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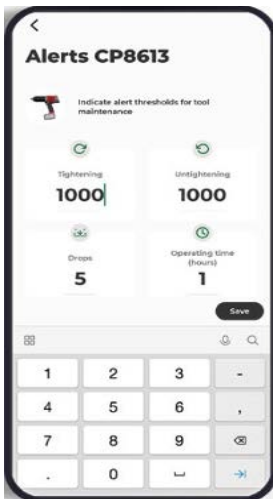
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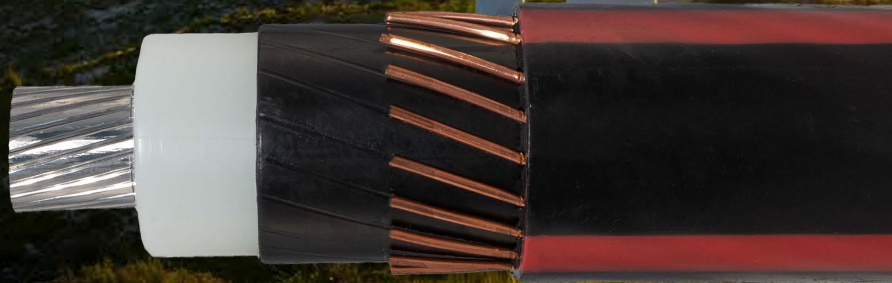


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14

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THE RISING TIDE OF OFFSHORE WIND

As more projects begin operation, the benefits of offshore wind will reach even more communities across the nation.

BUILDING THE SOV FLEET TO SUPPORT A NEW AGE

Construction and maintenance of U.S. offshore wind projects will need a combination of expertise. 20

PLANNING A STRONGER RENEWABLE SECTOR IN CANADA

Despite challenges, Canada is still determined to meet its net-zero carbon goals. 24

PROFILE

When LS GreenLink's new HVDC manufacturing plant in Virginia goes online in 2027, it is expected to be a boon to U.S. offshore wind's development and a producer of American jobs. 28

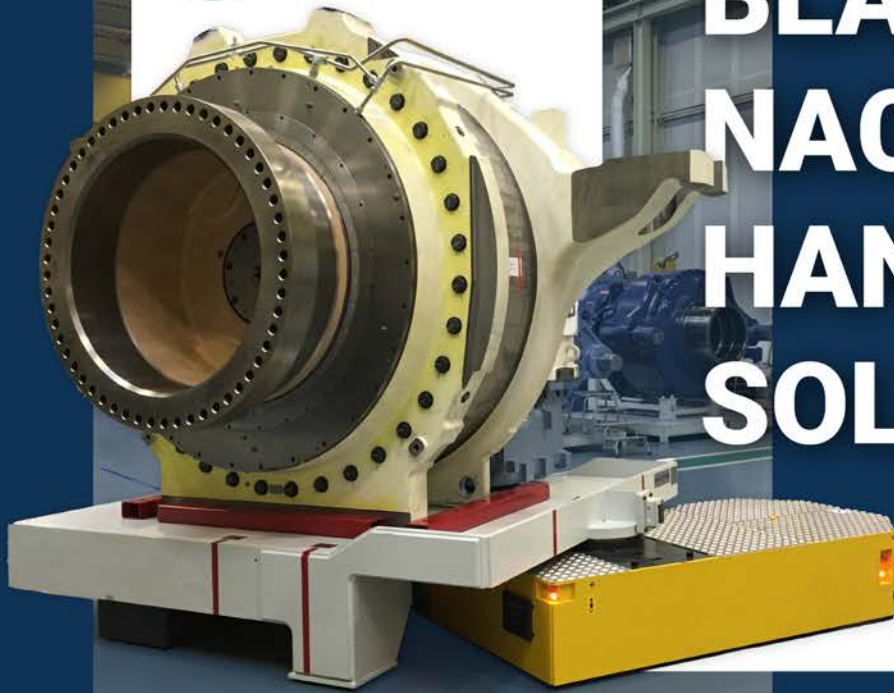


CONVERSATION

Lars Persson, sales project manager at AB Volvo Penta, discusses the collaboration that designed and constructed a new type of CTV 32



