, which has a staff of more than 100 professionals. Additionally, she will oversee the finance, human resources, and information technology departments.

"Kelly is the best," said Jason Grumet, ACP's Chief Executive Officer. "Her diverse background and proven leadership make her an invaluable addition to the association. I know Kelly to be a transformational leader, and I'm excited to see what she will bring to our organization at this pivotal time for the clean power industry."

Most recently, Darnell served as the interim chief executive officer of the Bipartisan Policy Center. Previously, she held the role of COO for several organizations, including The Executive Leadership Council, United Way of the National Capital Area, and the Washington, D.C., Office of the State Superintendent of Education. In these roles, she was responsible for operations, finance, fundraising, IT, marketing and communications, member services, and events management.

"It's an honor to join the American Clean Power Association as its new COO and to work once again with Jason," Darnell said. "I'm incredibly excited to bring my experience to bear in a new sector that is so crucial for our future."

Darnell is a Woodrow Wilson Fellow and has received numerous awards, including the 2019 Washington Business Journal's Women Who Mean Business Award. She holds a B.A. in Economics from Spelman College, a Master of Public Management from the University of Maryland, and a law degree from the American University, Washington College of Law. Darnell assumed her role in September.



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DIRECTION

THE FUTURE OF WIND

DORIS has assisted more than 60 offshore wind projects across 17 countries. (Courtesy: DORIS)



bp awards framework to DORIS for offshore wind engineering

DORIS, a leader in engineering, advisory, and project management for energy, has been awarded a framework agreement by bp for the provision of engineering services to bp's offshore wind projects.

This framework will see DORIS support bp globally. DORIS, drawing on its 20-year track record in offshore wind, will combine its direct experience in these established and growing markets as well as its international footprint to provide tailored engineering services to bp.

Across the five-year agreement, DO-RIS will provide engineering for scopes such as concept development, pre-FEED, FEED, and detailed design. The support provided by DORIS and its strategic partner Turner & Townsend will enable the delivery of projects across bp's offshore wind portfolio, assisting bp in its aim to develop 50 GW of net renewable generating capacity globally by 2030.

"DORIS is pleased to be awarded this global agreement by bp, a leading developer in the energy industry," said Christophe Sarri, DORIS' chief commercial officer. "Drawing on the expertise of our international offices and DORIS' vision to make renewable energies possible, we look forward to partnering with bp to execute key projects in the bp offshore wind portfolio."

DORIS is a leader in the provision of engineering, advisory, and project management services to the energy industry. DORIS has almost 60 years of experience and is committed to making conventional energies cleaner and renewable and new energies possible.

DORIS has assisted more than 60 offshore wind projects across 17 countries, totaling more than 90 GW. Experienced across the project lifecycle, DORIS delivers support including concept and feasibility, FEED, PMC, and owner's engineering services to fixed and floating offshore wind farms.

BOEM launches consultation for Oregon wind areas

The U.S. Bureau of Ocean Energy Management (BOEM) has launched a consultation for two offshore wind areas off the coast of Oregon that could host 2.6 GW of capacity.

Over a 60-day public comment period that began August 15, BOEM held an and supply chain companies and delivering reliable power to the Western grid," said Liz Burdock, founder and CEO of the Business Network for Offshore Wind.

Oregon plans to develop 3 GW of floating wind capacity by 2030 and is following progress made in California.

The U.S. Federal Energy Regulatory Commission (FERC) has agreed to streamline grid connection processes for wind and solar farms under new



BOEM has launched a comment period for two offshore wind areas in Oregon. (Courtesy: Reuters)

intergovernmental task force meeting and several public meetings with the region's fishing community.

The WEAs have water depths of about 1,300 meters, requiring the deployment of floating offshore wind turbines that can be manufactured domestically, the Business Network for Offshore Wind noted.

"The introduction of these new WEAs will benefit not just Oregon, but California and Washington, by attracting new investments in ports, vessels, rules that prioritize projects that have secured permits and impose penalties for transmission operators that miss deadlines. The final ruling aims to reduce delays in grid connections that are stunting renewable energy growth. Developers now take several years to secure grid connections as transmission operators work through a backlog of projects.

MORE INFO www.reutersevents.com/ renewables/wind



TDI-Brooks breaks ground and begins construction of a new expansion building at TDI's headquarters in College Station, Texas, 90 minutes north of Houston. (Courtesy: TDI-Brooks)

TDI-Brooks breaks ground on new technical building

Following three years of rapid growth of both business and personnel, TDI-Brooks has broken ground and begins construction of a new 16,000-squarefoot "Technical Building #2." The new expansion building is at TDI's headquarters in College Station, Texas, just 90 minutes north of Houston.

The building is designed with 5,000 square feet of new office space along with technical work spaces, fabrication shops, and storage areas. TDI-Brooks technical staff plans to move into the building by the end of the year. "This new location will not only allow for the growth of staff we've employed to keep up with the growing demand for our technical services in offshore wind, it will allow further space for fabrication and storage of our geotechnical tools designed for seafloor surveys," said Daniel Brooks, director of Technical Systems and CPT Specialist. TDI-Brooks is a 27-year-old research and service company specializing in geotechnical and offshore survey projects, multi-disciplinary oceanographic and environmental projects, surface geochemical exploration, and high-end environmental chemistry for IOC and offshore wind clients in addition to federal and state agencies. TDI-Brooks operates five research vessels: Brooks McCall, Miss Emma McCall, Gyre, Proteus, and the Nautilus. These are multiuse vessels suited for a wide variety of oceanographic research duties for the offshore renewables and energy sectors.

TDI-Brooks was formed in mid-1996 by Drs. James Brooks and Bernie Bernard. It is headquartered in College Station, Texas, with a remote domestic office in Houston, Texas, and strategically placed offices around the globe. TDI-Brooks has a staff of more than 150 individuals, including 14 Ph.D. level oceanographers, geochemists, biologists and geologists, hydrographers, geophysicists, mariners, cartographers, engineers, and GIS and CADD specialists who perform surveys and produce deliverables of the highest quality. The company has international affiliates in Port Harcourt, Nigeria (TDI-Brooks Nigeria Ltd.) and Rio de Janeiro, Brazil (GSI-Brooks), with branch offices in Colombia (TDI-Brooks Succursal Colombia) and Mexico.

MORE INFO www.tdi-bi.com

BOEM completes review for offshore New York proposal

The Bureau of Ocean Energy Management (BOEM) has completed its environmental review of the proposed Empire Wind Farm Project offshore New York, which BOEM estimates could power more than 700,000 homes with clean renewable energy. BOEM's review supports the Biden-Harris administration's goal of deploying 30 GW of offshore wind energy capacity by 2030.

"BOEM is doing its part to meet the Administration's ambitious energy goals – while remaining diligent in our efforts to avoid, minimize, and mitigate impacts to ocean users and



Empire Wind, LLC proposes to construct up to 57 wind turbines for Empire Wind 1 and up to 90 wind turbines for Empire Wind 2. (Courtesy: Empire Wind)

the marine environment," said BOEM Director Elizabeth Klein. "We value the feedback we have received from Tribal Nations, local community members, commercial fishing interests, and other ocean users in our process."

Empire Wind, LLC, proposes to construct two offshore wind projects, known as Empire Wind 1 and Empire Wind 2, in its lease area about 12 nautical miles south of Long Island, New York, and about 16.9 nautical miles east of Long Branch, New Jersey. The two projects will be electrically isolated and independent from each other.

The company proposes to construct up to 57 wind turbines for Empire Wind 1 and up to 90 wind turbines for Empire Wind 2, as well as up to two offshore substations with two cable routes connecting to the onshore electrical grid on Long Island. Together, the projects are expected to generate up to 2,076 MW of clean, renewable energy.

A Notice of Availability published in the Federal Register September 15, 2023, for the proposed project's final Environmental Impact Statement (EIS). The final EIS analyzes the potential environmental impacts of the activities laid out in Empire Wind, LLC's Construction and Operations Plan. The final EIS is available on BOEM's website.

