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 energy.industry.maritime.



IN FOCUS

OFFSHORE WIND OPPORTUNITIES IN THE GULF OF MEXICO

The footprint of the region has generated interest in using that geographic scope for various potential wind projects.

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Reliability When It Matters Most

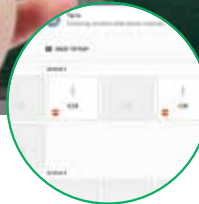
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▀ THE FUTURE OF WIND



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Association canadienne
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ÉOLIEN, SOLAIRE, STOCKAGE



Wind Systems (ISSN 2327-2422) is published monthly by Media Solutions, Inc., 2660 Yeager Parkway Pelham, AL 35124. Phone (205) 380-1573 Fax (205) 380-1580 International subscription rates: \$72.00 per year. Periodicals Postage Paid at Pelham, AL and at additional mailing offices. Printed in the USA. POSTMASTER: Send address changes to Wind Systems magazine, P.O. Box 1210 Pelham AL 35124. Publications mail agreement No. 41395015 return undeliverable Canadian addresses to P.O. Box 503 RPO West Beaver Creek Richmond Hill, ON L4B4R6. Copyright 2006 by Media Solutions, Inc. All rights reserved.



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FROM THE EDITOR

Good news for wind — and the planet

Steps to get a handle on the planet's climate problems recently got an unprecedented boost when President Joe Biden signed the Inflation Reduction Act into law August 16.

The legislation includes many positive investments in the country's present and future — including tackling deficit reduction, health-care access, and prescription drug pricing, but it's the law's climate change initiatives that are making the renewables industry really take notice.

The law sets up some ambitious net-zero goals such as reducing carbon emissions by 40 percent below 2005 levels by 2030. To do that, the law locks in tax credits for wind and solar into the next decade. This will help with the creation of new jobs and economic development.

Provisions within the law also take into account the need for materials used to make solar panels and batteries, and — most especially for our readers — the development of offshore wind.

The American Clean Power Association was ecstatic over the bill's passing.

"With the stroke of the pen, a clean-energy future is now the law of the land," said Heather Zichal, CEO of American Clean Power Association. "This does for climate change and clean energy what the creation of Social Security did for America's senior citizens. This law will put millions more Americans to work, ensure clean, renewable and reliable domestic energy is powering every American home, and save American consumers money. For our industry, it's the starting gun for a period of regulatory certainty which will triple the size of the U.S. clean-energy industry and generate over \$900 billion in economic activity through construction of new clean-energy projects."

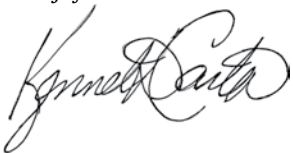
Offshore wind is especially important for readers interested in what our September issue has to offer.

To prepare for ACP's Offshore WINDPOWER Conference & Exhibition in Providence, Rhode Island, October 18-19, our inFocus articles take a look at several aspects of the burgeoning offshore wind sector in the U.S., including supply chain challenges and the development of offshore wind in the Gulf of Mexico.

In addition to our offshore articles, this month's issue also preps you for Canada's tradeshow as well. Electricity Transformation Canada is CanREA's annual conference in Toronto from October 26-28, 2022.

To get you in the mood for that show, I talked with CanREA President Robert Hornung on the state of Canadian wind and other renewables and what challenges Canada will need to tackle in order to meet some ambitious net-zero goals.

Enjoy those articles and much more, and, as always, thanks for reading!



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Published by Media Solutions, Inc.
P.O. Box 1987 • Pelham, AL 35124
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Rep. Tonko receives Clean Power award

From ACP

In celebration of American Clean Power Week, the American Clean Power Association (ACP) presented Rep. Paul D. Tonko (D-NY) with a Clean Power Champion award at Key Capture Energy's NY 1 energy storage project August 18.

Tonko was joined by representatives from ACP, Key Capture Energy, the Alliance for Clean Energy (ACE) NY, the New York Battery and Energy Storage Technology Consortium (NY-BEST), and NYSEERDA. The delegation conducted a site visit of the Key Capture NY1 project. The 20-MW project is the largest lithium-ion battery storage project in New York State, providing clean energy that enhances power grid performance and reliability, along with supporting the state's goal to reach 1,500 MW of energy storage by 2025.

"As co-chair of the Sustainable Energy and Environment Coalition, which promotes clean-energy technology innovation and domestic manufacturing, Rep. Tonko leads one of the largest and most effective caucuses committed to advancing high-impact clean energy, environmental, and climate priorities," said Moira Cyphers, ACP Director for Eastern State affairs who presented Rep. Tonko with the award.

"Rep. Tonko is known for his tireless efforts on offshore wind, expansion of clean power in his home state of New York, and leading critical transmission investments during the consideration of the bipartisan infrastructure bill," said Heather Zichal, American Clean Power Association CEO.

"Congressman Tonko has long been a champion for clean energy in New York State and his partnership at the federal level is unparalleled as we work together to tackle some of the most pressing climate and energy issues of our time," said Doreen M. Harris, President and CEO, NYSEERDA. "This well-deserved award is a true testament to the Congressman's commitment to advancing historic actions to build a thriving green economy while fighting for more resilient communities and a cleaner future for all New Yorkers."



American Clean Power is the voice of companies from across the clean-power sector that are powering America's future. For more information, go to www.cleanpower.org

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DIRECTION

THE FUTURE OF WIND

Each seabed lease site would abate tens of millions of tons of CO₂.
(Courtesy: Cerulean Winds)

Cerulean Winds to bid for four seabed lease sites for offshore development

Green-energy infrastructure developer Cerulean Winds will bid for four seabed lease sites to decarbonize the U.K.'s oil and gas sector as this scale will remove more emissions quickly, keep costs lower for platform operators, and provide the anchor for large scale North-South offshore transmission.

The floating offshore wind and green energy proposal for Crown Estate Scotland's Innovation and Targeted Oil and Gas leasing round (INTOG) includes four 1.5 GW sites of floating wind power.

With more than £6 billion of investment proposed for each 100-turbine site, the scheme would abate tens of millions of tons of CO₂ in line with North Sea Transition Deal targets.

Cerulean Winds, with its selected delivery partner NOV, has been engaging the supply chain for more than 18 months and has a live request for information (RFI) with U.K. yards for the fabrication and assembly of its tri-float technology.

The development would create more than 10,000 jobs, many of which would be high value manufacturing jobs in Scotland.

"We have a big, bold bid, which is ready to go on scaling the green economy, creating thousands of jobs and making Scotland's oil and gas production the cleanest in the world," said Dan Jackson, Cerulean Winds founding director. "We are absolutely committed to the local supply chain benefiting from this development and far surpassing local content targets. Our base structure design can be floated in very shallow water depths suitable for the U.K., unlike alternative cement floating wind structures which require 90 meters so can't be built here."

"There is a lot of concern about rising energy prices and energy security," he said. "Wind and green energy at this scale are a big part of the solution. We are engaging with oil and gas operators and can see the appetite is there

to get behind cleaning up production, and we can deliver in a way that minimizes disruption. Whilst smaller piece-meal wind developments are useful for testing concepts or innovations, it will take a U.K.-wide solution to remove the emissions at the pace required to hit the net-zero targets governments. Furthermore, our large-scale scheme lowers the LCOE — cost of the power — which is highly attractive to the operators."

MORE INFO ceruleanwinds.com

DNV names climate equity associate director

DNV has named Cici Vu as an associate director of energy and climate equity.

Vu has more than a decade of experience across climate change, water and air quality, energy, natural resources, transportation, housing, homelessness, public health, and safety sectors. An experienced mediator and facilitator, she works with utilities, public agencies, and investors, who are benefactors and advocates of clean-energy investments, to develop strategies, which consider and engage vulnerable and hard-



DNV has welcomed Cici Vu to its Energy and Climate Equity Team. (Courtesy: DNV)

communities. Vu helps stakeholders navigate politically complex environmental, social and racial conflict, and large-scale, collaborative programs involving government agencies, philanthropic entities, and underserved/environmental justice communities.

"We consume energy as pervasively as we do water, air, and food for our

basic health and well-being," Vu said. "Yet, egregiously, more than one-third of our communities in the U.S. face basic, yet wrenching trade-offs: heat or eat? To achieve an equitable energy transition, our frontline communities must be empowered to self-determine the solutions right for them."

MORE INFO www.dnv.com

TÜV NORD prepares assessment for Philippines wind farm

TÜV NORD has prepared an energy yield assessment for one of the first large wind farms in the Philippines for the Bremen-based project developer and operator of wind and solar farms wpd and cooperation partner Triconti ECC Renewables Corporation. The AEP report (annual energy production) is very important for the planning of a wind farm in order to estimate the wind conditions at the planned site and to calculate the expected energy yields. Site assessment experts from TÜV NORD GROUP in Hamburg and Athens worked closely together to produce the technically demanding report for the project.

The Aklan wind farm is being built in a hilly area on the north-western tip of Panay Island at an altitude of between 123 meters to 362 meters above sea level. According to wpd, commissioning is scheduled for the end of 2025 or the beginning of 2026.

As the wind-farm area is considered a complex terrain according to IEC classification, CFD (Computational Fluid Dynamics) modeling was carried out for the project by wind-energy experts in Athens. The results of this flow modeling were then used for further calculations in Hamburg.

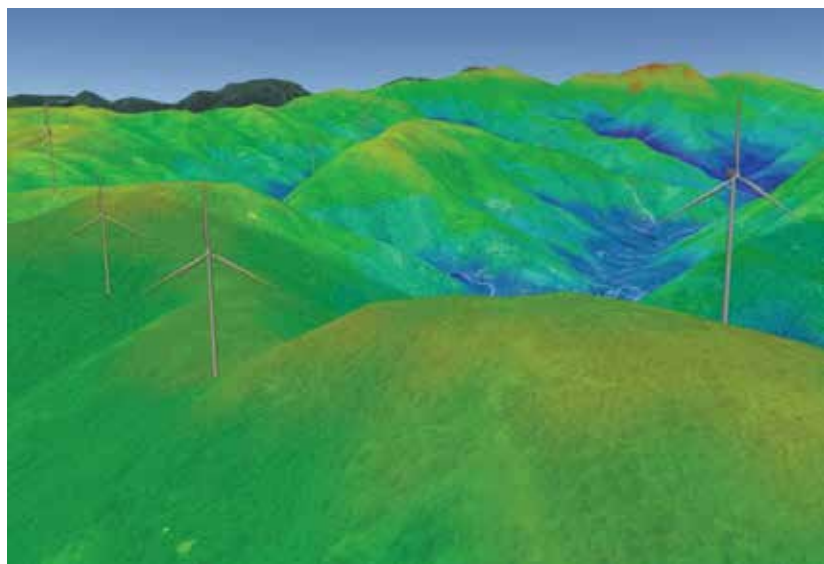
The yield assessment was based on wind measurements that wpd and its cooperation partner Triconti ECC had previously collected at the planned

site using several measuring masts and Lidar devices. The combination of two measurement methods and also the correlation among the data sets enabled a comprehensive picture of the wind conditions in the challenging terrain. With these evaluations and the CFD modeling, the Hamburg site assessment experts of TÜV NORD determined the wind potential at the respective locations of the planned wind turbines and thus predicted the expected energy yield.

MORE INFO www.tuev-nord-group.com

BASF to supply clean energy to 20-plus U.S. sites

BASF is committed to renewable energy solutions to power its sites across the United States and has entered into virtual power purchase agreements (VPPAs) for wind and solar power total-



TÜV NORD created a visualization of the wind farm. (Courtesy: TÜV NORD)

ing 250 MW. They are designed to offset the carbon-intensive grid-supplied electricity being used at more than 20 of BASF's manufacturing sites in sever-

al states across the country, from Texas to Michigan.

"Renewable energy is an essential tool to reach BASF's ambitious goal

27 ——— 30
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of net zero emissions by 2050,” said Michael Heinz, member of the board of executive directors, BASF SE and chairman and CEO of BASF Corporation. “We are committed to further improving our energy footprint in the region, and we are eager to drive the energy transition for chemical manufacturing in North America.”

The combined agreements for the output of 250 MW of renewable generation capacity will result in the purchase of more than 660,000 MWh of electricity per year — the equivalent of electricity consumed by more than 90,000 average U.S. households. Based on EPA estimates, the VPPAs will offset more than 472,500 metric tons of CO2 emissions annually. With these agreements in place, the share of renewable energy in BASF’s total North American electricity consumption will rise to more than 25 percent.

“These agreements help us reach our clean-energy goals in areas where the local electric utility does not supply adequate renewable power,” said Tobias Dratt, president of BASF North America. “At the same time, our financial commitment enables the realization of large solar- and wind-power projects and adds clean energy to the grid.”

To realize its ambitious emission goals, BASF is collaborating with various partners who are driving the sustainable change of the energy sector. The chemical company will purchase 100 MW of power generated by Dawn Solar. An additional 150 MW of renewable energy capacity will be added through transactions with EDF Energy Services.

Last year, a collaboration with EDF Energy Services added 35 MW of wind capacity to the energy mix for BASF’s manufacturing sites in Freeport and Pasadena, Texas. In another joint project with EDF Renewables, BASF’s property in Toms River became home to New Jersey’s largest solar project and the largest solar project built on a Superfund site in the United States.