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▸ THE FUTURE OF WIND



DIRECTION

8

*Clearway to deliver wind energy to Puget Sound Energy ▸
Maritime academy honors Oceanic founder Liz Burdock ▸
BOEM releases impact review for Oregon coast*



CROSSWINDS

44

RENEWABLE ENERGY: FORGING CRITICAL COMPONENTS TO FIGHT CLIMATE CHANGE

The availability of a wide range of forged components is helping to keep renewable energy projects on track and production reliable for the long-term.

TAILWINDS

THE BUSINESS OF WIND



▸ CONSTRUCTION

Mammoet takes delivery of LR12500 crawler crane **34**

▸ INNOVATION

DNV emphasizes critical role of digital twins **36**



▸ MAINTENANCE

Moog slip ring increases turbine reliability **37**

▸ MANUFACTURING

Vestas receives 795-MW order for Netherlands wind farm **40**



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Offshore in the U.S. continues to grow

Seems like every day, there's another announcement about developments in U.S. offshore wind.

For example, there has been a lot of activity with recent BOEM lease sales.

The wind-energy lease areas, off the coast of Delaware, Maryland, and Virginia, span a total of 277,948 acres and could generate up to 6.3 GW of clean power, enough electricity to power more than 2 million homes, according to the American Clean Power Association. The Delaware and Maryland lease area

covers 101,443 acres, about 26 nautical miles from Delaware Bay, while the Virginia lease area covers 176,505 acres, roughly 35 nautical miles from the Chesapeake Bay mouth.

BOEM's lease sale was the result of extensive environmental reviews and significant engagement with a diverse group of stakeholders including the National Oceanic and Atmospheric Administration, the Department of Defense, states, maritime industries, commercial fisheries, non-governmental organizations, and an

extensive public comment period.

With all that offshore buzz, a lot of September's content takes a look at several aspects of the burgeoning offshore wind sector in the U.S.

Our cover story from Oceanic's Stephanie Francoeur looks at how the rising tide of offshore wind will only serve to strengthen American communities and economies.

Those offshore wind farms will need vessels to support their construction and maintenance, so Dr. Wei Huang, the director of ABS Bureau's global offshore division, shares her insights on the building of an SOV fleet to support the clean-energy opportunity of a new age.

And be sure to check out this month's company profile and Conversation, which also offers unique perspectives on offshore wind development.

In addition to our offshore articles, this month's issue also preps you for Electricity Transformation Canada, CanREA's annual conference in Calgary October 21-23.

To get you in the mood for that show, I talked with CanREA President and CEO Vittoria Bellissimo on the state of Canadian wind and other renewables and what challenges Canada will continue 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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Sector boasts \$500B in new investments, 100K new jobs, report says

From American Clean Power

A new report by the American Clean Power Association (ACP) shows that, in the last two years, the U.S. clean energy industry has announced \$500 billion in new investments, spurring the American economy and creating tens of thousands of new jobs.

ACP's 2024 Clean Energy Investing in America report finds that the industry is leading a manufacturing renaissance, with plans to build or expand more than 160 domestic manufacturing facilities along with announcements of more than 100,000 new manufacturing jobs nationwide.

Alongside the new data, the report presents stories of how this new clean-energy manufacturing renaissance is revitalizing local economies. This progress underscores the nation's commitment to expanding its energy portfolio and solidifying its position as a global leader in clean energy.

Clean-energy investment: Highlights from the report include historic investments announced for the U.S. clean energy economy since August 2022:

- ✔ **Total capital investment announced:** \$500 billion.

- ✔ **Manufacturing investment announced:** \$60 billion-plus.

- ✔ **Realized project investments:** \$75 billion into projects that have come online in the last two years.