On November 14, 2022, BOEM published a draft EIS, initiating a 60-day public comment period that closed on January 17, 2023. BOEM also held three virtual public meetings to solicit additional feedback on the draft EIS from Tribal Nations, local community members, commercial fishing interests, and other ocean users. BOEM received 180 comments from Tribal Nations; federal, state, and local government agencies; non-governmental organizations; and the public during the comment period. BOEM considered these comments and stakeholders' feedback when developing the final EIS. BOEM plans to issue a Record of Decision on whether to approve the project, and if so, identify conditions of approval, this fall. *A*

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BLADES 🚩 REPOWER

UNLOCKING BIG SAVINGS: THE ROLE OF PREDICTIVE MAINTENANCE NOMPONENT RELIABILITY

Predictive maintenance strategies deliver benefits beyond those of a typical drivetrain condition monitoring system.

By DR. JOHN COULTATE

s demand for clean energy rises, the wind industry is scaling rapidly to keep pace with the energy transition. With Wood Mackenzie expecting 1.4 TW offshore wind capacity to be connected by 2050, wind developers and operators are facing a myriad of pressures to maximize efficiency, minimize maintenance costs, and ensure sustainable energy production.

Among these challenges, the reliability of wind-turbine components is a critical focal point. The complex combination of mechanical, environmental, and operational factors places significant stress on components, demanding not only robust design and manufacturing processes but also effective maintenance strategies. Component failures cannot only lead to costly downtime but also have substantial safety, economic, and environmental implications.

The rate of replacement of major components remains very high. Statistics show that in a typical operational wind turbine:

More than 40 percent of gearboxes will have to be replaced in 20 years of project life.

✓ More than 20 percent of main bearings will have to be replaced within 20 years.

✓ More than 5 percent of blades will have to be replaced within 20 years.

As turbines continue to grow in size and complexity and floating offshore wind picks up pace, this makes maintenance more challenging. It is essential for operators to have advanced warning of individual component failures in order to put in place the correct maintenance strategy is implemented to monitor their assets and growing portfolios.

ASSESSING CRITICAL COMPONENT FAILURES

Drivetrain failures typically make up the majority of unplanned wind-turbine O&M costs. A well-maintained drivetrain helps to maximize energy generation, reduces overall operational costs, and contributes to the overall sustainability of wind power. However, the mechanical drivetrain is not immune to failure, and several factors can lead to breakdown. Over time, wear and tear and exposure to harsh operating conditions can lead to component failure and degradation. Additionally, issues such as misalignment, lubrication problems, and electrical faults can contribute to drivetrain failures. Pitch bearings also exhibit high failure rates. They cannot easily be repaired in-situ, and a replacement can be

The complex combination of mechanical, environmental, and operational factors places significant stress on wind-turbine components, demanding not only robust design and manufacturing processes but also effective maintenance strategies. (Courtesy: ONYX Insight)

IN FOCUS



Technology developments mean owners and operators can extract increasingly more value from CMS and predictive maintenance tools as part of a robust O&M strategy. (Courtesy: ONYX Insight)

extremely costly — requiring the whole blade or rotor to be removed. If undetected, a pitch bearing failure can be catastrophic and, in the worst cases, can result in the loss of a blade. Therefore, detecting pitch bearing failures early and optimizing the replacement strategy before a substantial failure can deliver huge cost savings.

Similarly, while blades make up a relatively small percentage of turbine failures, they are one of the most challenging and costly components to fix. They are undoubtably one of the most exposed parts of any turbine, with the latest designs reaching more than 123 meters in length. Damage or faults that go undetected can have disastrous results, so early detection is crucial to assure ongoing safety, reliability, and productivity. External blade failures are often caused by environmental factors such as lightning or erosion, and these external forces can visibly damage the blade's surface, affecting its aerodynamics and efficiency. These failures are typically monitored effectively using drone inspections or ground-based visual inspections.

Internal blade failures can be more complex and can affect the structural integrity of the blade. Additionally, the industry currently lacks widely accepted approaches to monitoring these critical failures. Internal cracks in the main spar or bond lines can develop very quickly, growing from a few centimeters to one to two meters in length within weeks or even days. The emerging wider adoption of blade-monitoring technology will enable increasingly early detection of internal blade faults — therefore enabling low cost up-tower repair of blade defects, avoiding the huge expense of a blade replacement.

By using advanced sensing inside the blade, alongside drone inspections and periodic internal inspections, there is significant opportunity to drive down unplanned blade O&M costs.

TECHNOLOGY DRIVEN RELIABILITY

Major component failures have great potential to cause damage and consequential costs, and relying on periodic inspections is not an effective method for detecting most problems. Technology continues to play an increasingly important role in predictive maintenance, using advanced sensing to provide an accurate picture of a turbine's health in close-to real time.

The benefits derived from condition monitoring systems (CMS) are widely accepted in the wind sector as a proven method to drive optimal wind-turbine performance and enable predictive maintenance. More data from more turbines means the industry is better equipped to rise to any emerging O&M challenges.

CMS technology delivers the maximum value when it is factored in from the design stage and PdM tools are in-



While blades make up a relatively small percentage of turbine failures, they are one of the most challenging and costly components to fix. (Courtesy: ONYX Insight)

troduced early. This ultimately allows for optimized O&M planning and allows operators to plan maintenance in line with component and equipment lead-times, reduce down-time and increase productivity.

WHOLE TURBINE PREDICTIVE MAINTENANCE

As CMS advances, the wind sector is moving beyond monitoring single components in isolation toward a "holistic" approach to monitoring the whole turbine with multiple types of sensing. Technology developments also mean owners and operators can extract increasingly more value from CMS and predictive maintenance tools as part of a robust O&M strategy.

There is no doubt that a "whole turbine" approach to O&M, using an integrated combination of targeted inspections based on advanced analytics and monitoring, delivers the greatest benefits and value to asset owners and operators. This approach enables operators to tackle progressive faults faster, reducing downtime and costs.

Many turbine operators are still approaching O&M reactively, with 65 percent of O&M costs currently unplanned and 80 percent of these costs are typically attributed to blade and drivetrain failures, according to ONYX's analysis. However, by combining technology adoption with a proactive approach to maintenance, significant benefits can be achieved. This not only delivers enhanced safety and reliability but lowers the risk and, therefore, encourages much-needed investment in the sector.

Predictive maintenance strategies deliver benefits beyond those of a typical drivetrain CMS. As the demand for wind energy continues to increase, standardization of O&M will also be imperative to increasing operational uptime and reducing project costs. By harnessing the power of data analytics, remote monitoring, and advanced algorithms, holistic PdM tools empower wind-farm operators to make informed decisions that optimize performance and extend the lifespan of their assets.

In the dynamic landscape of renewable energy, where wind power plays a pivotal role, the challenges surrounding the maintenance of wind-turbine components are undeniably complex. As the demand for clean energy escalates, ensuring the reliability and efficiency of these towering giants becomes paramount. Predictive maintenance flips the script on conventional practices, shifting from a reactive to a proactive approach.

ABOUT THE AUTHOR

Dr. John Coultate is VP – Advanced Sensing at ONYX Insight and leads a team responsible for hardware and sensor solutions for condition monitoring. Coultate has a Ph.D. in mechanical engineering from the University of Nottingham, U.K., and has worked at ONYX InSight for more than 16 years.

TIME TO REPOWER YOUR WIND-ENERGY SITE?

The Summit Wind project in California's Altamont Pass entailed repowering a former wind farm and replacing 569 100kW turbines with 23 modern turbines. Barr assisted with the foundation design, which addressed the significant seismic loading of the region. (Courtesy: Barr Engineering Co.) Repowering is an investment opportunity for the facility owner, enabling owners to retrofit power plants on existing sites with new and/or refurbished technology.

By BRIAN TRI and WES KARRAS

o take advantage of better technology and current tax credits, wind-energy facility owners are repowering their sites, often before the end of the turbines' expected service lives. Through repowering, owners can boost power capabilities, sometimes by running fewer machines, as well as add to the grid without investing in an entirely new facility, experiencing significant permitting requirements, or needing new electrical interconnections.