BASF aims to reduce its greenhouse gas emissions by 25 percent compared with 2018 by 2030 and achieve net-zero

emissions by 2050. One important lever to bring down emissions is to replace fossil-based electricity with fossil-free electricity. BASF aims to secure the required amounts of renewable power it needs through a “make and buy” approach.

MORE INFO www.basf.com/us

Crowley names Karl as senior VP and GM of Wind Services

Crowley has appointed Bob Karl as senior vice president and general manager of the company’s new business unit, Crowley Wind Services. As Crowley el-



Bob Karl (Courtesy: Crowley)

evates the scope of its offerings in wind energy, Karl will lead the company’s wind services team in the strategic development and expansion of services to support the emerging sector.

The development of a wind service business unit emphasizes the importance of wind to Crowley’s diverse portfolio to customers and the company’s commitment to clean-energy services. The company will continue to leverage its expertise and assets to provide landside and marine logistic solutions throughout the wind lifecycle. These include solutions for port terminals and marshaling, vessel development and operation, engineering, and the U.S. workforce.

Karl is a long-time energy industry leader, serving more than two decades in various global leadership and management roles at GE, as well as other renewal energy and manufacturing roles. From 2011 to 2018, he was North American wind-projects director for GE Renewable Energy and most recently served as COO of GE Renewable Energy Global Services since 2018. ✈

MORE INFO www.crowley.com



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The background image shows a vast offshore wind farm in the Gulf of Mexico. Several large wind turbines with three blades are visible, their towers rising from the ocean. To the right, a large red and white construction vessel, likely a jack-up barge, is positioned near the turbines. The sky is a clear, deep blue, and the water is a lighter blue with some whitecaps. The overall scene conveys a sense of large-scale renewable energy development.

IN FOCUS

OFFSHORE ► CANADA

OFFSHORE WIND OPPORTUNITIES IN THE GULF OF MEXICO

The vast potential for renewable wind energy in the Gulf of Mexico (whether via grid generation, green hydrogen, or otherwise) has been recognized by all coastal states with the establishment of the Gulf of Mexico Intergovernmental Renewable Energy Task Force.



Despite what is understood as the limited “wind to grid” capacity in the Gulf of Mexico, the footprint of the region has generated interest in using that relatively expansive geographic scope for various potential wind projects.

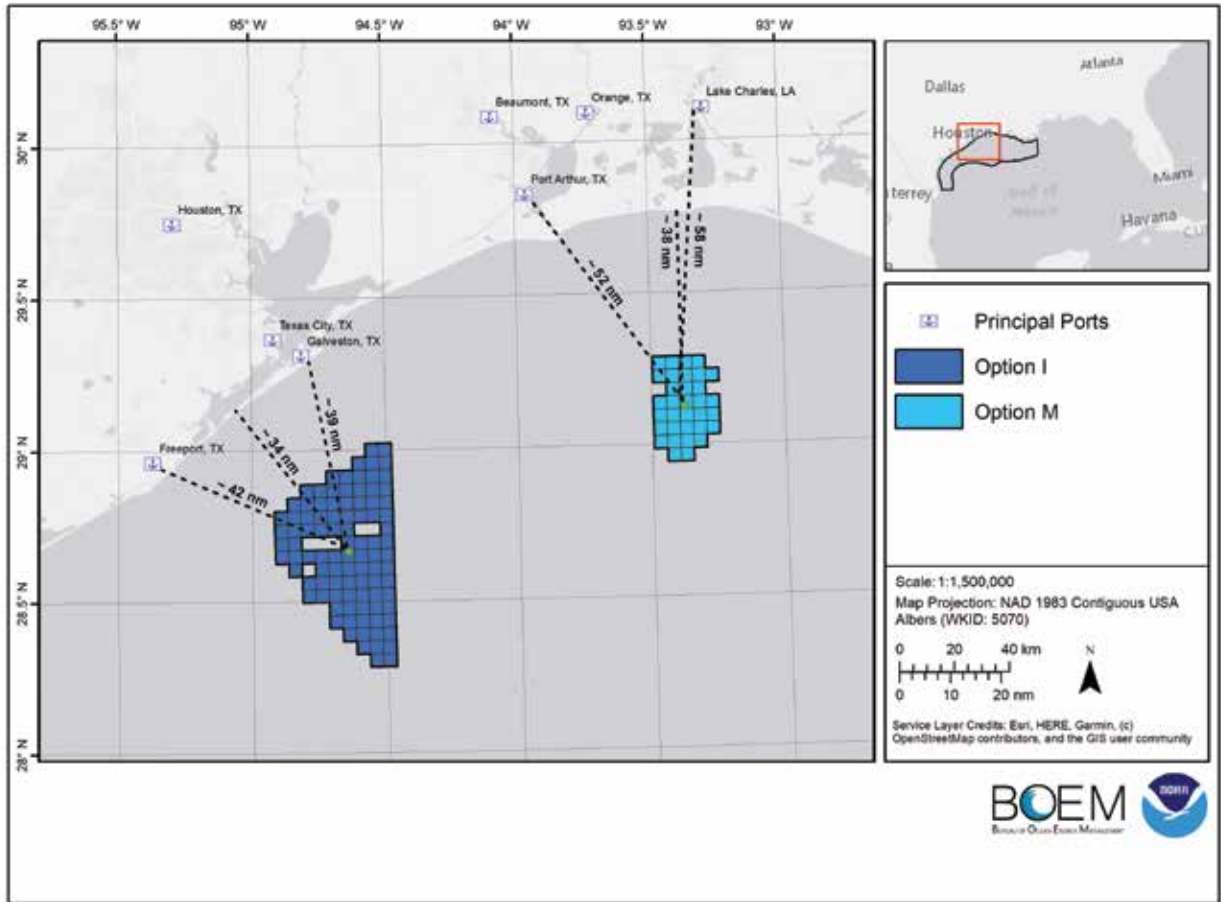
By CHRIS HANNAN and JOE TIRONE

As the United States’ burgeoning offshore wind industry has dominated headlines and begun putting steel in the water along the Eastern seaboard, it has done so thanks in no small part to the equipment, know-how, and experience of the oil and gas services industries throughout the Gulf Coast. Just as the Cajun Mariners helped develop the modern offshore oil and gas industry [1] in the Gulf of Mexico as we currently know it, the next generation of Cajun, Texan, and other Gulf Coastal marine, oil and gas service companies have already begun applying their skills and experience to building a new renewable American energy industry in offshore wind. And those same companies are on the brink of many new opportunities as the traditional vents de carême (literally “Lenten winds,” a Cajun French term for “strong spring winds” typically prevalent in the weeks before Easter in southeast Louisiana) in the Gulf of Mexico are poised to become part of that new wind economy.

And while preparing for the imminent rise of offshore wind in the Gulf, Gulf Coast oil and gas service companies — along with the banks and engineering/consulting firms that have supported oil and gas projects in the petroleum energy economy — can take immediate advantage of their unique experience and skillsets to become part of the expanding (and increasingly critical) offshore wind supply chain necessary to meet U.S. renewable energy goals.

FAIR WINDS AND FOLLOWING SEAS: FEDERAL SUPPORT FOR A DOMESTIC OFFSHORE WIND INDUSTRY

Offshore wind has been a huge focus of the Biden administration, from both a policy and fiscal standpoint. The administration has put a goal in place of 30 GW of offshore wind power by 2030. [2] As to be expected with what is essentially a “startup” industry (at least in the U.S.), opinions are mixed as to whether this goal is feasible, given current



Wind energy area option blocks in the Gulf of Mexico. (Courtesy: BOEM)

permitting, supply chain, and workforce challenges [3]; but most agree that even if it is a “stretch” goal, it is achievable with the right governmental support at the federal and state levels, and with market ingenuity. [4] This renewed focus on building a domestic renewable wind industry is a marked change from the Trump administration, during which offshore wind efforts had essentially been stalled. [5]

To back up this ambitious goal, the Biden administration has bulked up the regulatory agency (Bureau of Ocean Energy Management, BOEM) that issues federal leases and permits for offshore wind farms. [6] Likewise, the administration recently revitalized the Federal Permitting Improvement Steering Council (FPISC), a little-known federal agency (whose budgetary authorization had been set to expire in December of 2021) that fosters inter-agency coordination across the broad spectrum of federal agencies necessarily involved in the offshore wind permitting process (BOEM, National Oceanic and Atmospheric Administration, U.S. Army Corps of Engineers, U.S. Coast Guard, and others). [7] The FPISC will be focused on ensuring a clear, efficient, and speedy path to final permitting for offshore wind-project developers, which will (theoretically) in turn allow those

developers to provide more certainty and predictability in their downstream contracts with suppliers and OEMs. Likewise, the Biden administration budgeted an 86 percent increase for the Wind Energy Technologies Office (WETO) within the Department of Energy to facilitate R&D for scaling up the offshore wind infrastructure. [8]

STEEL IN THE WATER: CURRENT STATUS OF DOMESTIC OFFSHORE WIND PROJECTS

In the midst of all this activity, the largest permitted project to date — Vineyard Wind off the coast of Massachusetts, being developed by Avangrid Renewables and Copenhagen Infrastructure Partners — has commenced onshore construction and will begin offshore construction/installation next spring. Vineyard Wind took essentially four years to work through the permitting process (and six years total from lease sale), a pace that would not allow for the “30 by 30” goal to be reached.

That said, under the Biden administration’s bulked-up BOEM and other wind-centric agency improvements, the process for future projects is expected to go more quickly (but could still take at least two years [9]). The following pro-

vides a fairly broad 80,000-foot summary of where things currently stand in terms of the offshore wind pipeline:

Two major ... projects with about 940 MW of capacity have reached [final investment decision] and have commenced onshore construction, more than 15 GW of projects are undergoing federal permitting review, 17.5 GW of project capacity has secured offtake commitments from states, auctions containing 12-to-16 GW of potential will be concluded before the end of this year, longer term leasing plans for the Gulf of Mexico, the Central Atlantic, Oregon, and the Gulf of Maine are being developed for auctions before the end of 2024, turbine component, foundation, and cable factories and Jones Act wind-farm vessels are being built in the U.S. and offshore wind port development is accelerating. — www.oedigital.com/news/495870-what-to-expect-from-the-us-offshore-wind-market-this-year

As things stand, offshore wind on the East Coast is a tangible reality, primarily because the Atlantic coast has the best/most consistent wind closest to population centers that can off-take the power. To this end, the Biden administration very recently announced an Eastern seaboard federal/state partnership in support of building out offshore wind infrastructure and economies: “Eleven leading states along the East Coast will participate in this new partnership, a first-of-its-kind forum for collaboration between federal and state officials to accelerate offshore wind progress.” [10]

NEW HORIZONS: OFFSHORE WIND IN THE GULF OF MEXICO AND PACIFIC COAST FOR GRID TRANSMISSION AND BEYOND

But as sure as the annual “Lenten Winds,” offshore wind in the Gulf of Mexico (GOM) and the West Coast is coming, with the first GOM lease sale (from among 11 BOEM-designated wind lease areas [11]) tentatively scheduled for early 2023. BOEM recently announced (on July 20, 2022) the first two draft wind-energy areas (WEAs) off the coasts of Galveston, Texas, and Lake Charles, Louisiana, which combined have the potential to power more than 3 million homes. [12] These first two draft WEAs have been culled down from the original 30-million-acre GOM “call area” originally identified in October 2021, based on BOEM review of data for avoidance of conflicts with other ocean uses (i.e., commercial/recreational fishing, maritime navigation, existing offshore infrastructure, military activities, and protected marine/avian species). [13]

The two draft WEAs will be subject to public comment period, which was scheduled to close on August 20, 2022. A similar process is underway for lease-area-identification and sale processes for the West Coast, with the anticipated West Coast lease sale to follow in 2023. [14]

Likewise, the recently passed Inflation Reduction Act, the highly touted keystone legislation supporting the Biden administration’s “Build Back Better” theme, includes numerous tax credits and financial incentives intended to “supercharge” offshore/renewable wind development in the United States, including in the GOM and West Coast, by incentivizing investment in offshore wind development

projects as well as in manufacturing of offshore wind components and infrastructure, including support/installation vessels, to create a robust and efficient domestic supply chain. [15]

However, there are only a few areas of the GOM with sufficient quality/consistency of wind to support direct wind-to-grid operations, and the West Coast will require floating infrastructure (not bottom-fixed infrastructure) due to the near-shore depths on the Pacific shelf. Floating wind turbines have been deployed on a limited scale in Europe, but not at grid-scale (although the technology for floating is rapidly advancing). Nonetheless, the state of California has formally made offshore wind development a line-item priority pursuant to a legislative edict fleshed out by a recently issued plan by the California Energy Commission, which focus on floating infrastructure and anticipated fast ramp-up of floating technologies. [16]

Further, another potential alternative use for wind energy in the GOM would be to power offshore carbon sequestration — i.e., to provide on-site, on-demand offshore electricity, without requiring extensive transmission infrastructure and/or taxing onshore grids servicing population centers, to power compressors that can inject and store under pressure captured carbon in depleted offshore oil and gas well formations. Indeed, this potential alternative use for offshore wind was specifically incorporated into the infrastructure bill passed by Congress and signed by President Biden in late 2021. [17]