Manufacturing renaissance: The investment into clean energy is driving a new American manufacturing renaissance, marked by substantial new or expanded facilities and job creation:

- ✔ **Total new manufacturing facilities announced:** 161 facilities.

- ✔ **Facilities online and operating:** 42 facilities.

- ✔ **Facilities in development:** 119 facilities.

Creating high-quality jobs: The clean energy manufacturing renaissance is also significantly contributing to American employment opportunities:

- ✔ **Jobs generated by operational facilities:** 20,000.

- ✔ **Jobs expected from facilities in development:** 80,000.



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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Contact the editor, Kenneth Carter, at editor@windsystemsmag.com for how you can share your expertise with our readers.

Giving Wind Direction
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DIRECTION

THE FUTURE OF WIND

Clearway Energy signs 25-year deal with Puget Sound Energy. (Courtesy: Clearway Energy)

Clearway Energy Group to deliver wind energy to Puget Sound Energy

Clearway Energy Group recently announced it signed a 25-year power purchase agreement with Puget Sound Energy for the Haymaker wind farm, a 315-MW facility under development in Wheatland and Meagher counties in Montana.

Once operational, Haymaker will generate enough electricity to power about 116,000 homes each year.

“We are proud to partner with Puget Sound Energy in delivering low-cost clean energy to their customers and supporting their ambitious renewable energy goals,” said Valerie Wooley, senior vice president of origination at Clearway.

“Reinforced by the Inflation Reduction Act, Haymaker represents a major investment in central Montana’s economy, and we’re eager to work with the community through development, construction and our long-term stewardship of the project.”

“This agreement with Clearway helps us meet some of the most ambitious laws in the nation while delivering on our customers’ expectations for energy that is clean as well as safe, reliable, and affordable,” said Ron Roberts, PSE’s senior vice president of Energy Resources.

“We are proud to be a partner in developing Montana’s wind resources, and this is yet another milestone in our continued investment in the state’s energy economy.”

Haymaker is expected to provide millions in landowner payments and more than \$100 million in property tax revenue over the life of the project.

Hundreds of well-paying union labor jobs will be created during construction, and a permanent local workforce will operate and maintain the site.

Construction of the Haymaker Wind is scheduled to begin in 2026, with commercial operations expected by 2028.

MORE INFO clearwayenergygroup.com



Oceanic Wind CEO Liz Burdock is Massachusetts Maritime Academy’s Person of the Year. (Courtesy: Oceanic Network)

Maritime academy honors Oceanic founder Liz Burdock

Massachusetts Maritime Academy, a public university with undergraduate degree programs focusing on science, engineering, technology, math, and business that blend academics and experiential learning, will honor Liz Burdock, founder and CEO of Oceanic Network, as Person of the Year during an October 26 event on the academy’s campus. “I am honored to receive the 2024 Maritime Person of the Year Award,” Burdock said.

“I have dedicated my career to protecting the environment through the advancement of clean energy, and our maritime partners are already proving to be a key part of our nation’s clean-energy future. Every offshore wind project requires a host of specialized vessels and dozens of skilled technicians.

Each of these massive construction projects are bringing jobs, training, and investment to maritime companies and communities across the East and Gulf Coasts. Thank you to Massachusetts Maritime Academy for recognizing the importance of offshore wind energy and its contributions to the domestic maritime industry.”

Burdock co-founded the Baltimore-based Oceanic Network – an organization dedicated to growing the offshore wind and other ocean renewable industries and their supply chains – in 2013.

With a deep background in policy, she has led the Network, launching the International Partnering Forum, the largest offshore wind conference in the Americas; delivered critical offshore industry products and services, including Supply Chain Connect, the Offshore Wind Market dashboard, and Foundation 2 Blade training and remains a thought leader advancing the development of the U.S. offshore wind industry and domestic supply chain.

With extensive experience in running public/private partnerships, Burdock has focused her career on convening and coordinating diverse stakeholders, including businesses, academics, government agencies, policy makers, community leaders, workforce organizations, and strategic investors, to develop sound solutions that facilitate the implementation of clean energy in the U.S.