WHAT EXACTLY DOES IT MEAN TO REPOWER A WIND FARM?

There are two options when repowering a wind farm: full repowering or partial repowering. Full repowering involves completely dismantling and replacing turbine equipment at an existing project site. Partial repowering is defined as installing a new drivetrain and rotor on an existing tower and foundation. Partial repowering allows existing wind-power projects to be updated with equipment that increases energy production, reduces machine loads, increases grid service capabilities, and improves project reliability at a lower cost and with reduced permitting barriers relative to full repowering and greenfield projects.

Wind repowering — the combined activity of dismantling or refurbishing existing wind turbines and commissioning new ones — plays an important role in the industry. By modernizing the existing wind fleet, repowering sets the stage for future wind industry investments and helps maximize wind energy use in the coming energy transition.

WHEN DOES IT MAKE SENSE FOR WIND FARM OWNERS TO CONSIDER REPOWERING?

Wind repowering is fundamentally an investment opportunity for the facility owner, enabling owners to retrofit power plants on existing sites with new and/or refurbished technology, including building taller, more efficient wind turbines to increase productivity. By using existing grid connections and infrastructure, repowered projects can often gain further cost-saving advantages compared to new greenfield (or vacant lot) developments.

WHAT ARE THE CHALLENGES ONE MIGHT ENCOUNTER WHEN REPOWERING A WIND FARM?

The costs associated with constructing or modifying existing foundations to support new turbines can be significant. Foundation work is sometimes required, but not always, and is dependent on engineering evaluations. Barr has developed an industry-leading program to evaluate existing wind-turbine foundations for repowering potential — an approach widely accepted by independent engineers, financial institutions, and presented in detail at industry events.

The first step in the process is a desktop evaluation to determine if the proposed foundations can support the new



Wind farm repowering structural assessment: To take advantage of better technology and boost capabilities, one of the largest clean-energy developers in the United States sought to replace existing turbines with new models. Barr assisted this client by performing a structural assessment for the repowering of a 150-MW wind farm. The findings and recommendations allowed the client to move ahead with repowering while continuing to produce power for 40,000 households. (Courtesy: Barr Engineering Co.)



Cyclic degradation geotechnical evaluation for wind turbine foundations: Xcel Energy retained Barr to complete a supplemental geotechnical evaluation for a wind repowering project in Nobles County, Minnesota. This evaluation included an assessment of soil behavior subjected to cyclic foundation loading for the proposed repower locations. The field campaign focused on undisturbed thin-wall samples collected at a depth corresponding to the base of the turbine foundation, while the laboratory testing program centered around cyclic triaxial strength to assess the behavior of the soil under enhanced foundation loading associated with the repower. (Courtesy: Barr Engineering Co.)

tower loads. These evaluations rely on design experience, current design practices/codes, and a database of historical foundation performance. Based on these evaluations, a determination can be made whether the new specifications can be met.

If the desktop assessment produces an acceptable outcome, the results are then validated with a field assessment. Field investigation is tailored to each project and based on the results of the desktop study, but it typically includes structural health monitoring (SHM) to determine a sample size of foundation performance while turbines are operating. The assessment can also include visual inspections and coring inside the foundations to check for cracking or hidden issues. At times, the desktop studies and investigations can result in uncertainty. Barr specializes in evaluating this risk and helping clients make decisions on how best to proceed. Whether the conclusion is to reuse the existing foundations, as is, and implement a risk-reduction monitoring program, or to design upgrades or modifications to the existing structures, Barr partners with owners to complete the necessary evaluations and design documents.

IS THERE ANY CURRENT FUNDING AVAILABLE FOR WIND-REPOWERING PROJECTS?

Over the past several years, companies repowering wind facilities used the Renewable Electricity Production Tax Credit (PTC), which was phased out at the end of 2021. With the passage of the Inflation Reduction Act (IRA), the PTC has been extended through 2024 for wind-energy projects that begin construction prior to January 1, 2025. In 2025, the PTC will be replaced by the new Clean Electricity Production Tax Credit (45Y), which will support any net-zero power generation technology, including wind facilities, for the following 10 years.

According to previous Internal Revenue Service (IRS) guidance, each wind turbine, pad, and tower is treated like a separate power plant or "facility." The IRS uses the 80-20 test to determine whether the facility is "new" and thus qualifies for the tax credit. The amount spent on repowering the facility must be at least four times the value of the used parts retained from the old turbine, pad, and tower. Repowering facilities can also qualify for additional incentive boosts from the Clean Electricity PTC if they meet

Crane walk geotechnical engineering at Kings Point wind site: Barr was retained for design services related to geotechnical analysis, engineering, and reporting for evaluation of selected crane path travel-ways at Kings Point Wind Project. Barr provided crane walk pre-planning and construction-phase geotechnical engineering services in support of the construction of a new wind farm. The evaluation used both data collected during the design-phase geotechnical investigation for wind-turbine foundation design, and supplemental investigation along crane path travel-ways. (Courtesy: Barr Engineering Co.)

the new prevailing wage and apprenticeship requirements. Additional incentives may be available if the facility is in an energy community or meets domestic content requirements, as defined by the IRS.

HOW CAN BARR HELP?

Since 1998, Barr has worked on more than 400 wind-power projects in 30 states, Canada, Mexico, and South America. In the United States alone, Barr has provided engineering services for more than 50 percent of the megawatts installed. Barr assists wind-power clients with pre-construction permitting and geotechnical investigations, foundation design, construction oversight, repowering evaluations, crane-walk assessments, and damage evaluations to O&M services.

For clients, the existing condition of wind-turbine foundations and associated investigation results can be a gray area; Barr specializes in evaluating risk and helping clients make decisions about moving forward.

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ABOUT THE AUTHORS

Brian Tri, vice president, senior civil/structural engineer, specializes in steel and concrete design for foundations, buildings, and other structures. He has served as design engineer, project manager, engineer of record, and principal engineer for wind-turbine foundations on more than 100 new and repowered wind projects across the country. Tri is a member of the Barr team that provides pre-repowering assessments as well as structure and post-construction inspections for wind power projects. He also helps oversee damage evaluations for wind turbine towers and foundations, which involves site investigation, nondestructive testing, and structural analysis. Wes Karras, structural engineer, is Barr's wind-turbine-foundation field program manager and a member of the team that provides pre-repowering assessments as well as structure and post-construction inspections for wind projects. He coordinates foundation inspection and structural health monitoring activities related to wind-turbine-foundation assessments, including repowering. Karras has six years of experience in the wind industry and has served as the design engineer, structural inspector, and project manager on numerous wind power projects across the country. For more information on a variety of topics related to wind energy, go to www.barr.com.





EVERWIND FUELS

CLEAN ENERGY FOR A BETTER FUTURE

Within the last 18 months, EverWind has purchased a site that has achieved environmental approval while managing to bring in three First Nations partners to help. (Courtesy: EverWind Fuels) EverWind Fuels strives to use global renewable energy resources to create sustainable power solutions with green hydrogen and green ammonia.

By KENNETH CARTER 💌 Wind Systems editor

any within the renewables sector are touting the next logical step to diversifying and expanding, and that next step entails making hydrogen from renewable sources — namely, wind.

Green hydrogen helps to solve a big challenge with renewables: the longer-term storage of that renewable energy; because, what happens when the wind doesn't blow or the sun doesn't shine?

"You've got batteries, and they may last for four to 12 hours; you have some hydro storage, but there are not a lot of other ways to store that power; this is where green hydrogen plays an important part," said Trent Vichie, EverWind Fuels' CEO and founder. "That's why people around the world are really excited about it."

To that end, EverWind Fuels was born, a company started to develop the means and resources to create green hydrogen. "The way that EverWind fits into the renewables ecosystem is that, in order to make green hydrogen, you need the renewable power, then obviously the process, terminal, and logistics to bring it all together," Vichie said. "What we are is a developer of all of those elements."

BRINGING THE PIECES TOGETHER

Creating green hydrogen involves a lot of interplay between the wind industry, the siting, the development, the actual terminal, and the logistics, according to Vichie.