PERIODIC WINDS, PERIODIC TABLES: GREEN HYDROGEN IN THE GULF OF MEXICO

Despite what is currently understood as the limited “wind to grid” capacity in the GOM, the shear breadth/square area footprint of the GOM has generated interest in using that relatively expansive geographic scope, which has consistent if not qualitatively sufficient wind for grid-generation purposes, to install smaller wind turbine units — perhaps on existing no-longer-viable oil and gas infrastructure. These smaller but more numerous installations could then be used to generate electricity to power offshore electrolyzers that convert desalinated sea water to liquid hydrogen, which could in turn be shipped via existing oil and gas pipeline infrastructure back to shore for use in myriad potential applications. Green hydrogen in the GOM is, in many analysts’ view, the most imminently viable means of harnessing offshore wind energy in the GOM. [18]

A green hydrogen market could be a huge boon for Louisiana and Texas — and provide new opportunities for the existing oil and gas midstream service sector — given the number of chemical plants, the potential for hydrogen fuel cell truck transportation on the Interstate 10 corridor, redundancy/backup for utility power generation, alternative/renewable fuel for powering marine terminal/port infrastructure and “cold ironing” vessels in port, and use as a marine fuel to meet upcoming maritime carbon emission restrictions as well as investment/market-based ESG

initiatives. To this last point, New Orleans-based Maritime Partners, LLC is currently building a proof-of-concept true zero-emission 2000 HP inland pushboat, the HYDROGEN 1, which will be powered by methanol feed/fuel stock, processed via onboard methanol reformers, into liquid hydrogen to run hydrogen-fueled engines. [19]

GOM COASTAL STATES ESTABLISH RENEWABLE ENERGY TASK FORCE, LOUISIANA STATE WATERS LEASING

The vast potential for renewable wind energy in the GOM (whether via grid generation, green hydrogen, or otherwise) has been recognized by all coastal states with the establishment of the Gulf of Mexico Intergovernmental Renewable Energy Task Force, [20] an effort that was spear-headed by Louisiana Gov. John Bel Edwards' office in the fall of 2020. The Task Force has held two meetings with BOEM and is actively engaged in making renewable wind energy a reality in the GOM.

Louisiana has further continued to lead the charge toward a wind economy in the GOM, including recently passing state legislation authorizing and establishing a process for installation of wind facilities in state territorial waters (which would potentially allow for speedier permitting than the federal leasing process), all toward Louisiana's state goal of 5 GW of renewable offshore wind power by 2035. [21] Analysts view this state-water path as a potential incubator for smaller proof-of-concept wind-to-electricity projects, as well as wind-to-green hydrogen. [22] Louisiana Rep. Jerome Zeringue, one of the co-sponsors of the legislation along with Rep. Joe Orgeron, has indicated that he expects the first Louisiana state lease sales (for wind leases in state territorial waters) "should occur in the next 18 months." [23]

TRADE WINDS – PRIVATE SECTOR INVESTMENTS IN THE DOMESTIC OFFSHORE WIND MARKET

And the private sector is getting involved as well: In April, Germany-based RWE Renewables (a leading offshore wind developer) entered a formal partnership with GNO, Inc. (the regional economic development nonprofit organization serving the 10-parish region of Southeast Louisiana that includes Jefferson, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John the Baptist, St. Tammany, Tangipahoa, and Washington parishes) "to build a program that will help existing Louisiana companies, especially in oil and gas, participate in the growing national supply chain for offshore wind." [24]

The goal of the partnership is to conduct outreach to "existing Louisiana companies with transferable capabilities for offshore wind [—] for example, companies that build oil rig jackets (underwater towers) can do the same for offshore windmills [—]... to provide leading energy companies, like RWE, with viable supply chain contacts to fulfill their need to deploy several gigawatts of offshore wind power."

Despite all this progress, there remain challenges, and

arguably the biggest one facing the U.S. offshore wind industry as a whole is the creation of a viable, sustainable domestic supply chain, from domestic construction of components to logistics to move components — including perhaps most prominently vessels and port/terminal facilities — workforce training, etc. And of course, behind all of this is the need for capitalization, either through market capital or governmental support/incentives or (most likely) some combination of the two.

LOAN GUARANTEE PROGRAM FOR OFFSHORE WIND TECHNOLOGIES

The Biden administration has allocated a tremendous amount of funds to facilitate/encourage offshore wind investment through various modes (direct federal lending support through the Loan Programs Office of the Department of Energy, port/infrastructure grants through the Maritime Administration, dedicated funds/incentives in the Build Back Better bill, etc.). As specific examples, the Department of Energy's 2023 budget for FY 23 has allocated nearly \$350 million earmarked for development of wind technologies. [25]

Likewise, the DOE's Loan Guarantee Program has access to \$3 billion in loan guarantee capacity specifically for offshore wind technologies, including potentially supply chain and vessel construction support. [26] Additionally, the Maritime Administration (MARAD) has recently announced that financing of offshore wind installation/support vessels will be a priority under its Title XI vessel finance mechanism, with approximately \$475 million in capacity for construction guarantees under the program. [27] Further, in its most recent and upcoming lease sales, BOEM has been offering a 20 percent credit/rebate to successful bidders contingent on reinvestment of those funds into workforce development, vessel construction, and supply chain buildout. [28]

In addition to — and perhaps because of — these government efforts, the private/market sectors have also begun investing heavily in offshore wind. For example, the recent New York Bight federal lease sale resulted in the lease of 488,000 acres for a total of \$4.37 billion. [29] And the most recent lease sale of North Carolina brought winning bids totaling \$315 million. [30]

DOMESTIC SUPPLY CHAIN

As noted above, two of the most critical potential bottleneck areas in the domestic supply chain for offshore wind are port infrastructure and specialized vessel availability. The East Coast projects in particular have struggled to source sufficient port space (or even space available to expand existing ports) — i.e., "lay down" areas — to accommodate the extremely large offshore wind-farm components (blades, nacelles, and monopile structures). [31] As a result, much of the current mobilization has relied heavily either on direct trans-Atlantic mobilization from European manufacturers, or from Gulf Coast manufacturers/ports (who have experience/expertise in building oil and gas infra-



The emerging offshore wind economy promises new opportunities for the Gulf Coast's existing oil and gas service industries, both at home and on the Atlantic and Pacific coasts.

structure components, and the port area to mobilize them). This sometimes results in tension for developers who often have local content requirements in contracts with their East Coast purchasers (utilities who will buy power from the eventual wind farm production). Also, it should be noted that, because most developers are coming from the long-existent European offshore wind industry, they already have efficiencies/economies of scale in place with European component manufacturers, so they are somewhat apprehensive about changing their models to start using untested U.S. manufacturing sources.

As to vessels, under a set of federal laws known as the Jones Act cabotage laws, any vessel that moves materials from a point in the U.S. to a point on the U.S. continental shelf (where most offshore wind farms are located) has to be U.S.-built, U.S.-owned, and U.S.-crewed.

Currently, there are no existing specialized wind-farm construction/installation vessels (although there are a few under construction, mostly with Gulf of Mexico shipyards). The Jones Act/vessel problem is a classic chicken/egg pre-

dicament: Developers need the vessels, but aren't willing to offer long term usage contracts for the vessels, because they (the developers) do not know what the timeframes will be for future wind-farm lease projects. Thus, because the developers are essentially working with one-at-a-time, long-lead projects, they are hesitant to commit to long-term charters/rentals of vessels. In turn vessel owners/operators aren't willing to invest the capex — or more importantly, cannot convince banks to lend them the necessary capital — to build new vessels without long-term usage contract commitments from the developers. That said, there are an increasing number of these highly specialized vessels (including the largest Wind Turbine Installation Vessels (WTIVs) and Service Operations Vessels (SOVs), and Crew Transfer Vessels (CTVs)) being built in the U.S. to Jones Act compliance specifications. [32]

Further, as was the case with the first U.S. offshore wind farm at Block Island in Rhode Island, developers can deploy a Jones Act compliance feedering solution, whereby Jones Act compliance U.S. vessels (barges, tugs, and jackup vessels)

deliver wind-farm components to foreign-flagged vessels offshore for installation. [33]

LENTEN WINDS: OPPORTUNITIES TO EXPAND AND DIVERSIFY EXISTING INDUSTRIES

In the end, just as Louisiana's "Lenten Winds" coincide with spring and new growth, the emerging offshore wind economy promises new opportunities for the Gulf Coast's existing oil and gas service industries, both at home and on the Atlantic and Pacific coasts. Indeed, the supply chains necessary to build, support and sustain an American offshore wind industry will necessarily be national in scope and will not be sustainable if parochial interests prevail. The expertise and practical know-how developed over decades in the GOM oil and gas service industry is uniquely positioned to seamlessly provide expert, cost-efficient, and efficient/timely support to the wind industry.

The same fabricators who have made oil well jackets can easily retool to fabricate wind turbine monopiles. The oilfield service vessel shipbuilders can build to new wind support specs, and the vessel operators have the crews and administrative staff to operate them. The same ports and terminals across the GOM with the laydown space and equipment to station and transport oilfield project cargos from rig modules to pipeline infrastructure can dedicate those same assets to blades, nacelles and monopiles. And all the upstream industries that have supported the oil and gas energy industry for decades — banks, engineering consultants, logistics experts, etc. — can apply the same skills to the wind-energy industry.

Rather than presenting a challenge for reinvention, wind energy is an opportunity for oil and gas service providers to retool and diversify. And as a result, offshore wind will not (and certainly not in the short term) be a replacement for the existing, and extremely important, oil and gas industry in the Gulf. Rather, the advent of offshore wind in the GOM is better described as an "all-of-the-above" approach, as Rep. Zeringue of Louisiana has described in the context of the recent bill opening Louisiana state waters to wind leasing: "This is going to augment and support the oil service industry — oil and gas industry — that are primed to be able to take advantage of this new technology. I mean, if you can build an oil rig you can build a wind turbine." [34]

Both "energy" industries — traditional oil and gas and renewable wind — will work (and put people to work) side by side, as Michael Hecht, CEO of Greater New Orleans, Inc. has aptly described: "It's not an either/or; we think that there's going to be a portfolio approach, with renewables increasingly part of the mix." [35]

Questions for Gulf Coast Companies to consider regarding offshore wind supply chain opportunities:

► What phases of the offshore wind supply chain fit your company's service/expertise profile?

► What presence does your company have in the U.S. offshore wind market/supply chain currently?

► What geographical regions can your company service,

either directly or via local partnerships? East Coast? West Coast? Gulf?

► What challenges/questions does your company envision regarding its entry/role into the U.S. wind industry?

► What funding sources/incentives (public and/or private) would be helpful?

► What introductions would be helpful?

► What further information would be helpful to evaluate your company's potential opportunities in offshore wind?

► What specific answers to specific questions would help your company determine its role in the wind economy, both regionally and nationally? ↵

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REFERENCES

- [1] <https://64parishes.org/in-the-wind>
- [2] <https://www.whitehouse.gov/briefing-room/statements-releases/2021/03/29/fact-sheet-biden-administration-jumpstarts-offshore-wind-energy-projects-to-create-jobs/>
- [3] <https://www.rechargenews.com/energy-transition/bidens-ambitious-2030-us-offshore-wind-goal-unattainable-due-to-bottle-necks-ihs-markit/2-1-1045650>
- [4] <https://dailyenergyinsider.com/news/29720-biden-administration-announces-30-gw-offshore-wind-plan/#:~:text=E2%80%9CThe%20Biden%20Administration's%20ambitious%2C%20but,Zichal%2C%20CEO%20of%20the%20American>
- [5] <https://electrek.co/2021/01/26/egeb-first-major-us-offshore-wind-farm-asks-biden-to-restart-permits/>
- [6] <https://www.natlawreview.com/article/five-things-you-should-know-about-offshore-wind-development-right-now>; <https://www.boem.gov/newsroom/press-releases/biden-harris-administration-proposes-key-program-increases-bureau-ocean>
- [7] <https://news.bloomberglaw.com/environment-and-energy/new-biden-permitting-boss-looks-to-rebuild-interagency-muscle>
- [8] <https://www.energy.gov/eere/wind/articles/biden-administrations-budget-request-calls-increase-across-wind-energy-research>
- [9] <https://www.natlawreview.com/article/five-things-you-should-know-about-offshore-wind-development-right-now>
- [10] <https://www.whitehouse.gov/briefing-room/statements-releases/2022/06/23/fact-sheet-biden-administration-launches-new-federal-state-offshore-wind-partnership-to-grow-american-made-clean-energy/>
- [11] <https://www.rechargenews.com/wind/first-auctions-next-year-as-us-unveils-lease-bonanza-to-build-16gw-of-offshore-wind-in-gulf/2-1-1207600>



There are an increasing number of highly specialized vessels and Crew Transfer Vessels being built in the U.S. to Jones Act compliance specifications.