Burdock holds a degree in sociology from Frostburg State University and is a graduate of Leadership Maryland. She has been featured in energy-related publications including ReCharge, reNEWS, and RTO Insider, as well as the Baltimore Sun, Forbes, Reuters, and the Wall Street Journal.

The Emery Rice Medal has been awarded to a select group of maritime professionals. Past honorees of the Massachusetts Maritime Academy Person of the Year include admirals, captains, and CEOs.

“We are delighted to award the Emery Rice Medal to Liz Burdock, not only for her significant contributions to the maritime industry, but also for embodying the very principles we teach at the Academy – leadership, ethics, business sense, and respect for the ocean environment,” said Rear Admiral Francis X. McDonald, USMS, president



BOEM has announced that a lease for Oregon offshore energy development would have few impacts on people or the environment. (Courtesy: BOEM)

of the Massachusetts Maritime Academy. “We look forward to honoring her during our October 26 ceremony.”

The Academy has a tradition of honoring a civilian or military leader with a distinguished career of excellence, innovation, and service to the maritime industries and other related industries with the Emery Rice Medal, named for an 1897 Academy graduate and WWI hero. Capt. Rice was twice recognized by President Theodore Roosevelt for his maritime skill and bravery.

MORE INFO www.oceanticwind.ca

BOEM releases impact review for Oregon coast

The Bureau of Ocean Energy Manage-

ment (BOEM) recently announced the availability of its final Environmental Assessment (EA) of the possible impacts from issuing leases for potential offshore wind-energy development off the Oregon coast, including site assessment and site characterization activities such as geophysical, geological, and archaeological surveys. The EA concluded that lease issuance would have no significant impacts to people or the environment.

“BOEM relies on the best available science and information for our decision-making regarding offshore-wind activities,” said BOEM Director Elizabeth Klein.

“Working with Tribes, government partners, ocean users, and the public, we gathered a wealth of data, diverse perspectives, and valuable insights that shaped our environmental anal-

ysis. We remain committed to continuing this close coordination to ensure potential offshore wind energy leasing and any future development in Oregon is done in a way that avoids, reduces, or mitigates potential impacts to ocean users and the marine environment.”

Since the start of the Biden-Harris administration, the Department of the Interior has approved the nation’s first nine commercial-scale offshore wind-energy projects.

BOEM has held four offshore wind lease auctions, including sales offshore New York, New Jersey, and the Carolinas; and the first sales offshore the Pacific and Gulf of Mexico coasts.

BOEM is exploring more offshore wind-energy development opportunities in the U.S., including in the Gulf of Maine and offshore the U.S. Terri-

tories. The Department also continues to take steps to evolve its approach to offshore wind to drive toward union-built projects and a domestic-based supply chain.

On April 30, the Department of the Interior announced a proposed offshore wind lease sale for two Wind Energy Areas in Oregon.

BOEM expects to hold an Oregon offshore wind-energy lease sale later this year. A final sale notice will be published at least 30 days prior to the sale, detailing the time and date of the lease sale and qualified participants.

Any leases that might be issued from the sale would not authorize the construction or operations of an offshore wind-energy facility. Rather, a lease provides the lessee with the right to submit a project plan for BOEM's review. For any future proposed offshore-wind projects, BOEM will develop an Environmental Impact Statement to analyze the specific impacts of those projects before deciding whether to approve the proposed construction and operations plan.

The EISs will be prepared in consultation with Tribes and appropriate government agencies, and informed by input from stakeholders, ocean users, and the public.

MORE INFO www.boem.gov

Crowley accepts delivery of LNG bunker barge

Crowley recently accepted delivery of the LNG bunker barge Progress, the largest U.S. Jones Act-compliant vessel of its kind, after construction was completed at Fincantieri Bay Shipbuilding in Sturgeon Bay, Wisconsin.