"The reason we thought we were well suited was that we have experience in each one of those verticals, and it was really about tying them all together," he said.

Another advantage EverWind has with making green hydrogen a fuel contender is the company's flexibility and ability to fast track development, according to Vichie.

"We just got to work on it," he said. "That's one of the reasons I believe that we've got a very strong lead. We're one of the leaders in this space globally. And it fits well with the wind industry. Up until today, the wind industry has been very much reliant on existing grids. You wait for the grid use. There's a contest or a PPA, and then that's the key driver for building wind. This is no longer the case. If we build the wind, we are effectively the customer, because we are taking that renewable power to split water into hydrogen and oxygen. We've now got a new customer base for wind, and that, to me, can be a huge acceleration in the development of wind globally."

MOVING THE PRODUCT

Once that hydrogen is created, however, Vichie pointed out the next important step is to be able to transport it efficiently and safely. "There are a whole host of issues that come with delivering hydrogen and bringing it to different places," he said. "The first phase of our project is converting hydrogen into green ammonia, which is easier to transport — It's denser; it's liquid at a higher temperature, and here's an interesting one: Ammonia is one of the most widely used compounds in the world today. It's mostly used as a fertilizer, and without it, we'd have 3 billion less people on the planet. Today, this fertilizer is coming from natural gas, so half of what's on your dinner plate is a result of fossil fuels. By using wind power to make green hydrogen and green ammonia, we can start to decarbonize this particular area."

AMMONIA ADVANTAGES

Another advantage of converting green hydrogen into ammonia is that ammonia is a fuel in its own right, according to Vichie.

"It's combustible; it can be used as a marine fuel," he said. "But ammonia is also an effective carrier of hydrogen. You convert it into ammonia, transport it more efficiently, and then you 're-crack' it back into hydrogen when and where you need it. And ammonia is just the beginning — Green hydrogen also can be used to make sustainable aviation fuel, green methanol, and a whole host of chemicals. It's really the building block of a lot of growth industries."

Vichie said Europe has had a big lead on the demand for green fuels, and it has set targets of 10 million metric tons per annum of import into Europe. Japan is also looking to import green fuels in an effort to decarbonize. EverWind's long-term focus is to provide Canada the green fuels it needs to power a net-zero economy.

WHY USE WIND?

And using wind to produce green hydrogen is ideal, according to Vichie. "We think that wind is an excellent way to make the renewable power for green hydrogen, and the reason is, in the right regions, wind has a really high-capacity factor," he said. "If you've got expensive capital that's breaking water into hydrogen and oxygen, you want that equipment being used as much as possible. You can have cheap solar power, for example, that only operates 20 percent of the time, but I'd much rather have a wind project that's 50 percent or an offshore project that's closer to 60 percent of the time because that can give you better economics. Ever-Wind is going to be a large user of wind power and a huge customer for the various players. Sitting here today, we've got a multiple-gigawatt pipeline. In Nova Scotia, we have land for about 3,000 MW of power."

EverWind recently made public that it is building its first 600 MW of wind in Nova Scotia and is doing environmental studies on the next 2,000 MW, according to Vichie. The company also has been awarded development rights on 268,000 hectares of government land in Newfoundland to support more than 2 GW of onshore wind.

PROFILE

EVERWIND FUELS



The 80-meter MET tower at Windy Ridge wind farm. EverWind is working hard to procure turbines, construct MET towers, and ramp up its team, while collaborating with local contractors. (Courtesy: EverWind Fuels)

Nova Scotia has some of the best offshore wind resources in the world. If you can get that cheaper wind, which can be used in sustainable aviation fuel or other applications like green steel, I think wind in this area can drive massive decarbonization globally. ▼

"We're talking about a real industrial scale play with some of the best wind resources in the world in an advanced economy close to North America and Europe, so, this is a start," he said. "What we really want to do is build a hydrogen hub here in Atlantic Canada, but, most importantly, be leaders and risk-takers on the capital side to show the way. We've got more flexibility to move quickly. In the space from buying the terminal to where we are today, we have the most advanced industrial scale green hydrogen and green ammonia facility in North America. We've got Black & Veatch doing engineering, Siemens on the electrolyzers, and an all-star team. We've spent almost \$200 million developing the project, and we have MOUs with some of the largest energy companies in Europe, E.ON and Uniper, and more to come. There's a big opportunity, and we are running hard at it."

BUILDING RELATIONSHIPS

As a result, Vichie said EverWind is working hard to procure turbines, construct MET towers, and ramping up its team,



A MET tower installation at wind-farm development. (Courtesy: EverWind Fuels)

The first 16 holes are completed in a MET tower. An advantage EverWind has with making green hydrogen a fuel contender is the company's flexibility and ability to fast track development. (Courtesy: EverWind Fuels)

while collaborating with local contractors. Within the last 18 months, EverWind has purchased a site that has achieved environmental approval while managing to bring in three First Nations partners to help.

"We've managed to develop a fantastic relationship with the Nova Scotia government, the federal government, First Nation rightsholders, local stakeholders, and also the utility," he said. "We've sat on the world stage with the Prime Minister and the Chancellor of Germany to show our project. The speed and how much we've pushed the project forward in such a short space of time has people saying, 'You've got one of the most advanced projects on the planet.' I'm damn proud of that, and I'm damn proud of the team that we've put together and our partners." EverWind has gotten there with straightforward honest talk, hard work, logic, and just trying to do the right thing, according to Vichie. "We're doing this, too, to help the local community — high-paying jobs, tax revenues, adding stability to the grid, and economic activity," he said. "I grew up poor from a rural area, and I'm proud to create opportunity and empowerment — to make a difference, make a change. There's a lot we can be proud of until the moment that we've actually finally delivered. That's when I'll be really proud."

MORE WIND IN THE FUTURE

The advent of green hydrogen is only going to increase the opportunity for wind in the next decade, according to Vichie. "Wind, particularly offshore, is going to get larger, cheaper, and more efficient at scale," he said. "Nova Scotia has some of the best offshore wind resources in the world. There are potentially several hundred gigawatts where you can do fixed bottom, and there are a lot more than that where you can do floating. If you can get that cheaper wind, which can be used in sustainable aviation fuel or other applications like green steel, I think wind in this area can drive massive decarbonization globally."

Vichie is quite passionate about his company's renewable energy goals because it ultimately means a better and more sustainable future, but he said time is of the essence.

"You can see the impacts of what we're dealing with — we don't have time," he said. "That's one of the other things that we're focused on. It's like we're trying to go fast and people say, 'Slow down.' We don't have time. Time is not your friend when you're trying to do this. There's a great saying that time kills all deals, and I believe that. When you've got something, you go after it, and you work your backside off. You're either doing it 100 percent or 150 percent, or you're not doing it. There's nothing in the middle."



CONVERSATION

Alexis Crama

Vice President — Weather and Environment 💌 Vaisala



"To apply optimization and artificial intelligence, you need accurate & smart data, and what Vaisala is going to do is acquire, process, and deliver all the weather and environment-related smart data."

Vaisala, a global leader in weather and environmental measurement and monitoring solutions for the renewable energy industry, recently named former GE Renewable Energy's strategy head, Alexis Crama, as its vice president — weather and environment. Wind Systems recently talked with Crama about what he will bring to the table when it comes to the future of wind energy.

As vice president — weather and environment at Vaisala, what will be your duties?

I would say my duty is to bring all the product and industrial growth experience I have out of 17 years spent in renewable energy — mostly in wind — and help the company grow in the energy and energy transition segment. That's really the primary reason of me being there.

How has your background prepared you for this position?

I am an engineer in aerospace, and I have a business degree as well. That's my core foundation. But mostly my 17 years of experience in renewable energy with wind rotor and wind turbine suppliers where I occupied functions within industrial planning, strategy, business development, general management, and more are important as well.

Within GE Renewable Energy, I spent time going beyond the wind key components at the wind turbine supply chain system level, expanding into the hydro components, grid system, grid automation, grid digital, Power-to-X, and also solar hybrid storage systems.