- [12] <https://doi.gov/pressreleases/department-interior-announces-next-steps-offshore-wind-energy-gulf-mexico>
- [13] <https://www.boem.gov/renewable-energy/state-activities/gulf-mexico-activities>
- [14] <https://www.govinfo.gov/content/pkg/FR-2022-05-31/pdf/2022-11537.pdf>
- [15] <https://crsreports.congress.gov/product/pdf/IN/IN11980>; <https://nawindpower.com/senate-passes-inflation-reduction-act-to-advance-clean-energy-deployment>
- [16] <https://www.energy.ca.gov/publications/2022/offshore-wind-energy-development-california-coast-maximum-feasible-capacity-and>
- [17] https://www.huffpost.com/entry/infrastructure-law-carbon-capture-offshore_n_62b4c08ce4b0cdccbe68d51a
- [18] <https://www.politico.com/news/2022/05/30/energy-wind-gulf-of-mexico-00035446>
- [19] <https://www.marinelog.com/inland-coastal/inland/maritime-partners-hosts-hydrogen-event-in-new-orleans/> <https://www.bunkerspot.com/global/56598-interview-fuel-cell-technology-piquing-the-interest-of-larger-operators-says-e1-marine>;
- [20] <https://www.boem.gov/renewable-energy/state-activities/gulf-mexico-gom-intergovernmental-renewable-energy-task-force>
- [21] <https://www.spglobal.com/marketintelligence/en/news-insights/latest-news-headlines/la-governor-signs-bill-creating-framework-for-state-s-1st-offshore-wind-farms-70882032>
- [22] <https://www.rechargenews.com/wind/offshore-wind-pilots-and-green-h2-louisiana-plots-way-forward-on-us-gulf-energy-journey/2-1-1248521>
- [23] <https://neworleanscitybusiness.com/blog/2022/08/04/louisiana-updates-offshore-wind-energy-legislation/>
- [24] <https://gnoinc.org/news/rwe-gno-offshore-supply-chain/>
- [25] <https://www.energy.gov/sites/default/files/2022-04/doe-fy2023-budget-volume-4.pdf>
- [26] https://www.energy.gov/sites/default/files/2021-03/DOE-LPO_Program%20Handout_T17-REEE-Offshore%20Wind_2021-03-26.pdf
- [27] <https://www.maritime-executive.com/article/marad-prioritizes-offshore-wind-vessels-for-title-xi-financing>
- [28] <https://www.govinfo.gov/content/pkg/FR-2022-05-31/pdf/2022-11537.pdf>; <https://www.doi.gov/pressreleases/biden-harris-administration-announces-wind-energy-lease-sale-offshore-carolinas>
- [29] <https://www.boem.gov/renewable-energy/state-activities/new-york-bight>
- [30] <https://www.doi.gov/pressreleases/biden-harris-administration-announces-winners-carolina-long-bay-offshore-wind-energy>
- [31] <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/scaling-the-us-east-coast-offshore-wind-industry-to-20-gigawatts-and-beyond>
- [32] <https://ww2.eagle.org/content/dam/eagle/publications/cutsheets/offshore-windfarm-support-vessels-cutsheet.pdf>
- [33] <https://www.tradewindsnews.com/offshore/deme-eyes-jones-act-compliant-feeder-solution-for-us-offshore-wind-farms/2-1-1213075>
- [34] <https://louisianaradionetwork.com/2022/08/02/new-law-opens-bigger-leases-for-wind-energy-and-sets-up-revenue-share-for-the-state/>
- [35] <https://64parishes.org/in-the-wind>

U.S. OFFSHORE AMBITIONS HINGE ON SUPPLY CHAIN

Installing and commissioning turbines offshore requires a variety of specialized vessels, ranging from wind-turbine installation vessels (WTIVs) to jack-ups, crew-transfer vessels, and cable laying vessels. (Courtesy: Motive Offshore)

With the proper planning and by incorporating some of the best experience from European models, the U.S. should be able to roll out robust offshore wind development.

By DECLAN SLATTERY

Bold action comes from bold ambition, and ambitions don't come much bolder than the United States' plan to scale up offshore wind capacity from 42 MW to 30 GW by 2030. That goal will require wind farms across almost the entire coastline, yet today there are no commercial-scale offshore wind farms operational in the country.

This will require an unprecedented pace of development. The U.S. is not allowing itself the luxury of the multi-decade timescales European pioneers such as the U.K. have allowed themselves. That's OK though, because the U.S. is not starting from zero and can build on the expertise and technology developed in Europe to accelerate the roll-out — and after all, if any country has proven its ability to deliver on supsize projects, it's the U.S.

How exactly then, can the U.S. incorporate the best of the European offshore wind industry to meet its ambitions? It helps to be specific, so let's focus on supporting installation infrastructure and supply chains.

THE PROBLEM OF PORTS AND VESSELS

Installing and commissioning turbines offshore requires a variety of specialized vessels, ranging from wind-turbine installation vessels (WTIVs) to jack-ups, crew-transfer vessels, and cable laying vessels. These, in turn, rely on specialist port infrastructure shoreside to load, service, and deploy them.

The U.S. has a shortage of the necessary specialized vessels. An obvious solution would be to source them from elsewhere, but this avenue is restricted by the Jones Act, which prevents foreign-built, owned, or manned vessels transporting goods between U.S. ports and, therefore, hinders the import of fleets from more mature markets. Eversource and Orsted recently announced construction on a 260-foot wind-farm service operations vessel, following behind Dominion Energy's Charybdis, the first Jones Act-compliant WTIV, projected to be sea-ready by 2023. The tight timelines involved in installing 30 GW by 2030 render it unlikely that a new compliant vessel supply will suffice, even if the order book balloons tomorrow — designing and commissioning such vessels is itself a multi-year undertaking. However, the challenge is surmountable. Indeed, the Jones Act has been in place since 1920, and in that time, another offshore industry with similarly complex requirements has thrived — the Gulf of Mexico oil and gas sector.

Possible workarounds include operating out of Canada for projects in the Northeast or relying on U.S.-flagged barges. The Jones Act applies from port-to-port, so for example, components could possibly be transported from the shore by barges to waiting WTIVs that have sailed from Europe or Asia.

Such solutions come with ingrained inefficiency and don't obviate the need for investment in U.S. specialist vessels, but they can make the short-term pain less acute.

ONSHORING THE OFFSHORE SUPPLY CHAIN

The U.S. also lacks a fully established domestic supply chain for offshore wind as of today; relying on an internationally dispersed and disparate supply chain could also impede development. Capital projects worldwide — and not just in the offshore wind sector — are suffering from materials shortages at the time of writing, and that problem is harder — and more expensive — to manage when suppliers are extremely remote.

As an added incentive to build out the domestic supply chain for the sector, local economies can be bolstered by local content and skilled employment opportunities. This is particularly important in the U.S., which takes pride in supporting a healthy ecosystem of independent service and equipment suppliers such as those so prevalent in the Gulf of Mexico and in the onshore oil and gas sector.

Fortunately, there are signs that elements of the U.S. offshore wind supply chain are clicking into place. Homegrown giants and specialists such as GE and Oceaneering have rich expertise earned abroad to bring to bear at home. Then there are other companies doing the reverse — taking expertise developed in far-flung home markets and applying it to the States. For example, the likes of JDR (U.K.) and Prysmian (Italy) have made strides in manufacturing sub-sea cables out of the U.S., and supermajor BP is poised to leverage expertise built in U.S. onshore wind, U.S. offshore oil and gas, and European offshore wind to move quickly in the space.

This appears to be a winning combination — a balance of American companies supplying American projects, and specialists from abroad plugging the gaps by creating American jobs in the process. However, there is a significant stumbling block in this regard, as it can be difficult for foreign companies to know where to base their U.S. operations. Different states apply different offshore licensing rules, employment law, taxes, and incentives, and it's impossible to know. The day after a decision is made, another state may announce an even better deal, leading to decision paralysis. In time, this problem will fade as different areas generate a critical mass of certain businesses and become the de-facto centers of gravity for their respective niches — but time is of the essence, and an expedited solution would help maintain momentum.

ALL EYES ON MARTHA'S VINEYARD

There is an urgent imperative to integrate and simplify buying services across a complex, far-flung international supply

chain. U.S. developers could benefit from neutral conveners capable of bringing together an ecosystem of equipment and providing an integrated end-to-end offering from equipment sourcing to operation.

In this context, it will be instructive to watch the progress of the 800-MW Vineyard 1 project off the coast of Martha's Vineyard — “a project that the industry has long treated as a harbinger of the industry's fortunes” and the first commercial scale offshore wind farm in the U.S.

At Motive Offshore, our knowledge and experience from working on wind projects across the U.K., Taiwan, and Europe allows us to supply reliable cable handling, lifting, and pulling equipment on both a purchase and rental basis to the offshore wind market. Our expert global teams also provide inspection services to the specialist vessels, which are vital to sustaining safe and efficient wind operations offshore. This can expand to include everything from equipment sourcing and testing to mobilization and operation under one umbrella. To date, we've provided support to more than 30 large, global offshore wind projects such as Greater Changhua in Taiwan, Seagreen in the U.K., and Vineyard in the U.S.

The U.S. can benefit from Europe's more mature offshore wind market, which has been able to join up everything from supply chains to design and engineering — both by sourcing services and components directly and by looking to its development for instruction. If it can get the balance right, the nascent U.S. offshore wind industry could become a tremendous source of jobs and wealth for the country and even bring that lofty 30 GW by 2030 target within reach. ↴

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A renewable hybrid power container. As an added incentive to build out the domestic supply chain for the sector, local economies can be bolstered by local content and skilled employment opportunities. (Courtesy: Motive Offshore)

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TACKLING TOUGH NET-ZERO GOALS

Even though renewables growth in Canada is quite impressive, it still has a long way to go in order to meet some important targets set by Canada's federal government such as net-zero greenhouse gas emissions by 2050 and a net-zero electricity grid by 2035. (Courtesy: Goldwind)



Canada is once again experiencing renewables growth, but the country still has a lot of work to do to meet set emissions reduction targets.

By KENNETH CARTER ▀ Wind Systems editor

Renewable energy growth in Canada started accelerating in 2021, and it's expected to grow even more by the end of 2022.

According to Robert Hornung, president and CEO of the Canadian Renewable Energy Association (CanREA), Canada saw almost 1 GW of new capacity installed in 2021. That gigawatt broke down into about 700 MW of wind and about 300 MW of solar.

"That was actually the largest annual installation we'd seen in about five years, so that was a really positive step," he said. "But the good news is that we'll blow by that this year. And we've already seen significant new builds so far in 2022. We may end the year with somewhere between 2,000 and 3,000 MW of new wind and solar capacity installed this year, and that's something we would expect to see again the following year. We're at the beginning of a new wave that is coming for wind and solar deployment in Canada."

AMBITIOUS NET-ZERO GOALS

Even though renewables growth in Canada is accelerating, it still has a long way to go in order to meet some important targets that have been set by Canada's federal government — namely, net-zero greenhouse gas emissions by 2050 and a net-zero electricity grid by 2035, according to Hornung.

"Despite the 1-GW growth, and then between 2 or 3 GW this coming year, we probably need to be installing more at the rate of 4 to 6 GW a year if we're going to meet those targets," he said. "So, there's still a lot of work to do."

Part of that, according to Hornung, will depend on policy certainty.

"We have clarity on carbon pricing in Canada until 2030," he said. "We don't know what happens beyond that. We are going to have a regulation in place for a net zero grid by 2035, but that's still in development. So, securing policy certainty is critical to enabling the new deployment required."

In order to expand wind and solar at the scale needed to meet those goals, Canada will need to look at reforming the permitting processes in order to make them more efficient so projects can be deployed at a quicker rate.

"We're also going to need to invest in new transmission so that we can connect these projects to the grid," Hornung said. "We're going to need to accelerate our efforts to develop the workforce that will allow us to deploy and operate these projects going forward when we're scaling up."

PATHWAY CLARITY

In order to do that, Hornung said more clarity will be needed in terms of what that pathway is going to look like. For example, between now and 2030, how much wind and solar can the country procure in the different provinces and at

what rate? That is necessary information that will give investors and developers an opportunity to plan ahead. And with the recent passage of the Inflation Reduction Act in the U.S., the renewables marketplace is about to become much more competitive in North America.

"The passage of new legislation in the United States will provide some significant incentives for wind and solar deployment going forward," he said. "And Canada has to compete for that investment. So, there's a strong incentive to provide more clarity on the pathway going forward. I can tell you the industry is ready to respond. We just need to see more clearly what that path is going to look like."

PROVINCE BY PROVINCE

Across Canada, however, there are many signs emerging that support meeting those ambitious net-zero goals.

For example:

▀ In Quebec, Hydro-Québec, the provincial government-owned crown corporation, has indicated that it now believes it's going to need to increase electricity production by 50 percent by 2050. In order to start down the path of meeting that demand, the company recently announced plans to procure another 6,000 MW of renewables. The province already has two procurements for 480 MW and 300 MW now being finalized.

▀ In Alberta, the corporate demand for renewables has led to the signing of contracts that will lead to the deployment of more than 2 GW of renewables. Those contracts were just signed within the last two years.

▀ In Ontario, Canada's most densely populated province, two years ago the perception was that there was an electricity surplus and that there was no urgent need for new demand. Now, with climate change commitments and electrification moving forward, the INDEPENDENT ELECTRICITY SYSTEM OPERATOR in Ontario, also a crown corporation, says they're going to need at least 8,000 MW of new generation by 2030 to go forward.