The Progress will expand access to cleaner energy for ship operators at the Port of Savannah, Georgia. Shell NA LNG, LLC, signed a long-term agreement with Crowley to operate the barge, providing another fueling location to ships using liquefied natural gas. "The Progress LNG bunker barge

sets a new standard for quality and capability to serve the energy needs of the shipping industry," said James C. Fowler, senior vice president and general manager, Crowley Shipping. "LNG offers a safe and reliable solution for ocean carriers that advances the transition to lower emissions.

We congratulate the people whose dedication and hard work in designing and building this world-class vessel allowed us to reach this milestone for the U.S. industry and our customers."

Designed by Crowley's engineering services group, the 416-foot-long barge has a capacity of 12,000 cubic meters (3.17 million gallons) and features a transformative design, enabling supply of LNG to fuel ships.

Progress' technologies include capability developed by Shell and Crowley's engineering services group to deliver LNG to various types of LNG containment systems.

"Fincantieri Bay Shipbuilding continues to be an industry leader in

building LNG bunkering barges," said Jan Allman, vice president and general manager of Fincantieri Bay Shipbuilding.

"We take tremendous pride in seeing another FBS-built vessel leave Sturgeon Bay to its new operational home port. I am proud of the work of our entire Fincantieri Bay Shipbuilding team."

LNG is the lowest carbon fuel now available to shipping at scale, emitting up to 23 percent less greenhouse gas emissions (well-to-wake) compared to very/ultra-low sulfur fuel oil.

Crowley is a privately held, U.S.-owned-and-operated maritime, energy, and logistics solutions company serving commercial and government sectors with \$3.4 billion in annual revenues, more than 170 vessels mostly in the Jones Act fleet and about 7,000 employees around the world.

MORE INFO www.crowley.com

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The PREDICT 2.0 initiative involves deployment of various sensors that can be used to help identify the potential impacts of floating wind farms on marine ecosystems. (Courtesy: Ørsted)

Salamander wind farm deploys environmental monitoring campaign

Salamander, a joint venture between Ørsted, Simply Blue Group and Subsea7, recently partnered with two Scottish universities to investigate any potential impact of floating wind farms on marine ecosystems.

The PREDICT 2.0 initiative involves deployment of various sensors that can be used to help identify the potential impacts of floating wind farms on marine ecosystems, including the drivers of variation in fish movement and availability as prey.

The innovation package has now been deployed on the Salamander floating wind site, as was committed

to during the project's Innovation and Targeted Oil & Gas (INTOG) bid. The sensors — which include a fluorometer and echosounder — are gathering data on fish presence and behavior as part of a research program led by the University of the Highlands and Islands' (UHI) Environmental Research Institute and the University of Aberdeen. When the program is complete, the equipment will be fully removed.

"This multi-year initiative aims to help us develop a deeper understanding of fish migration patterns and how these can be better monitored; the goal is to improve siting of offshore wind farms to minimize any impact on fish and their predators," said Tom Brown, Salamander's innovation manager. "We already know that the demand for offshore renewable infrastructure is increasing exponentially, and by en-

suring we can appropriately research new project locations, we can more sustainably build a path to a better energy future while protecting the environment."

"It's really good to see the Salamander project team deliver once again, on time, one of the key components that demonstrates Salamander's value to the commercialization of floating wind and for the Scottish supply chain," said Salamander Project Director Hugh Yendole.

"Marine sensing is vital to understand the environment around floating offshore wind farms," said Dr. Benjamin Williamson, associate professor of energy at UHI. "Robust information and evidence are needed to inform where offshore wind developments should be located to better protect marine ecosystems. This exciting research will help to understand the drivers of variation in fish movement and the potential for environmental interactions with offshore wind."

The 100-MW floating wind farm will be 35 kilometers off the coast of Peterhead, generating enough green energy to power 100,000 homes. In May, the project submitted its offshore consents application to the Scottish Government.