I would say I have a very strong and robust wind experience — from product to supply chain, and markets and end users, and also a solid experience within the broad field of energy transition with all power generation assets and infrastructure.

My experience and background help me to understand

where to focus and what good things need to be developed for the industry.

How will you help expand Vaisala and its support of a global energy transition?

Vaisala has a really strong tradition of developing extremely accurate and reliable products along with robust industrial processes delivering sensors as well as digital solutions at scale to serve meteorology and aviation and some "in-factory" industrial businesses. That's a good core foundation to build on with what I bring from the energy business.

There is a nice complementary aspect of trying to suit this with new market needs in the fast-growing solar market as well as with wind systems to improve the performance of assets, to develop new farms with lower cost of capital, lower risk, and being able to offer a suite of sensors that deliver high accuracy, high availability, and high reliability. We also want to help investors and asset managers to develop faster and improve their portfolios. That's basically what I think Vaisala and I, with my background, can help do in the business and, at the end, grow Vaisala and bring value to our customers.

What about Vaisala most excites you about its clean energy initiatives?

There are different product lines, first of all. There are traditional sensors for wind measurement, with air stations with temperature pressure, humidity visibility, and gas measurement. There is a robust lidar product line that has been the result of an acquisition recently, which leverages the Lidar technology, the laser technology, to literally visualize the wind at different horizons depending on the application. You have all these suites of sensors on top where you can add digital treatments to integrate that data and process it in a way that can be exploited into a SCADA system and control system, and Vaisala brings both hardware systems and digital integration to help make a new integrated solution for customers.

This deep tech element is really exciting. The amount of experts with Ph.Ds in science and very experienced engineers in this domain is really exciting, too. The opportunity to decarbonize the world with a massive transition into electrification and into decarbonization of transportation is really creating a context of an exciting blue ocean type of strategy. That includes partially continuing what we have been doing in Vaisala by accelerating in wind and solar but also with grid management, in storage on an industrial scale, and in other applications on the side of energy.

Tell us more about Vaisala's measurement monitoring and forecasting solutions and your goals to further advance or promote them.

Vaisala has so far focused on general weather forecasting with multiple application space.

We've been focusing mostly on assets development. So, for wind farms, a lot of focus has been on wind resource assessment for new wind-farm development. There also has been some development in measurement resource stations for solar farm development. These are early-stage projects, steps in projects lifecycle, and that has been the bulk of our activities, and we have developed knowledge and expertise in doing so. I think now stepping back and bringing my expertise, the important thing is to look at the entire product lifecycle of the wind farm, solar farm, industrial storage, and grid system, so at the development planification stage, we can bring data to optimize the location and the type of assets an investor will want to put at a certain location.

But during construction, we can have solutions to optimize the weather risk and basically install wind turbines more efficiently, because you have to lift the assets. You cannot do that in a harsh weather environment, but if you can provide more accurate weather data, you can more efficiently build.

Then you have the commissioning of your assets, solar farm, wind farm, and eventually storage, where you validate the promise of your supplier per the expectation. You measure the exact wind or solar resource; you measure what your renewable energy asset is delivering; you compare the gap, and you see if it's compliant, if there are some warranty issues, some compensation, or some additional engineering tuning to perform to close that gap. Then during the entire asset management, having some accurate weather sensors and digital forecast solutions will help you gain some additional percentage of annual energy production. By pitching your blades more accurately and more dynamically, you harvest a single gust of wind coming not foreseen before or you can optimize the fatigue loads of your turbine. You can really try to extract the most wind from your wind farm.

With a large offshore wind farm, unforeseen side gusts can be seen coming from a WindCube scanner. That allows us to look approximately 15 kilometers around and see 10 to 15 minutes ahead where the side wind is coming from. You have the main wind, and you have side wind, and then you can make certain turbines harvest some of this power, which normally would not have been. All this optimization along with the wake management is something that is not really fully exploited today. We are providing instrument measures to better understand that and help to close the loop and improve the control system. That's really going to deliver higher annual energy production. You can also optimize and retrofit wind farms if you better understand your assets. You can see that maybe you can put larger rotors on existing turbines. You can do your servicing more efficiently during times of maintenance, especially at sea and offshore.

You can better plan your maintenance activities when the weather can allow it safely. At the end of the asset's life, when you can have all the weather measurement data, you can better understand if that particular site is better off having an extended life of existing assets or if you are better off dismantling and repowering with new units. It's really from early-stage investment until retirement of your assets, that is procuring a new field of application for a Vaisala solution. But today we are only at the early stages. There are multiple new phases to exploit where we can work with our utility customers, IPPs, asset owners, and OEM manufacturers to really make a positive difference in their businesses.

What are some of your specific wind energy related plans with Vaisala?

We are working on a new digital portal that will help to better manage the assets, like the sensors and the Lidars that we sell. This will help to integrate the data in the cloud, and also visualize the data so customers have the full end-toend solution. All this digital play is basically a way for us to structurally integrate with the data and process it remotely so that it can be integrated into a cloud. Vaisala has lots of expertise and knowledge in weather forecasting and weather modeling, on top of which we have good artificial intelligence expertise. By having our own models, it's a smart way to apply artificial intelligence and the most powerful set of data because we have the largest global network of sensors. When you put that all together, you can get an amazing set of data that can really help tap into an unknown, so far, of extremely accurate weather solutions, the current cast, the historic data, and the forecast.

We are living in a world of optimization and artificial intelligence for multiple applications. To apply optimization and artificial intelligence, you need accurate, reliable, and smart data, and what Vaisala is going to do is deliver all the weather and environment-related smart data. That's digital play. From the sensor to this digital layer, it will enable our customers to exploit this data even better.

Where do you see the future of the wind industry, and how can Vaisala push its advancement in the U.S. and abroad?

I think wind has been growing a lot with an overall modest growth in the last few years — except in China, which experienced a surge in demand recently. But if we split the world

CONVERSATION



from China, which is massive — I mean it's more than half of the global demand for wind, but there are big swings, which sometimes affects the numbers. If I look at the world without China, the wind is growing still at about a 5 percent growth rate year over year onshore. But there's a 20-plus percent growth in offshore. That's good trends for electrification.

However, the trends are way off in terms of fulfilling the Paris Agreement to try to limit the global warming at 1.5 degrees by the end of the century. Therefore, in reality, we will need to at least double the amount of investment for electrification. That gives the idea of the potential that still exists for additional incremental growth in the short and midterm.

On top of this increased electrification, what we see is a decarbonization of other industries like transportation, steel making, and petrochemical. This is where we see an emerging green hydrogen economy that is at the extremely early stage today, which will probably be larger by 2030 and become massive past that date. That is an additional layer of growth for wind and solar because basically for 1 megaton of green hydrogen, you need at least 12 GW of wind power capacity installed. We will need, depending on the scenario we see, a conservative estimate of 250 megatons of green hydrogen by 2035.

In the most optimistic scenario, we can go up to 600 or 700 megatons per year. It really says that we are on the growth path, multiplying by two this renewable energy investment for electrification, and we can potentially multiply by four to five if we integrate the green hydrogen needs. That's an

extremely high perspective and very encouraging for us. Of course, you can do that by deploying more supply chain but also pulling more financing. To have efficient financing, you need to lower the risk so you can reduce the cost of capital, and to lower that risk, you need to deliver better weather forecasting for this intermittent wind resource. That's what Vaisala is contributing to do: supplying extremely accurate and reliable weather observation, monitoring, and forecast data to its customers.

Is there anything else you'd like to mention that we didn't talk about?

Beyond our sensors, our Lidar lines are developing fast and there are still applications and use cases that have not been used a lot so far, especially our scanning Lidar that allows to visualize wind. It is really an untapped potential for customers in terms of application to monitor wakes at a wind farm or to even install in some boats for smarter and safer operation at sea for offshore wind.

By better controlling the minutes and seconds of wind and solar, you can better balance your grid, lower the risk, and lower the amount of investment. If you look at the hundreds of billions of investments in the grid today, there is not much done on weather forecasting within the grid environments.