▀ Nova Scotia just closed a procurement for 350 MW of wind and plans to proceed with another procurement shortly to respond to corporate demand for renewable energy in the province.

RIISING CARBON PRICING

Carbon pricing is still a major issue, and Hornung pointed out that important foundational policies at the federal level are moving into place, which will send signals to the industry about the rising carbon price.

"Although we don't yet have any clarity after 2030, we do know that the carbon price is increasing steadily until 2030, and it'll be \$170 a (metric) ton in 2030 — that's a significant amount," he said. "The clean electricity standard will send



In order to expand wind and solar at the scale needed to meet those goals, Canada will need to look at reforming the permitting processes. (Courtesy: Enbridge)

a very clear signal when that regulation is released, which is supposed to happen next year. The federal government has also made a commitment to develop an investment tax credit for energy storage. It has some funding programs to support smart grid investments and new technologies to contribute to integration and reliability within the renewable sector. So, that's also helping to defray some costs and move some projects forward. We do see a number of growing initiatives like that."

On the provincial level, it varies from province to province, according to Hornung.

"Running quickly across the country, in Alberta, the market is driven by corporate PPAs," he said. "And I spoke to the fact we've had contracts signed that will lead to 2 GW being installed just in the last couple years. Saskatchewan has recently announced a new small procurement for solar, just 100 MW, but it has indicated that in the fall, there'll be a much more significant procurement for wind and solar. Ontario has said that it's going to move forward with a 4,500-MW procurement. It's not just for renewables; it's a broader procurement, but renewables will, we hope, have the opportunity to compete in that."

ELECTRICITY PRODUCTION

In order to get to that 2050 net-zero goal, Canada will have

to double its electricity production, according to Hornung.

"That's going to require massive amounts of investment," he said. "And that means there's going to be real incentives to pursue the lowest cost options to get there. And right now, wind and solar are the lowest cost options for a new non-emitting generation — in fact, for new generation period — in the country."

And even though supply chain issues and COVID-19 have pushed costs up, those cost increases have affected all energy production, not just renewables, according to Hornung.

"It hasn't weakened wind and solar's competitive position relative to other technologies," he said.

'THE BIG SWITCH'

Recently, the Canadian Climate Institute released its report, called "The Big Switch," that looked at what's expected to happen to electricity between now and 2050. The CCI reviewed six different studies on net-zero pathways to get there. Those studies found wind and solar would have to move from 6 percent of Canada's electricity today to somewhere between a third and three quarters of Canada's electricity by 2050 in a grid that is twice as big as it is now.

"The growth is actually phenomenal," Hornung said. "We released a vision document last year at our conference, actually, — a 2050 Vision document — where our own review of some of those net-zero studies concluded that wind and solar capacity in Canada will probably have to increase about tenfold between now and 2050 if we're going to have any hope of meeting these targets."

New technologies will help play a part in meeting those goals, according to Hornung.

"Where we're seeing a lot of innovation at this point, I think, is more on the distributed-energy resources side and on the smart grid technologies that'll help facilitate the interaction of those distributed renewables with electric vehicles or with the electricity grid as a whole as we switch from a one-way grid to a two-way grid," he said.

PLAYING CATCH-UP

A challenge for Canada, according to Hornung, is it is behind other countries in terms of a smart grid and distributed energy resource (DER) deployment.

"We're still, in many ways, at the pilot project stage with a number of these technologies," he said. "But those pilots are also demonstrating there's a real value in terms of looking at things like non-wires alternatives to transmission build. There's a lot of untapped potential there that we've only begun to scratch the surface of. I think with the utility scale stuff, there's also a lot of untapped potential, but we're already starting to capture that and build on that with the projects that are moving forward. We're only at the beginning of the process with respect to DER."

U.S. COMPETITION

Even before the passage of the Inflation Reduction Act in the U.S., Hornung said there had already been strong interest in



Across Canada, there are many signs that most of the country is on board to meet the ambitious net-zero goals. (Courtesy: Bryan Passifiume)

an increased collaboration between Canada and the United States, for example, in terms of raw materials for batteries and for electric vehicles new and transmission interties.

“There’s a growing recognition that we want to increase some of those linkages between the two countries,” he said. “But I do think that a lot of the measures that are included in the legislation that will be coming forward in the United States are actually ones that pose a competitive challenge for Canada.”

The desire to shift to renewables is growing every day, and investors have a choice as to what markets they want to invest in, according to Hornung. And they will choose markets that would provide the greatest certainty, the lowest risk, and the highest prospect of returns.

“Some of the provisions in the U.S. legislation are quite significant, and provide certainty — relative to historic levels — for example, 10 years of certainty on investment tax credits for renewables,” he said. “These things are really a major step forward. And Canada has nothing like that at this point. So, I think it’s kind of a wakeup call for Canada, that if we’re going to compete successfully for some of this investment, then we’re going to need to grow our renewables, and we’ll need to step up our activities in support of them as well.”

MAKING A BIGGER EFFORT

Part of that will need to involve some general recognition that Canada will have to step up its efforts, according to Hornung.

“At this point in time, there was a study just recently released that showed that, of the G20 countries — excluding China and Russia — there was less government funding for renewables in Canada than in any other country of that group. We do have opportunities to increase our investment in an area that we all recognize will be essential to meeting our climate commitments.”

According to Hornung, Canada’s electricity market is dominated by government-owned utilities, and 60 percent

of the country’s energy comes from hydro power. The overwhelming majority of that electricity comes from those government-owned utilities, according to Hornung.

“There has been relatively limited government investment in renewable-energy projects directly,” he said. “When the renewables industry started in Canada for wind and solar, there was a clear desire by governments and utilities to have that developed by the private sector, and that has continued for the most part today, and we believe the private sector is well positioned to deliver the new renewable energy Canada needs.

“We are, however, starting to see more examples of utility engagement. For example, Hydro-Québec has formed partnerships with independent power producers to jointly develop renewable energy projects, and I think there’s a chance that we’ll see more of that across the country in the future.”

Quite a few challenges must be overcome in order for Canada to meet its ambitious net-zero goals, but Hornung emphasized the country is well positioned to tackle those challenges head on.

“We really are at a unique moment right now in Canada, where we can see the foundation being built that will enable a significant acceleration in wind and solar deployment in this country,” he said. “There’s still work to do to get that in place, but the level of interest, the level of optimism that exists in this sector in Canada, has increased significantly over the last couple of years. People are very, very bullish about where this market is going.”

EDITOR’S NOTE

Electricity Transformation Canada is CanREA’s annual conference and is expected to attract key stakeholders looking to advance the global electricity transformation to Toronto from October 26-28, 2022. Participants will include utilities, system operators, governments, end-use sectors undergoing electrification, and a variety of energy professionals. For more information, go to electricitytransformation.ca.



PROFILE

VENTUS GROUP

TRANSFORMING DATA INTO VALUE

Ventus Group's strategy is to focus on the rotor and rotor efficiency and reducing risk. (Courtesy: Ventus Group)

Ventus Group develops novel technology and services related to rotor monitoring and underperformance, as well as how to minimize operational risk in the global wind sector.

By KENNETH CARTER ▀ Wind Systems editor

Keeping wind turbines spinning efficiently and safely can involve a wide array of expertise. That's why the minds behind Ventus Group have an extensive portfolio that tackles the technology needed to optimize a turbine's performance as well as the services required to ensure those assets are able to reduce risk in order to offer attractive insurance packages to the market.

From efficient power generation to safety measures, Ventus focuses on the rotor of a turbine, according to Poul-Anker Lübker, CTO of Ventus Group.

"The rotor is the motor for our wind turbine," he said. "You can do whatever you want with the gearbox, generator, and whatever, but it's the rotor that captures the wind. That means this is the most important instrument for our wind turbine. This is our focus. Our strategy is that we focus on the rotor and rotor efficiency and reducing risk — this is the insurance arm we have here. We provide a really, really good access into the insurance industry."

INSURANCE COLLABORATION

To that end goal, Ventus has developed a collaboration with one of the biggest insurers in the world for wind farms where the company has conducted its services, according to Lübker.

"Then, we are able to go in and offer a 15-percent discount in insurance premiums," he said. "We see the insurance industry as a very, very important sales channel. And the reason is we are simply reducing risk on the wind turbines."

But in order to reach that goal, first the rotors of a turbine must be shown to be operating as efficiently as possible, and that's where Ventus' patented technology comes into play, according to Lübker.

INNOVATIVE DESIGN

Through Lübker, Ventus has developed proprietary image acquisition software and methodology and high-speed, high-resolution camera technology that allows for on-site image processing without the need for interrupting the operation of the turbine.

"We filed a patent for using high-speed camera technology to see rotor behavior and blade pitch angles," Lübker said. "And what's really, really interesting here is that when you see the type approval of wind turbines today, you are only allowed to have ± 0.3 degrees misalignment. But nobody had been able to see it before. We simply developed, over two years, this high-speed camera setup. We actually just have contracted the first turbines in Canada for this technology."

And Lübker said there are about 450,000 wind turbines in operation, and all of them are in need of the rotor monitoring technology Ventus offers.

"You have 450,000 wind turbines out there that need this

service, and what's interesting is this is new turbines; this is old turbines; this is all turbines," he said.

The AI and machine-learning techniques can detect irregularities in the rotor performance and appearance such as blade damage and bending or twisting differences, according to Lübker.

NON-INVASIVE SERVICE

When yaw misalignment and blade-pitch misalignment are adjusted, then the rotors can produce more power in a very short payback window.

"All our services are what we call 'non-invasive,' which is extremely important," he said. "You see, the OEMs, normally, if you start interfering with anything, then you can lose the warranty. So, all our services are non-invasive."

There are several steps Ventus takes in order to show a potential customer what can be done to increase the efficiency of the assets. A meeting with the commercial elements of a customer goes over the concept, then Ventus meets with the technical arm of a customer that reviews the nuts and bolts of the technology, and, finally, Ventus arranges a demonstration of the technology on a few of the customer's assets, according to Lübker.

"Even though we have done this many, many, many times in different continents and so on, they always want to have a demo on their own turbines," he said. "And this, we do. Normally, we do a small demo on maybe 10, 15, or 30 turbines. Once the technical people are convinced, then we do a rollout."

EXPERIMENT LEADS TO PATENT

The origins of Ventus' technology took an interesting turn for Lübker when he began experimenting with mounting two Lidars on one turbine. Expecting to get similar results from each Lidar, Lübker was surprised when the two devices returned different data.

His first assumptions were either the Lidars weren't installed correctly or they were defective, but, as it turned out, both Lidars were working perfectly in all respects. Lübker discovered the induction zone in front of the rotor was asymmetrical, when it should be symmetrical.

From those experiments, Lübker was able to devise a method to track the G-Force on each individual blade by converting the rotor into a turbine-monitoring instrument.

"And that means that, actually, I'll be able to see which blade is the most efficient blade," he said.

REDUCING RISK

By using this technology to detect inefficiencies in the rotor, then Ventus is effectively reducing risk, according to Lübker.

"And of course, with insurance, they are always going in



Ventus Group has developed proprietary image acquisition software and methodology and high-speed, high-resolution camera technology that allows for on-site image processing without the need for interrupting the operation of the turbine. (Courtesy: Ventus Group)

and evaluating the risk,” he said. “And our services, as you see today, with balancing the rotor and being able to see cracks in the blades using the sensor technology and so on, this is simply a matter of reducing risk. And that means, for an insurance company, less payout, because you can attend to damages in progress earlier on. This has simply been accepted by the insurance industry, meaning that they give credit for the use of these technologies.”

28 YEARS OF HISTORY

Before Ventus Group was officially formed, Lübker was hired by Union Bank of Switzerland to mature a company called Nordtank in 1994, which eventually became part of Vestas.

Lübker began experimenting with his two nacelle-based Lidars in 2015 and filed for the TripleCMAS patent in 2016.

In 2017, Ventus Engineering was formed. A year later, the company received FFG funding to bring the patent to market.

Through its journey to assist the wind-energy industry, Ventus has had more than 20 patents filed and approved, and Lübker said that many of the bigger OEMs are taking notice of the technology Ventus has to offer.

In addition to that, Ventus was recently awarded ISO 9001:2015 certification for its quality management system and ISO 45001:2018 certification for its occupational health



Ventus Group's AI and machine-learning techniques can detect irregularities in the rotor performance and appearance such as blade damage and bending or twisting differences. (Courtesy: Ventus Group)

and safety (OH&S) management systems, which will help speed up the process of getting the company's services in operation, according to Lübker.

“Normally, when we go into tenders, we would have to explain about our systems and so on — this is a big burden,” he said. “But when you are ISO certified, then you only need to send them the certificate, and that's it. It's a kind of blue stamp in the industry.”

LOOKING TO THE FUTURE

Lübker expects even more big things for Ventus as it moves into its next decade of development.

“I have been in the industry for 27 years, and I would say this is one of the most exciting industries you can imagine,” he said. “When we hire new people, I warn them and say, ‘Well, if you get in, you will never get out.’ This is just how this industry is. For all these years, we have been growing with everything. The industry has been growing 10 to 25 percent on a yearly basis and still is.”

Along with that growth, according to Lübker, will be the need to monitor those rotors as assets continue to grow.

“This is an amazing industry, and when you look 10 to 20 years ahead, you will definitely see much larger wind turbines,” he said. “People call them wind turbines, but actually, it is a power plant. You will see bigger power plants probably taking advantage of the best wind conditions you can have. And that's probably offshore. You will see a lot of development offshore. This is also something related to the political situation, where people want to have it offshore for better wind conditions, but also because some people don't want to have the wind turbines in their backyard.”

With all that potential industry growth, the ultimate goal for Ventus is relatively simple:

“If you consider for Ventus, in 10 to 20 years, I think we will be the global rotor specialist,” Lübker said. “That's, at least, our target.”

MORE INFO

www.ventus.group

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Chris Cieslak

Director and Founder ▀ BladeBUG

“We have designed the robot to be a platform which can mount different tool payloads, depending upon requirements.”

BladeBUG is developing advanced robots to assist technicians in the inspection and repair of turbine blades, without the need for rope access. *Wind Systems* recently talked with Chris Cieslak, director and founder of BladeBUG, where he discussed the innovative technology.

▀ What was your inspiration behind BladeBUG?

I come from a wind turbine/blade designer background. Whilst working on blade design and trying to improve efficiency, I realized that once the equipment had left the factory, blades were often left to their own devices. At most, an annual inspection may take place and, when sufficient damage on multiple blades in a wind farm were visible, a campaign to repair them could be justified.

I noticed an opportunity to place that same level of care and attention into blades once they left the factory. I believed that there was a better way to ensure all blades were spinning efficiently and damage free, for as long as possible. By keeping on top of any minor defects, large and expensive problems could be prevented. The inspiration for BladeBUG was, therefore, to try to ensure blades are kept in the best possible condition for their entire design life.

BladeBUG utilizes the knowledge I garnered in blade design and manufacturing and combines this with a robotics system, taking a more proactive approach in blade management. At the time of founding BladeBUG, we were fortunate that robotic technology had also significantly progressed.

▀ What is the BladeBUG robot designed to do?

The BladeBUG robot is designed to be agnostic. We have designed the robot to be a platform whereby we can mount different tool payloads, depending upon what is required. We can have inspection payloads, which work in harmony with drone inspections.

People often ask why BladeBUG does not use a drone. Whilst drones are excellent at the overall imaging of the blades, we believe that the follow-on inspections are problematic. The BladeBUG robot is able to go onto the blade,

where defects have been pre-identified, and perform a much more thorough inspection.

This can be as simple as a visual inspection because the robot is able to get so close to the damage that we can obtain a clear and stable image. We can also go beyond this, too, by mounting ultrasonic, non-destructive testing equipment to the robot, allowing us to conduct subsurface scans. Drones are a non-contact visual so they can provide the next level of information. As a result of the BladeBUG robot performing a subsurface defect investigation, we can understand specific areas, such as: If there is a crack, does that crack propagate much deeper beneath the surface? Do you have a de-lamination? Basically, it is about gathering more data in order to make informed decisions about how the asset is treated.

For example, if there is an image from a drone inspection that shows a crack, BladeBUG can go there and determine the size and scale. This information can be passed on to a blade-repair company, and they will know exactly what to expect. This minimizes the time a rope access technician is required to undertake dangerous repairs. Even better, if it is a minor defect, the robot can treat it without the need for on-blade human intervention.

BladeBUG is about rectifying problems early. If it is too big a problem, then it's about providing better quality data to ensure more informed decisions.

▀ Tell us more about the repair side of the design.

At BladeBUG, we are looking at some of the crucial areas on the blade. Leading edge erosion is a key element we are currently focusing on. Our robot has the ability to straddle the leading edge and perform sanding and cleaning operations, as well as applying coatings.

This can work twofold: We can work alongside technicians, assisting them with some of the more monotonous tasks, which allows them to focus upon more prevalent repair and maintenance tasks. However, that is not the end of the story, as BladeBUG is looking to offer the turnkey ourselves in the future.



The BladeBUG robot can take away human risk in some common tasks now performed by human technicians. (Courtesy: BladeBUG)

Our inspection equipment is interesting as it is essentially “off-the-shelf” tools that the industry currently uses. At BladeBUG, we essentially mount them within a robot, turning them into remotely operable systems. With the repair element, it involves more bespoke tools that we are developing in-house to solve specific issues.

We are also aware that blade life is approximately 20 to 25-plus years, and technology is always changing. We see the BladeBUG as being really useful for applying add-ons to blades — aerodynamic features to improve the efficiencies

with the overall objective of making wind turbines operate more productively. We see it as inspection repair, but also with upgrades. It’s this multi-functioning tool that provides a suite of capabilities to the owners, operators, OEMs and independent service providers.

▀ **Does BladeBUG help in keeping technicians safe?**

There is an inherent risk when working a hundred meters from the ground, and when you take the inspection off-shore, a few hundred miles off the coast, a minor incident

can become very serious, very quickly. Wind-turbine technicians require a lot of training. There is so much equipment that requires to be assessed and reviewed with a huge number of processes.

With the BladeBUG robot, we can take away human risk in some of these tasks, such as checking the light and protection system on the blade. It is a matter of putting a probe onto a receptor and measuring the conductivity. It is not a complex task but it currently requires someone to complete it. Our belief is that if the robot can do a task, it reduces the potential of having something go wrong.

There are huge health and safety benefits to that. In addition, when we go to the aerial version, we remove one of the biggest risks, which is transferring people from vessels to the assets. You can compound that even more when you start the introduction of floating offshore turbines, where everything is moving at different rates.

► You recently unveiled a new-look concept robot. What makes this version unique?

This is an outcome of a collaboration between BladeBUG and an industrial design company called EGGs Design based in Denmark and Norway. It's the first time BladeBUG has worked with external designers and engineers. We have spent a lot more time considering how people are going to be using the BladeBUG, which has influenced the new design immensely. Previously, we were focused very much on the R&D and the functionality of the robot. It was great to work with a company that took the concept and the functionality to the next level by interviewing end users and understanding the whole user journey.

Even though its functionality is the same, we have improved both the visual appearance of the BladeBUG and its usability. This has enhanced its operation massively. The BladeBUG now has integrated handles and ingress protection from the environment, such as water and dust.

It's much more suited to what we have designed it to do, which is operating on a wind turbine and performing multiple tasks. It's a great combination of taking our knowledge as a robotics company and combining that with the design and knowhow of those who are attuned at turning prototypes into much more production versions.

We are now at a stage where the concept robot is what people can see as a finalized product. The first impression of our latest robot is a sleeker concept, and that has made a big difference to how people view our product. People like to see a more simplistic, cleaner version. You're not seeing the wires; you're not seeing the cabling. They are all still there, but they are just protected now. This makes the robot more robust and reliable because there's less chance of those wires and cables getting snagged, caught, or coming loose.

► The newer BladeBUG was made possible by a grant from the Robots for Inspection Network. How did this award come about?

Through our work with EGGs Design. One of their designers heard about us on a BBC Radio 4 series called, "39 Ways to Save The Planet." BladeBUG was featured on an episode, and the designer heard it. She was very intrigued about what we were doing and felt that she and the team could help us. They approached us with this opportunity, and we thought about it for about five minutes and said, "Yes, this sounds great." To have the opportunity to have a really experienced and aligned company to work with us is such a fantastic opportunity. We applied for a grant together, and, thankfully, we were awarded it.

► Has there been industry response from your concept; are owner-operators interested in what BladeBUG can do for them?

BladeBUG has been speaking to companies for a few years now. We're constantly keeping multiple organizations informed and aligned about what we are doing. This new concept has really helped with those conversations because conceptually, everyone loves the idea of what we do, but there was always a slight apprehension in terms of what the robot looked like as a prototype.

Now, when you show them our updated version with the new shell, and they can see it operate, a lot of the concerns have been alleviated, and they, too, are excited about our next conception.

► What is the future for BladeBUG?

We are working on an early adopters pilot program where we have completed one-to-one sessions with end users. We've performed end-to-end tasks in front of OEMs, owners, operators, and independent service providers. Recently, we have been in France on a client's turbine. Next year is when we hope to start working on more commercial projects.

At the moment, we currently take the robot to the end user. However, the overall objective is for us to remain a robotics company and provide the BladeBUG robot as a tool to the industry.

We will provide training for people to use the robot, and then they will be able to go away, have a complete system, and perform the tasks themselves. For the next year, we need to ensure we develop the whole user experience and the user interface to make sure that it's at the right level, so we can hand it over to customers in 2024.

As a relatively new tech company, we're always looking for investors, and that's going to really help accelerate BladeBUG's growth. This will also allow us to grow our service side of the team. We also hope to get some non-tech related people in to the business to help grow our commercial element, too. This will no doubt come with a lot of trials.

So, if people are interested in our tool, please reach out to us, we will happily give you a demo. ✌

MORE INFO bladebug.co.uk

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Telemetry Load Pin TW-3.0



The customized wireless load pins are used for cable pulling applications in the construction of offshore wind turbines. (Courtesy: DLM Wireless)

CONSTRUCTION

DLM Wireless supplies load pins for Atlas winches

DLM is a specialist in the design, manufacture, repair, and calibration of load cells, load monitoring, and cable-working equipment for the offshore, renewable energy, marine, subsea, and lifting and rigging industries. In this instance, it supplies load pins for installation by Atlas in various capacity capstans, which work in tandem with hydraulic power units (HPUs). The “load pin winches” are typically purchased by Atlas’ clients for long-term use.

“Atlas is a valued customer that uses our load pins in their winches for this important end-use application, but we have collaborated on several projects over the years, and we also manufacture force measurement solutions for other projects in this fast-paced industry,” said Martin Halford, managing director at DLM. “We supply the load

pins ready-machined; they just need to be installed in the winch-mount point. Our respective design teams communicate and share drawings to make sure the items fit and work together.”

When constructed, the power generated by a turbine is transmitted to an offshore substation before then going to the mainland. This requires miles of subsea cabling, and the final stage of pulling cables into the foundation of each turbine or to the substation is completed by special winching equipment and, here, a state-of-the-art load monitoring system is provided via the load pins. The equipment has combined on various U.K. and European offshore wind farms.

Anton Lavery, managing director at Atlas, said the final section of each cable — approximately the last 200 meters — is pulled from a vessel into the base/foundation of a turbine or to the platform of an offshore substation. The electrical cable is high specification and high value, and it is, therefore, important to monitor the load applied during the pulling process.

“A spike in the load applied might indicate a problem, and it is also im-

portant that the cable installers can demonstrate and prove that the cable has not been over-strained during installation,” he said. “Cables have a maximum load that they can be exposed to, and if this is exceeded, the cable warranty will be invalidated.”

Historically, Atlas has produced several six-ton capacity capstan winches and HPUs, having originally provided them for a client called Cwind in 2014. Last year, it supplied a larger, nine-ton unit to a client before taking an order for a further eight of the same capacity. Atlas has since designed 11-ton and 12-ton capstans, which follow the same design concept, incorporating load pins. The winches and HPUs are produced by its manufacturing partner, Marotechniek, based in the Netherlands.

When Atlas places an order, the load pins are designed by DLM’s engineering team using in-house SolidWorks and other computer-aided design (CAD) modeling software, at which point the client can sign off on technical drawings. The pins are then machined from stainless steel using a computer numerical control (CNC)

lathe at DLM's sister company, Vulcan Offshore. Once a load pin returns to DLM, it is ready for the strain gauging process, which is a "very intricate and delicate process," Halford said.

Next, DLM builds the TW-3.0 transmitter electronics into the orange telemetry end cap, designed by in-house engineers, and wires it up to the strain gauges. The load pin is then proof loaded, calibrated, and tested prior to goods outward inspection and finally dispatch.

"Each (load pin) is generally different to the next as they are typically custom-designed for the application," Halford said.

"The common part is the telemetry end cap, which customers and end users are familiar with on several of our load pin/shackle load cells and running line monitoring products. Every one of our wireless products uses our

own proprietary TW-3.0 electronics."

Notably, load pins represent approximately 60 percent of all DLM load cell sales, and it can custom-design to any size. They can be paired with a TW-3.0-T display, which has the capability to integrate with data-logging/load test software on a PC, log directly onto a USB stick plugged into the base, or send out an analog signal to a PLC system, depending on the model chosen. The handheld can communicate with up to 12 load cells simultaneously and one load cell can be connected to an unlimited number of displays.

"This makes them ideal for use in cable pull-in applications as you can have one local winch operator on the turbine monitoring the pull-in tension, and an operator on the vessel viewing the load and logging the load values on a laptop using (data-logging) software or by logging directly into the client's

survey suite," Halford said. "The client rep on board can also be provided with another handheld to provide confidence that throughout the duration of the pull-in, the cable is not damaged or overloaded."

In some set-ups, the winch is not installed with a load pin and instead a telemetry shackle load cell is used in a rigging arrangement over the top of the turbine platform above a snatch block to monitor the load.

The TW-3.0-T display is unique in the fact that it has a math function that allows for custom trigonometric equations to be added by the client to compensate for any angle variations over a sheave and output a line tension figure when measuring just the resultant load.