That's something I'd like to insist that Vaisala could bring a lot in this enormous grid management market. \prec

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TAILWINDS

NEWS ABOUT INNOVATION, MAINTENANCE, CONSTRUCTION AND MANUFACTURING



FOWIC will, in corporation with Shimizu, make use of the jack-up vessel Blue Wind for the project. (Courtesy: Fred. Olsen Windcarrier)

CONSTRUCTION

Fred. Olsen awarded Taiwan wind-farm contract

Fred. Olsen Windcarrier (FOWIC) has been awarded a contract working with Shimizu for the transportation and installation of monopile foundations for the 640 MW (8 MW/80 wind turbines) Yunlin offshore windfarm off the west coast of central Taiwan.

FOWIC, which is in a cooperative relationship with Shimizu regarding offshore wind-farm construction, will start operations in February 2024. The duration of the project is estimated to be 200 days. FOWIC will, in corporation with Shimizu, make use of the jack-up vessel Blue Wind for the project. When fully operational, this project in Taiwan will have a capacity to create up to 640 MW of green energy equivalent of more 600,000 Taiwan households and be another important step toward a fully green-energy future in Taiwan.

"We are extremely proud to be awarded the transport and installation contract with Shimizu," said Alexandra Koefoed, CEO at Fred. Olsen Windcarrier. "This contract demonstrates our commitment to offshore wind development in APAC as a region and to our partnership with Shimizu. We look forward to executing this project together with Shimizu and all the local stakeholders and suppliers on the project,"

Fred. Olsen Windcarrier established a partnership with Shimizu Corp. in 2021 to strengthen its position in the offshore wind industry in the APAC region. Both companies have a background in civil engineering and offshore and marine construction.

Together, FOWIC and Shimizu capitalize on a versatile jack-up vessel fleet, while making use of a larger pool of market knowledge and project execution experience. "We're happy for the chance to contribute with our joint capabilities to the Yunlin offshore windfarm project and to the APAC renewable energy overall," Koefoed said.

The vessel is engaged in the Ishikari Bay New Port Offshore Wind Farm project, one of the largest commercial offshore wind farms in Japan with 8 MW/14 wind turbines. The vessel will start preparation for the Yunlin offshore wind-farm project in December 2023.

MORE INFO windcarrier.com

CONSTRUCTION

DNV awarded Polish offshore wind contract

Independent energy expert and assurance provider DNV has been awarded a contract by the Equinor and Polenergia S.A. owned joint ventures, MFW Bałtyk II sp. z o.o. and MFW Bałtyk III sp. z o.o for the certification of the Bałtyk II and Bałtyk III offshore wind farms. The projects, in the Polish exclusive economic zone of the Baltic Sea, are set to contribute to Poland's renewable energy goals.

With a planned installed capacity of 720 MW each, Bałtyk II and Bałtyk III will collective-



Kim Sandgaard-Mørk, executive vice president for renewables certification at DNV (Courtesy: DNV)

ly generate 1,440 MW of clean energy, enough to power more than 2 million Polish households. The electricity produced will be exported to the Polish transmission grid, operated by the Polish TSO Polskie Sieci Elektroenergetyczne S.A.

To ensure efficient operations, each wind farm will have its own offshore substation.

DNV's scope of work includes the delivery of certificates for the wind farms related to design, fabrication/ installation/commissioning and operation in accordance with relevant laws, regulations, and codes. The following assets are defined as relevant for certification: wind-turbine generators, offshore substation platform, inter-array cables, and offshore export cables.

"DNV is extremely pleased to be awarded this contract and contribute to the drive to increase renewable energy in the country," said Kim Sandgaard-Mørk, executive vice president for renewables certification at DNV. "This move by Poland, to expand its offshore wind capacity, is supported by DNV's 2022 Energy Transition Outlook Report, which states that the share of offshore wind in total wind electricity generation will increase steadily, rising globally from 8 percent in 2020 to 34 percent in 2050."

"Building upon DNV's extensive experience in certifying renewable energy projects, it brings us great satisfaction to expand our certification expertise to Poland following the announcement earlier this year, that DNV has been authorized by the Polish Ministry of Infrastructure to issue certificates for offshore wind farms and assembly of power output equipment," said Krystian Slodzinka, project bid manager and Polish ministry coordinator, energy systems at DNV. "The certification of Bałtyk II and Bałtyk III by DNV further solidifies their commitment to meeting the highest industry standards for safety, reliability, and sustainability. I am personally looking forward to continue working on this project and to a successful outcome."

DNV is an independent expert in risk management and assurance, operating in more than 100 countries.

DNV provides assurance to the energy value chain through its advisory, monitoring, verification, and certification services.

MORE INFO www.dnv.com

FINNOVATION

Winergy introduces Service 360 for turbine drivetrains

Winergy presented Service 360, a service concept for wind turbine drivetrains. Thanks to multi-brand service, digital services, and the unique positioning as a system provider, it is the most comprehensive service concept in the market for wind drives. Winergy,



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THE BUSINESS OF WIND



CMaS Evolution is an integral part of Service 360. Plant operators have all turbine information constantly available and can optimize operation. (Courtesy: Winergy)

the wind brand of the drive specialist Flender, offers turbine manufacturers and wind-farm operators a one-stop solution for the entire drivetrain from gearbox to generator.

Today, wind is the cheapest energy form. Nevertheless, turbine OEMs and energy companies are trying to generate the maximum energy output at even lower costs.

Efficient management of wind farms is essential to harness the available wind resources while minimizing downtimes.

With Service 360, Winergy offers a service concept for drivetrains that can be individually adapted to the respective customer need. It is unique in the wind market and the result of many years of cooperation with turbine manufacturers and wind-farm operators. The service offering includes key innovations that cover the entire drivetrain, including the generator, and extends to servicing gearboxes from other manufacturers.

Winergy is thus able to cover more than 100 different turbine types and 130 gearbox models. Customers benefit from experience of the leading manufacturer of drive systems, regardless if it is a Winergy product or not. Partners receive a complete package beyond the products. In terms of service, it is crucial to be close to the wind farms. Winergy covers all major wind markets in the world with its network of manufacturing and service locations. The integration of Moventas locations has expanded the presence further. Service 360 is thus available quickly and at any time.

Service 360 also offers service for every point in the turbine's life cycle, from installation, maintenance, and repair to partial repowering, i.e. increasing the power of the wind turbine by upgrading individual components or the entire drivetrain.

"With this flexible multi-brand service, we focus on many gearbox and turbine brands and can thus serve drivetrains of entire wind farms. Service 360 can be applied to all turbine types with their various gearbox and generator types," said Aarnout Kant, Winergy president.

Digital condition monitoring is an integral part of many wind farms. Operators use it to monitor and analyze their turbines. Winergy's CMaS Evolution goes beyond this and offers customers a digital all-round service. It is part of Service 360 and, for the first time, fully compatible with already installed hardware. The end-to-end solution offers customers all important services, from the condition of the turbine to concrete recommendations for action to the delivery of spare parts at the right time and place. CMaS Evolution is based on the further development of the successful Moventas CMaS Service and, thanks to Winergy's unique position as a system provider, covers all components of the driveline from the main bearings to the transmission and generator. Existing systems can be connected without changing the infrastructure.

Customers receive access to a digital portal in which all information about the turbines and services can be viewed transparently. The scope of the required services is based on the needs of the customers and can be individually adapted.

Cross-turbine algorithms also allow conclusions about the condition of the sub-systems and components outside the drivetrain. CMaS Evolution offers everything in one place: recommendations for operation, condition reports, instructions, required spare parts and their availability, as well as the planning of service calls. "Service 360 combines everything our customers and partners need: service for all their turbines and drive types -- for the entire drivetrain and not just for individual components such as the gearbox or the generator," said Antti Turunen, Wind Service vice president.

"Plus, it is available everywhere in the world. With CMaS Evolution, we are also leveraging the full potential of digital intelligence to further increase the efficiency of wind farms. In addition to wind gearboxes, generators, direct drive segments as well as wind couplings, Winergy has long been known for its extensive service portfolio." The Service 360 package additionally offers original spare parts, replacement of drivetrain components, workshop repairs at one of Winergy's worldwide locations, on-site service, digital services, and training.