MORE INFO www.dlm-uk.com

The advertisement features a background image of several white wind turbine blades against a clear sky. In the upper left, there is a circular logo containing a detailed illustration of a bulldog's head with its mouth open, showing sharp teeth and a spiked collar. Below the logo, a white semi-truck with an American flag graphic on its side is shown pulling a large, dark-colored mobile shredding unit. The text is positioned to the right of the truck and below the logo.

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CONSTRUCTION

X1 Wind ready to install PivotBuoy prototype

Technology developer X1 Wind has laid its dynamic cable and is now ready for final installation of its floating wind prototype at the PLOCAN Test Site in the Canary Islands.

“The 20kV dynamic cable will allow us to fully validate the floater and wind-turbine performance, feeding the electricity to PLOCAN’s smart grid, as well as transmitting data through its fiber optic connection,” said Adrian Oliva, X1 Wind’s electrical engineering manager. “Also, we will be able to validate the cable’s dynamic behavior. Understanding how our TLP mooring system reduces motions and loads on the cable, compared to catenary systems, is crucial as it will reduce fatigue and potentially extend the lifetime of this critical component.”

X1 Wind’s team will wait for a suitable weather window to complete the towing and hook-up of the prototype.

X1 Wind’s technology is fitted with a turbine in a downwind configuration, enabling the structure to “weathervane” and orientate passively to maximize energy yields. It drives greater structural efficiency with a light and flexible design, which further supports future mass production at lower cost.

The platform uses a Tension Leg Platform (TLP) mooring system, which reduces the platform and cable dynamic motions, minimizes the footprint on the seabed, as well as allows its installation in deep waters.

“With the launch and implementation of X1 Wind X30 model, connected with our special dynamic cable, we finished another project for developing clean and sustainable energy,” said Rui Batista, Hengtong central Europe region sales director. “We are very pleased and proud to have participated in the realization of such a visionary project. Congratulations to the whole team and best wishes for success. We

look forward to participating in more new energy projects with X1 Wind.”

MORE INFO www.x1wind.com

CONSTRUCTION

Palfinger equips French regions with offshore wind cranes

The need of renewables is increasing, and within the EU, France is spearheading the race to build offshore wind farms. For each of three current offshore wind projects in the north-western region of France, Palfinger is providing two of its PTM600 jetty cranes.

Palfinger Marine cranes are the perfect fit for jetty harbor site applications. Proven technology, a maintenance-friendly design and high-quality workmanship characterize these cranes. The compact design of the PTM crane model with an integrated power pack and oil tank allows space-saving installation on site, so that even small harbors can be used as loading sites. The reliable telescopic function of a PTM and its safety features complete the range. With a Palfinger PTM crane, the crew transfer vessel (CTV) can be easily and reliably loaded with everything that is needed to service the turbine.

The jetty cranes in La Turballe in the region of Pays de la Loire, and in Fécamp, in Normandy, are already prepared for operation. The cranes in Ouistreham, also in Normandy, which is the operation and maintenance harbor for the Calvados Offshore Wind Farm, are scheduled for delivery by the end of 2022. Additionally, Palfinger Marine is providing 64 PF14000-4.0 cranes for the offshore wind turbine platforms of the Calvados Offshore wind farm. The 450-MW Calvados offshore wind project consists of 64 wind turbines more than 10 kilometers from the Bessin coastline and covers a total surface area of around 45 square kilometers. The Palfinger fixed boom

service cranes support in-cargo and spare-parts loading from crew transfer vessels (CTV) to the transition piece.

“We are proud that we strengthened our footprint in the French offshore wind industry, since we entered the market only one and a half years ago,” said Iavor Martchev Markov, global sales manager wind at Palfinger. “This shows us that we can meet our clients’ needs all over the world — no matter the circumstances.”

MORE INFO www.palfingermarine.com

INNOVATION

ematec to present new blade-lifting beam at WindEnergy

Ematec, a specialist supplier of lifting equipment for the wind industry, is using WindEnergy 2022 in Hamburg, September 17-30, for an extraordinary presentation (Hall A1, Stand 415). For the first time, ematec will show an offshore version of its innovative RBC-D rotor blade lifting beams and also will show visitors a world first with revolutionary potential: the new RBT-C50, an offshore lifting beam of a completely new dimension that can pitch rotor blades by 90 degrees before assembly.

“I am very proud that we can offer the trade two new developments for rotor blade assembly in the offshore sector at WindEnergy Hamburg; this is another milestone for us,” said Manfred Eberhard, CEO of ematec AG. “Up to now, we have mainly asserted ourselves onshore and established our yokes as benchmarks. But we also want to make rotor blade assembly and maintenance at sea as efficient and safe as possible. So, we have been working diligently. And in short: we can now also do offshore.”

With the RBC-D generation of yokes, ematec has revolutionized the assembly of rotor blades. The highlight: The cross beam can accommodate all blade shapes on the market without change-over times. This is made possible by

the automatic adaptive blade support, with which the crosshead automatically adapts to each rotor blade shape. That was previously only possible on land; now, it is available for rotor-blade assembly at sea. The RBC-D40 offshore can safely pick up and handle rotor blades of up to 40 metric tons — regardless of the blade shape. This makes the innovation predestined not only for initial assembly but also for the maintenance of offshore wind farms.

The second innovation for the offshore sector is still in the middle of development. The new yoke RBT-C50 combines the technological advantages from the RBC and RBT worlds and thus offers automatic adaptive blade support (RBC) on one hand and a pitch angle of 90 degrees (RBT) on the other.

“This means that our latest development definitely has the potential to revolutionize the assembly of offshore wind turbines,” Eberhard said.

Because on the vessels, rotor blades are usually transported standing up in their racks. On the other hand, a lying position of the blades is advantageous for single-blade assembly to keep the wind attack area and lost days due to wind as low as possible.

“Especially concerning cost efficiency, this is an issue when considering that a transport vessel can cost a six-figure sum per day,” Eberhard said.

To combine the advantages of an upright delivery of the blades with those of a horizontal assembly, the rotor blades have to be pitched 90 degrees before assembly.

“This is exactly what our latest development will be able to do,” Eberhard said.

At WindEnergy Hamburg, ematec will be presenting not only its innovations for the offshore sector but also, and above all, its successful RBC-D series for onshore assembly. The ematec technology is patent-pending, and wind-turbine manufacturer Enercon relies on yokes with automatic adaptive blade support. Enercon now has six RBC-D42 crossheads in use worldwide for rotor blades with blade weights of up to 42 metric tons. For heavier blades weighing up to 50 metric tons, Ener-



The automatic adaptive blade support of the RBC series yokes is a patent-pending technology. (Courtesy: Ingo Jensen/ematec)

con had also ordered eight RBC-D50 yokes; ematec has already delivered three of these to Enercon. The second round of orders recently followed with a further six RBC-D50 yokes.

“Our RBC-D yokes are extremely well-received on the market, as the

current orders show,” Eberhard said. “We manufacture at full speed at our production site in Memmingerberg. It confirms again that we have developed into a real specialist for lifting gear in the wind-power industry over the years.”

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GreenSpur Wind and Niron Magnetics collaborated on a rare-earth free generation solution for the offshore wind market. (Courtesy: GreenSpur Wind)

This year, the specialist supplier ematec is not only celebrating a host of innovations but also a double anniversary: 25 years of ematec and 10 years of expertise in the wind-power industry. In 2012, ematec AG entered the wind power industry with its first rotor blade traverse, the RBT 11.5.

“With our first development, we made a significant contribution to the international acceptance of single-blade assembly,” Eberhard said.

This was followed by the “bunny” version for safe bunny-ear mounting on gearless turbines. With the RBC series, ematec has set another benchmark in onshore single-blade mounting.

MORE INFO www.ematec.com.

INNOVATION

GreenSpur, Niron develop rare-earth-free solution

GreenSpur Wind and Niron Magnetics announced a new rare-earth-free generation solution for the offshore wind market. The findings have been verified by ORE Catapult, a U.K.-technology innovation and research center for offshore renewable energy.

“Existing turbines use radial-flux generators, and the current designs are reliant on rare-earth magnets,” said Andrew Hine, commercial direc-

tor at GreenSpur Wind. “However, we employ a unique and highly innovative axial-flux architecture that makes the use of rare-earth free magnets possible.”

Past iterations of the GreenSpur generator had attracted interest, but there were concerns about its mass. Keeping generator mass within the same range as existing machines is important, as adding weight requires more structural support, which increases cost. By designing with Niron’s Generation 1 Clean Earth Magnet, which offers stronger magnetic performance than the ferrites used in its earlier generator designs, GreenSpur developed a new 15-MW generator. Based upon initial non-optimized results, the new generator delivers a significant 56-percent reduction in mass.

“Our Clean Earth Magnet technology helps eliminate reliance on expensive, supply-constrained, rare-earth-based magnets, without compromising on performance,” said Andy Blackburn, CEO of Niron Magnetics. “Device designers and manufacturers take our technology and realize its impact. By working with GreenSpur, we have been able to demonstrate what can be achieved with our Generation 1 technology in wind applications, with innovative materials and innovative device design coming together to enable a potentially transformative solution for the offshore market.”

Supported by an Innovate U.K. grant, the new 15-MW generator design was reviewed by ORE Catapult,

the U.K.’s leading technology innovation and research center for offshore renewable energy. The review confirmed that GreenSpur’s 15MW generator design is now able to meet the mass and efficiency targets required by the market.

“We have worked with GreenSpur in support of their hugely innovative and disruptive technology for several years,” said Tony Quinn, director of Technology Development at ORE Catapult. “Although there was interest in a rare-earth-free solution, there were concerns that their generator would be too heavy. However, with Niron’s novel rare-earth-free magnet, GreenSpur is able to show attractive mass and efficiency targets and a credible solution for consideration within a next generation turbine. We are now helping GreenSpur and Niron to present this opportunity to OEMs, developers, and strategic investors. The aim is to create an industry consortium with the right combination of players to bring this offering to market.”

“The risk that the rare-earth magnet supply chain poses to international offshore wind is existential,” Hine said. “For the first time, we have a path that takes this risk out of the equation.”

MORE INFO www.greenspur.co.uk

INNOVATION

First recyclable wind-turbine blades installed in Germany

Siemens Gamesa’s RecyclableBlades are generating electricity in the first commercial installation of fully recyclable wind turbine blades, at RWE’s Kaskasi offshore wind power project in Germany.

“We are proving that as the leaders of the offshore revolution; we are committed to making disruptive technology innovation commercially viable with the pace that the climate emergency demands,” said Marc Becker, Siemens Gamesa offshore business

unit CEO. “We’ve brought the Siemens Gamesa RecyclableBlade technology to market in only 10 months — from launch in September 2021 to installation at RWE’s Kaskasi project in July 2022.”

“This milestone marks a significant contribution to Siemens Gamesa’s target of having fully recyclable turbines by 2040; with RecyclableBlade available for our customers, we can create a virtuous circular economy,” Becker said.

Wind turbine blades are made up of a combination of materials embedded in resin to form a strong, stiff structure. Using Siemens Gamesa’s RecyclableBlade technology enables full reclaim of the blade’s components at the end of the product’s lifespan. Separating the resin, fiberglass, and wood, among others, is achieved through using a mild acid solution. The materials can then go into the circular economy, creating new products such as suitcases or flat-screen casings without the need to call on more raw resources.



Siemens Gamesa RecyclableBlades leave Hull for the Kaskasi offshore development. (Courtesy: Siemens Gamesa)

“That we are testing in our offshore wind farm Kaskasi the world’s first recyclable wind turbine blades under operational conditions is a significant step in advancing the sustainability of wind turbines to the next level,” said Sven Utermöhlen, RWE Renewables’

CEO Wind Offshore.

A number of turbines at RWE’s Kaskasi offshore wind farm will be equipped with handcrafted Siemens Gamesa B81 RecyclableBlades, each with a length of 81 meters. The project is 35 kilometers north of the island of

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Heligoland in the German North Sea. It will be comprised of 38 SG 8.0-167 DD wind turbines, generating 342 MW of clean, renewable energy for up to 400,000 German households.

“The first power being generated from the first turbine using RecyclableBlades also underscores the great value creation provided by Siemens Gamesa in several countries,” Becker said. “The RecyclableBlade technology was developed in Aalborg, Denmark; the blades were manufactured in Hull, U.K., and the nacelles were produced in and installed from Cuxhaven, Germany. RecyclableBlade technology will help reduce raw material extraction by creating the potential for secondary markets for the reclaimed material, with the job creation that this could provide as an additional benefit in local markets.”

The RecyclableBlade technology is also available for the 108-meter long B108 blades used on the SG 14-222 DD offshore wind turbine and the 115-meter long B115 blades SG 14-222 DD turbines.

MORE INFO www.siemensgamesa.com/en-int

► MAINTENANCE

Belzona to exhibit at WindEnergy Hamburg

Together with the following authorized Belzona Distributors, Belzona Service Nord, SPIRAL, Perspect Benelux, AESSEAL Danmark, Belzona Portugal, Beltech Solutions A/S, Belzona is set to exhibit at WindEnergy Hamburg September 27-30.

Attended by designers, manufacturers, suppliers, financiers, operators, and service providers — both onshore and offshore — WindEnergy Hamburg is the world's largest wind-energy exhibition. About 35,000 visitors from more than 100 countries will be in attendance, as well as 1,400 exhibitors from industry-leading organizations.

On stand B6.265, Hall 6, visitors will have the opportunity to talk to Belzona engineers about Belzona's comprehensive range of repair composites and protective coatings for wind turbines.

This includes solutions for:

- Leading edge blades.
- Internal and external nacelles.
- Offshore splash zones.
- Transformers.
- Turbine bases.

In addition, live demonstrations of Belzona's recently launched leading edge repair and protection solution, Belzona 5711 and Belzona 5721, will be held by Belzona Engineers on September 27-29 at 11 a.m. Optimized to be easy-to-apply, fast-curing, and hard-wearing, the combination of Belzona 5711 and Belzona 5721 offers asset owners a competitive solution for fortifying wind-turbine blades with outstanding long-term protection against leading edge erosion.

Also, Belzona will be hosting a networking event on September 29 from 4 to 6 p.m. where customers, journalists, and press officers are invited to discuss Belzona solutions for wind turbines with our engineers (drinks and snacks provided). The networking event is invitation only; if you would like to book a place, please contact Chloe Hirst at: chirst@belzona.com

MORE INFO www.belzona.com

► MAINTENANCE

Ventus Group secures two ISO certifications

Ventus Engineering GmbH, supplier of end-to-end optimizing solutions for excellence in wind-turbine performance, has secured two international standard accreditations. Receiving ISO 9001:2015 certification for its quality management system and ISO 45001:2018 certification for its occupational health and safety (OH&S) management systems, Ventus has the

official seal of approval that its R&D processes, operational practices, and Ventus Academy are according to the same standards everywhere.

Following the world's most recognized quality management system standard, ISO 9001:2015 provides customers with assurance they will receive consistent, quality products and services no matter where in the world their wind turbines are. ISO 9001:2015 contains a set of quality principles, which include customer focus, leadership, engagement of people, process approach, continual improvement, evidence-based decision making, and relationship management.

Alongside this, gaining ISO 45001:018 certification demonstrates that Ventus Group operates a best-practice Occupational Health and Safety Management System. This international standard focuses on occupational health and safety, with Ventus recognized as having the systems in place to reduce workplace risks, create safer and healthier working environments that meet all legal obligations, and setting targets to improve its OH&S performance further.

The international accreditations come at an exciting time for Ventus Group, as it continues to expand into new markets. Headquartered in Vienna, Austria, the company has dedicated teams working in multiple locations, both on and offshore. Building on its success in Europe and the U.K., Ventus is now also present in India, with plans for further expansion globally.

“We are extremely proud to have achieved these ISO certifications,” said Ventus Group CTO Poul-Anker Lübker. “But more importantly, the framework we have in place will enable us to expand Ventus Group faster without compromising on the quality provided in our services and products and OH&S and minimum always in line with the high standards in the wind industry.” “The timing is important, as the Ventus Group is experiencing a fast rate of growth geographically and is about to launch new products in the market,” he said. “Many of our clients operate globally, and we are

committed to follow them wherever their wind turbines are located. We therefore have already opened new entities worldwide, and we will continue to expand into new markets.”

“These globally-recognized certifications demonstrate our ongoing commitment to working to the highest quality standards, for our staff and our customers, regardless of where in the world we are delivering a product or a service,” Lübker said.

MORE INFO www.ventus.group

▀ MANUFACTURING

Vestas to sell converters and controls business

Vestas continuously looks for partners that can support its strategic focus on its core business and help scale renewables efficiently in the long-term. To continue this development, Vestas has signed an agreement with KK Wind Solutions (KK) for the acquisition of Vestas’ converters and controls business, which includes Vestas’ three converters and control panels factories in Denmark, India, and China and associated staff functions. In total, about 600 Vestas employees are in scope for being part of KK.

As part of the agreement, KK will exclusively supply converters and control panels to Vestas from the three factories, while the agreement enables potential for local expansion and job growth by extending the use of converter technologies in areas adjacent to Vestas’ core business. Furthermore, the agreement between Vestas and KK includes joint development of converters with an engineering team at Vestas fully dedicated to the partnership. The agreement builds on years of collaboration between KK and Vestas, most recently exemplified by localization of offshore power conversion modules and low voltage cabinets in Taiwan.

“Across our global supply chain footprint, we are increasingly collaborat-

ing with partners to scale efficiently and build on the foundations we have established,” said Tommy Rahbek Nielsen, executive vice president and COO at Vestas. “This includes focusing our own resources to where they are most efficient and moving parts of our business to be run by other industry leaders who can create more value and secure additional long-term jobs. I’m therefore very excited about the agreement with our partner KK Wind Solutions, which can help grow and mature the wind energy supply chain.”

“As an established partner to Vestas, we aim to take a leading role in maturing the industry’s supply chain and accelerate the green-energy transition,” said Mauricio Quintana, chief executive officer, KK Wind Solutions. “The acquisition will bring immediate scale to our operations and extend our global footprint, while adding new competencies by welcoming over 600 highly skilled and experienced employees. As a result, we will be well-positioned to

develop and deliver world-class sustainable energy solutions to top tier wind OEMs and expand further into adjacent industries, such as Power-to-X.”

Vestas’ converter and control panel factory in Hammel, Denmark, employs about 280 people, and Vestas’ converter factory in Oragadam, India, employs about 50 people. In addition, Vestas owns a nacelle and hub assembly plant next to the converter factory in Oragadam, which will continue its operations. Vestas’ converter factory in China employs about 220 people and is part of Vestas’ manufacturing compound in Tianjin.

The transaction is expected to close in the first quarter of 2023, subject to receipt of approvals from the relevant regulatory authorities and separation of the converters and controls business, at which point the transaction will be reflected in Vestas’ financial accounts. ✈

MORE INFO www.vestas.com

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A person wearing a dark jacket, a blue and orange safety harness, and a helmet is seen from behind, working on the white surface of a wind turbine nacelle. They are secured with red ropes. In the foreground, a black rectangular hatch and some tools, including a power drill and a screwdriver, are visible on the white surface. The background shows a vast landscape with rolling hills, a few distant wind turbines, and a range of mountains under a sky filled with soft, white clouds.

CROSSWINDS

THE FUTURE OF WIND

CAN VIBRATIONS BE GOOD FOR BUSINESS?

SCADA analysis is more likely to detect failures such as blocked coolers, electrical and control problems, as well as small efficiency losses, complementing the other techniques. (Courtesy: iStock)

Vibration analysis can generate the lion's share of savings in a comparison between condition monitoring and SCADA analysis.

By DAVID FUTTER

How much does condition monitoring save the typical wind farm?

This question was put to me during a recent conference on innovations in the wind industry. The question relates to the financial benefits of vibration analysis, otherwise known as the cornerstone of condition monitoring, compared with SCADA monitoring. As an engineer, I am well used to explaining the technical advantages of vibration technologies. But when asked to provide a cold, hard figure, I had to hesitate.

Not because I didn't have an answer. But because it is actually a broader question and one that relates to a wide range of additional monitoring techniques. The application of condition monitoring must be expected to bring a return on investment in the short term. Otherwise, why apply it? But exactly how much ROI can a wind farm expect?

EUROPEAN STUDY

I was reminded of a study I conducted for a major European energy provider about 10 years ago. I can't go too deeply into the details, but I can discuss the methodology, and use published reliability datasets and my own industry knowledge to illustrate it. The method actually pre-dates and was the basis for the flow chart in ISO 16079-2 [1] related to the drivetrain monitoring of wind turbines, but the idea was based on the more general ISO17359. [2]

According to most condition-monitoring equipment suppliers, there are always specific, quotable examples where enormous savings were delivered thanks to the successful early identification of a fault. But this does not paint a full picture. Not every installation will suffer from such costly failure mechanisms, and it is still possible that a particular fault will not be detected in time.

My method, therefore, surveyed a range of failures and for each individual failure, it identified the likelihood of that failure occurring on a given turbine, coupled with the probability of its detection by a particular condition-monitoring technology.

The most challenging aspect was collecting a set of representative failure modes and then assigning probabilities to these failures. Costs were then applied to these failure modes, as well as revised costs assuming that condition-monitoring recommendations are implemented. Cost estimates included not only repair and replacement of parts but also the cost of logistics and lost power generation.

The process did not, in itself, differentiate between different monitoring types, so monitoring technology was additionally noted. Where multiple monitoring technologies were deployed, the probability of failure detection increased for some failure modes, but the initial and annual cost of monitoring also increased. Some external studies [3,4] have gone as far as to conduct a detailed analysis about which

technique makes the most difference.

But in this study, we calculated savings for two offshore wind farms (based on 2012 pricing), and two sets of published reliability data from the Reliawind [5] consortium. Unfortunately, as this was an internal study, I cannot share specific values, although the published data is available from the WMEP database. I can also highlight the typical patterns of identified savings.

THE RESULTS

We identified savings of more than 250k/euro per windfarm per annum in every case where a variety of monitoring techniques were applied.

It should be noted that the two specific wind-farm cases predicted lower savings than the amalgamated cases from the external datasets, probably due to the newer turbines deployed on these farms or possibly due to incomplete failure reporting in the datasets. Interestingly, the two offshore wind farms with turbines from different manufacturers foresaw savings in very different areas, even though the resulting figures were quite similar.

As part of the study, we found that several monitoring packages overlapped when it came to the type of failures they claimed to detect, with the exception of SCADA data analysis, which operates in different areas.

Monitoring techniques applied to the drivetrain — principally vibration analysis, acoustic emissions, and oil analysis — all detect similar gearbox and drivetrain failures. Any increased savings from the application of two of these techniques is marginal compared to only one. There is a slight increase in detection probability and lead time, but no additional failure mechanisms are revealed. Of these techniques, vibration analysis delivers the widest range of failure detection and can also be implemented for structural health monitoring.

SCADA analysis is more likely to detect failures such as blocked coolers, electrical and control problems, as well as small efficiency losses, complementing the other techniques. Typically, the individual costs of failures detected by SCADA data analysis are low, but they occur relatively often, whereas the more significant failures detected by vibration analysis are very expensive, but less likely to occur.

The analysis of SCADA data accounted for about 20 percent of the overall savings and improved detection rates in other areas by about 5 to 10 percent. Vibration analysis accounted for up to 70 percent of the overall savings, with the remainder made up of improvements in detection probability through other methods such as oil analysis.

CONCLUSION

So, when it comes down to it, vibration analysis really does generate the lion's share of savings in a comparison



Monitoring techniques applied to the drivetrain — principally vibration analysis, acoustic emissions, and oil analysis — all detect similar gearbox and drivetrain failures. (Courtesy: Adobe Stock)

between condition monitoring and SCADA analysis, although SCADA data is definitely beneficial in its own right because it detects different faults and should therefore be used in addition to condition monitoring to access the full potential savings.

Since the study, wind-turbine designs have improved significantly, but the cost of condition monitoring installations are also much lower. Taken together, I estimate little impact on the overall annual savings provided by a CMS system over the past decade, although recent market pressures are likely to have significantly increased potential savings from vibration analysis and condition monitoring.

But back to the original question about the actual savings. How did I respond?

“It depends,” was on the tip of my tongue, but based on this study and my confidence in the findings and capabilities of a modern CMS system, I could confidently reply: “At least a quarter of a million euros per wind farm per year.” And that’s good news for everyone. ✌

ABOUT THE AUTHOR

David Futter is a BINDT Vibration Analysis Cat IV practitioner, approved training coordinator, and head of Condition Monitoring Consultancy, part of Bachmann Monitoring GmbH.



Significant failures detected by vibration analysis are very expensive, but less likely to occur. (Courtesy: Adobe Stock)

REFERENCES

- [1] ISO16079-2 Condition monitoring and diagnostics of wind turbines — Part 2: Monitoring the drivetrain.
- [2] ISO17359 Condition monitoring and diagnostics of machines — General guidelines.
- [3] Coronado and Fischer: Fraunhofer IWES Condition Monitoring of Wind Turbines: State of the Art, User Experience and Recommendations, Jan 2015.
- [4] May, Allan; McMillan, David; Thöns, Sebastian Economic analysis of condition monitoring systems for offshore wind turbine subsystems, Proceedings of EWEA 2014.
- [5] Reliawind project Final Report: Reliability-focused research on optimizing Wind Energy system design, operation and maintenance: Tools, proof of concepts, guidelines & methodologies for a new generation.

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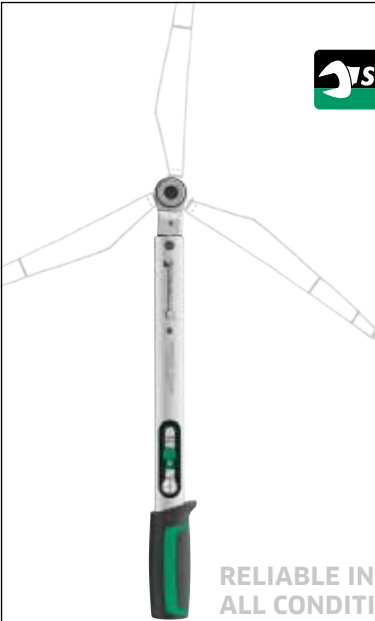
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