MORE INFO www.winergy-group.com



Lifetime extension applies to both offshore and onshore wind parks, but onshore turbines are often missing data from structural monitoring. (Courtesy: Bachmann)

INNOVATION

Bachmann partners with PE Concepts to extend turbine life

In Germany, 30 percent of installed onshore turbine plants are more than 16 years old. Operators must plan to extend operation within good time, but Lifetime Extension (LTE) assessments are usually conservative and based on estimates, often missing out on the full potential operational lifetime that remains after design lifetime has expired.

With a combined experience of almost 40 years in the wind industry, CMS provider Bachmann Monitoring GmbH and engineering consultancy P.E. Concepts GmbH are teaming up to take on that challenge. Bachmann systems deliver highly accurate Structural Health Monitoring (SHM) measurements that optimize the analytical LTE



TAILWINDS

THE BUSINESS OF WIND



The new Flender facility will be more than 1,800 square meters and has the structural capacity for a 50-ton crane. (Courtesy: Flender)

assessment performed by P.E. Concepts. This often leads to a longer period of extended lifetime for wind turbines and a dramatic impact on total ROI.

Bachmann's high-accuracy load and Eigenfrequency measurements help P.E. Concepts calculate remaining useful lifetime more accurately than traditional SCADA data and wind information.

"With Bachmann's data, we can significantly improve the theoretical calculation models and reduce uncertainty – often leading to a much higher remaining useful lifetime for our clients," said Matthias Saathoff from P. E. Concepts.

An analytical assessment based on measurement data supports the period of life extension with continuous monitoring, facilitating the optimal use of components with corresponding remaining service life potential. Owners and operators have access to all SHM data, allowing for better planning when it comes to economic decision-making during the extension period. "When it comes to ensuring optimal Lifetime Extension, the use of Structural Health Monitoring data simply makes sense," said Marc Thomsen, product manager at Bachmann.

MORE INFO www.bachmann.info/en

INNOVATION

Bachmann equips OT1300 Panel PC with Intel processors

Bachmann is equipping the OT1300 Panel PC Series with high-performance, 11th generation Intel processors that guarantee faster data processing and maximum work performance.

The new variant diversity of CPU and memory media enables adaptation to custom requirements and thus offers potential for using lower-cost variants. The OT1300 Series offers full scalability for the processors and for RAM, mass storage devices, and display diagonals. This flexibility offers customers reduced development and maintenance costs. Special emphasis has been placed on characteristics such as long-term availability, robustness, or industrial design.

Compatible solutions have been found for future repair and spare parts, to keep the conversion effort to a minimum and reduce costs. Device design remains neutral; there is no visible logo and design remains in the customer's hands.

In the standard configuration, the operating devices are delivered with the current Windows 10 Edition, Windows 10 IoT Enterprise 2021 LTSC. This edition offers the longest-term update support, to ensure maximum security. It is also possible to import customer-specific images to keep the commissioning effort minimal.

Bachmann offers the pre-installed atvise® HMI package that combines high-performance software with SCA-DA features, enabling cost-effective implementation of demanding applications. Bachmann is the central contact for all concerns (HMI, software, and control system).

MORE INFO www.bachmann.info/en

MAINTENANCE

Flender expands production in Australia

German drive train specialist Flender is expanding production and service capacities in Australia by opening a new facility in Sydney. With its Winergy brand for wind-turbine drives, the company has one of the largest installed bases in Australia, aiming to scale up the local presence and be close to customers.

The same is the case for the industrial drive portfolio with a proven track record in Australian industries such as mining, cement, harbor equipment, and further. Flender's gearboxes and couplings continue to power some of Australian industries' heaviest machines.

"For both our wind and industrial business, we see enormous growth potential on the continent," said Andreas Evertz, Flender Group CEO. "To reach the goals from the Paris climate agreement, we must not only ramp up renewable energy capacities but also transform our industries toward sustainability.

This includes recycling and establishing a circular economy. Our workshops are perfectly equipped for servicing and refurbishing the existing installed base, not only for our own fleet but all gearbox types in the market."

The new Sydney facility will be more than 1,800 square meters and has the structural capacity for a 50ton crane. It will have all equipment required to deliver OEM standard to customers. Flender will be able to repair gearboxes up to 40 tons as well as equipment such as main shafts for wind turbines, lube systems, fluid couplings, and brakes. Sydney is Flender's fourth service hub in Australia besides the locations in Rockhampton, Perth, and Melbourne. "It is important to be close to our customers," said Kareem Emara, managing director of Flender Australia and New Zealand. "With the new facility in Sydney, we are continuing to be more agile and respond to their needs as quickly as possible. We have been in the industry for many years. Using our OEM knowledge and technical expertise we can provide proactive support."

Flender's facilities are set up to support the lifecycle of a product from installation to decommissioning and refurbishment.

With the digital drivetrain intelligence AIQ, Flender also provides



The Electrom® iTIG IV tester is essential for wind farm operators and maintenance technicians for diagnostics and predictive maintenance of generators, as well as auxiliary motors used in cooling systems, automated lubrication devices, nacelle yaw motors, lift/hoist motors, and blade pitch motors.

When performed during a regular maintenance schedule, the surge, DC hipot, and megohm tests give users trending data on winding insulation condition so O&Ms can prioritize wind turbine servicing and schedule maintenance rather than risk unplanned downtime.



TAILWINDS

digital services that allow preventive maintenance and maximize plant availability.

Flender is headquartered in Bocholt, Germany, offers gear units, couplings and generators and associated services, with a focus on key industries such as wind power, cement, mining, oil and gas, power generation, water and wastewater, marine, conveyor and crane technology.

MORE INFO www.flender.com

MAINTENANCE

RelyOn Nutec UK launches technical training programs

RelyOn Nutec UK, leaders in practical and digital training for traditional and renewable energy, has launched technical training programs, backed



RelyOn technical training manager Gordon Andrew and operations director Catherine Leibnitz. (Courtesy: RelyOn Nutec UK)

by 500,000 pounds of investment in staff, facilities, and equipment. In recognition of the widening energy skills gap and the new skills required to power the energy transition, the launch signals RelyOn's commitment to the energy industry in expanding its remit across its U.K. training centers in Aberdeen, Teesside, and Liverpool. The new technical training suite in-







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TAILWINDS

THE BUSINESS OF WIND



Vestas Wind Systems has signed a conditional agreement to supply turbines for an onshore U.S. project. (Courtesy: Vestas Wind Systems)

cludes Engineering Construction Industry Training Board (ECITB) courses on Small Bore Tubing and Mechanical Joint Integrity.

These programs are important for increasing efficiency of oil and gas projects, where hydrocarbon leakage reduction is of vital importance to output and safety. The programs will also be adaptable to suit the renewables market.

"We're extremely excited to unveil our latest offering," said Catherine Liebnitz, RelyOn Nutec UK operations director. "As established safety training providers in the energy and other hazardous industries, expanding into technical training is a natural next step for us."

RelyOn also offers Global Wind Organization (GWO) basic technical training, delivered across RelyOn's digital and practical methods. The course is a first step in encouraging new talent in the wind sector and is designed for complete beginners to experienced candidates who have knowledge of technical systems and want to move into the wind sector.

"The transition will require training and skills development of up to 200,000 workers, and we don't underestimate the challenge ahead, but we know that with our increased offering we're able to continue to serve the industry on its journey to net zero," Liebnitz said.

Gordon Andrew, technical training manager, will lead the new offering. Based in Aberdeen, Andrew has more than four decades of experience in the energy industry and joined RelyOn in 2021. "Our expertise in global safety training makes us perfectly placed to deliver these new courses,"

Andrew said. "And with our latest investment in updating our facilities in our U.K. energy hubs, we can ensure our clients receive the highest standard of technical training, in a location that's convenient for them."

MORE INFO relyonnutec.com

MANUFACTURING

Vestas to repower three projects in the U.S.

Vestas has received a 158 MW order to repower three undisclosed projects in the U.S. The order consists of 72 V120-2.2 MW turbines for the three projects. The customer is not disclosed.

The orders include supply, delivery, and commissioning of the turbines, as well as a 10-year Active Output Management 5000 (AOM 5000) service agreement, designed to ensure performance of the asset. In the U.S., Vestas has repowered more than 1 GW of projects in the last five years across all major turbine brands. Turbine deliveries for each project are expected to begin in the fourth quarter of 2023 with commissioning scheduled for the fourth quarter of 2024.

MORE INFO www.vestas.com

MANUFACTURING Tecoi introduces welding edge prep machine

Tecoi North America has introduced to the North American market the TRF plate processing machine, a solution for heavy welding edge preparation and drilling.

The machine is designed for applications where large machining milling capacities are required for medium and large thicknesses. It is an optimal solution for industries with demanding regulations that require critical welding edge preparation, such as wind-tower fabrication, civil construction, shipbuilding, large steel structures, large vessels, and petrochemical infrastructure.

The TRF incorporates CBM® Cold Bevel Milling technology to create complex bevels in a single, high-speed cut. This results in improved quality and dimensional tolerance, without affecting the material properties of the metal.

The edges do not need to be cleaned after the bevel is cut, and the quality issues common with thermal beveling are eliminated. Bevels for narrow gap welding can be milled in one pass. Customized milling tools with specific geometries are available.

In addition to the CBM Cold Bevel Milling technology, the TRF plate processing machine also features an automatic multi-head system that duplicates productivity in the same processing station.

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TAILWINDS

THE BUSINESS OF WIND



A built-in automatic tool storage selection system is also available, capable of storing and configuring five tools for each job. A marking system can be provided for laser, plasma, scribing, micro-percussion, and ink, with options available for text, numbers, bar codes, auxiliary lines, etc. Tecoi's exclusive Vibratec® chip evacuation system can also be added as an option, which can save users up to 40 percent in cleaning operations, waste removal, and machine downtime. Tecoi designs and manufactures customized solutions for industries including steel service centers, steel construction, heavy duty machinery, the oil and gas industry, shipyards, and wind power. \checkmark

MORE INFO www.tecoi.com/en

The TRF machine provides a solution for industries with demanding regulations that require critical welding edge preparation. (Courtesy: Tecoi North America)

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THE FUTURE OF WIND

HOW TO REFRESH OFFSHORE WIND'S HIRING STRATEGY

The industry regularly talks about the potential to bridge the skills gap by filling roles with candidates from adjacent sectors such as oil and gas. (Courtesy: Shutterstock) Across the renewables industry, creating an ample pipeline of talent remains a work in progress, with the pressure set to increase as markets grow in line with global ambitions.

By JORDAN MASON

istorically, offshore wind developers have relied nearly entirely on exporting expertise from Europe to fill open vacancies in developing markets. But exponential growth expected from emerging markets such as North America, Taiwan, and Japan will put a squeeze on talent.

Last year, the Global Wind Energy Council estimated 3.3 million direct offshore wind energy supply chain jobs could be created by 2025 based on its annual growth estimates. Indeed, the U.K.'s wind industry has grown a staggering 16 percent year on year, and is set to employ more than 97,000 people by 2030. Similarly, North America's recent target to install 30 GW by 2030 is expected to create nearly 80,000 jobs. Although competitive salaries, attractive benefits packages, and well-defined career prospects will attract candidates to the sector, this can only go so far. Rather, a refreshed talent strategy is required to ensure projects are not unduly delayed by a shortage of skills. What that strategy looks like will ultimately vary by geography; however, there are several universal considerations to be made.

THE GEOGRAPHICS OF RECRUITMENT NEED A SHAKE-UP

If the global pandemic taught us anything, it is that many jobs do not need to be executed in a specific location all the time, and we need to upskill local candidates to serve in emerging markets.

Most workers have an interest in relocating, often allured by the idea of an accelerated career path. However, for many, the practicalities of family life and the usual visa implications create a challenge in turning this aspiration into actuality. If we remove the obstacles of location and time zones, many more candidates for niche roles suddenly become available. Rather than requiring complete relocation, candidates could be given the option of the same role with occasional international travel.

A further consideration is keeping recruitment trends in mind. Year after year, Airswift's Global Energy Talent Index (GETI) finds that Europe is the preferred destination for relocation within the renewables sector. Instead of basing a role on location, companies may find it easier to advertise the role as being based in Europe and provide assistance to relocate global candidates.

Although European fabrication will continue to be a major export, emerging markets, particularly those in Asia, are increasingly establishing their own supply chains and recruitment needs. The global pandemic gave us a glimpse of what life will be like if we do not source more of the workforce locally to meet those needs — in short, this picture is full of project delays. Successful recruitment of client representatives and quality control roles from competent local

content will be vital for ensuring high-quality fabrication from hotspots such as China, Taiwan, and Korea.

Similarly, as offshore wind's footprint expands globally, it is essential that companies upskill local workforces to ensure global standards for safety and quality are adhered to without the need to import this expertise from elsewhere. Creating a heightened safety culture is a substantial undertaking that will need careful and consistent implementation over a long period of time.

THE TECHNOLOGY SECTOR IS A PEER

There is an increasing overlap in skills between the renewables and technology sectors. Expertise in SCADA systems, cyber security, and IT are all highly sought after by offshore wind. As such, the technology sector is a peer and a rival for talent from which the renewables sector often faces stiff competition.

While remuneration and benefits packages are becoming more comparable, one major selling point of the renewables sector is typical contract lengths. Most offshore wind projects take several years to design, build, and commission, which presents the opportunity for contractors to work on one project and with one team for an extended period. This not only offers job security, but also a depth of experience that is not so readily achieved if working on several shorter projects.

BEING OPEN TO DIFFERENT EDUCATION AND EXPERIENCE

It remains quite common to see highly competent candidates sifted out of the interview pile because they do not meet specific education or experience requirements considered essential to the role. And the same happens in reverse, too — well-qualified candidates are put off applying because they don't have a master's degree in renewable energy or sustainable engineering, for example, despite having worked in the sector for the best part of a decade.

The industry regularly talks about the potential to bridge the skills gap by filling roles with candidates from adjacent sectors such as technology, oil and gas, and power, but we won't be able to make this happen at scale if we don't become more open minded about the backgrounds of candidates that we interview. Every job description should be thorough to ensure everything that is labeled essential is indeed essential and could not possibly be achieved any other way.

OFFER CERTIFICATION AND TRAINING TO SUITABLE CANDIDATES

Many candidates from adjacent sectors have a wealth of complementary skills that would make them an ideal fit for off-



There is an increasing overlap in skills between the renewables and technology sectors. (Courtesy: Shutterstock)

shore wind but naturally do not have the right Global Wind Organization (GWO) certificates to do so. The package cost for all five mandatory safety courses is more than a thousand pounds, which is prohibitive to some would-be applicants.

Industry initiatives that ease the burden of certification on the worker are welcomed. For example, GWO's Safety Training Access program allows qualifying workers with existing certification to follow a fast-track route rather than undertake the full mandatory training. However, offering certification as part of all appropriate recruitment drives, and particularly for positions that are renumerated via payroll, would significantly boost the number of potential candidates applying.

Structural engineering roles are another good example. The principles for designing an oil and gas jacket foundation are not all that dissimilar to those for an offshore substation or wind-turbine generator (WTG) for an offshore wind project. Recruits may need support with learning new software or adhering to specific industry or geographic standards, but at the core, structural engineering is still structural engineering. Across the renewables industry, creating an ample pipeline of talent remains a work in progress, with the pressure set to increase as markets grow



As offshore wind's footprint expands globally, it is essential that companies upskill local workforces to ensure global standards for safety and quality are adhered to. (Courtesy: Shutterstock)

in line with global ambitions. Hiring managers will need to push on every open door to attract candidates into the sector and evolve their hiring strategies to support efforts to do so. \prec

ABOUT THE AUTHOR

Jordan Mason is the contract recruitment manager for Airswift.

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