If consented, the project will provide key insights and opportunities for the Scottish supply chain for future larger-scale developments in Scottish waters and further afield, ahead of the larger-scale ScotWind build-out.

MORE INFO www.salamanderfloatingwind.com

Volue, Jua to harness the power of AI driven weather prediction

Volue, a leader in technologies and services that enable its customers to succeed in the energy transition, recently announced a partnership agreement with Jua that is set to revolutionize weather prediction for the renewable energy market.

The partnership will see both com-

panies work together to deliver new and innovative technological solutions for forecasting and market insights. As well as that, Volue will now use Jua's weather prediction for fundamental analysis of the energy markets, providing highly accurate production, demand, and price forecasts. Volue's customers can now also access Jua's weather forecast within the Volue Insight platform.

Jua provides technology-driven decision making and modeling. By leveraging proprietary, fundamentally new technology and tens of millions of primary data points, it operates the first artificial intelligence (AI) "Large Physics Model," capable of predicting weather with extremely high accuracy, precision, and speed.

Insight by Volue provides all participants in the energy markets with the necessary decision-making support they need in terms of fundamental and price forecasts.

Up until now, numerical weather prediction models have been the gold standard for the energy market. Jua's global foundational AI model learns and understands the underlying atmospheric physics. This allows Jua to predict the weather faster and with higher accuracy than established standards.

"The importance of understanding our global weather system has never been greater; now more than ever, we recognize that an increased number of participants in the renewable energy ecosystem depend heavily on forecasting, with good forecasting ensuring high stability of the grid, low imbalance costs, efficient power production, and increased trading profits," said Arnt Sollie, SVP, Insight by Volue. "By combining forces with Jua, we are set to create what will be world-leading weather predictions for the energy markets. By merging Volue's extensive knowledge and technology with Jua's highly accurate and precise weather information, we will deliver market insight that until now was thought of as impossible."

"Volue is one of the most trusted and most innovative companies in the energy technology space," said Andreas

Brenner, co-founder & CEO, Jua. "They are poised to greatly contribute toward accelerating the energy transition. We believe that our vision for the future and our understanding of quality are completely aligned. This partnership puts both companies on a trajectory to deliver more innovative products faster to a larger audience than they could alone. I am excited by this potential and look forward to doing our part in accelerating the energy transition."

MORE INFO value.com

BOEM issues offshore wind research lease to Maine

The Bureau of Ocean Energy Management (BOEM) recently announced the execution of the nation's first floating offshore wind energy research lease. The lease area covers a little under 15,000 acres 28 nautical miles offshore Maine on the U.S. Outer Continental Shelf and could allow for the deployment of up to 12 floating offshore wind turbines capable of generating up to 144 MW of renewable energy.

The research array will allow the state, the fishing community, wildlife experts, the offshore wind industry, and others to conduct in-depth studies and thoroughly evaluate floating offshore wind as a renewable energy source in the region. Research conducted on the array will evaluate its compatibility with existing ocean uses and assess its potential effects on the environment, supply chains, and job creation.

"Floating wind opens up opportunities to produce renewable energy in deeper water farther offshore," said BOEM Director Elizabeth Klein. "Signing the Gulf of Maine research lease demonstrates the commitment by both BOEM and the state of Maine to promote a clean energy future for the nation. It is another example of a successful all-of-government effort to reach the administration's offshore wind-energy goals and to combat the impacts of climate change."

Information gathered from the research lease will inform responsible commercial floating offshore wind development in the future and allow BOEM and Maine to capitalize on innovative technology, while protecting local and national interests and industries.

"Clean energy from offshore wind offers an historic opportunity for Maine to create good-paying jobs, reduce our reliance on fossil fuels, and fight climate change by cutting greenhouse gas emissions," said Maine Gov. Janet Mills. "This lease between the state and BOEM to support the nation's first research array devoted to floating offshore wind technology is the result of extensive engagement with stakeholders and communities across our state to establish Maine as a leader in responsible offshore wind, in balance with our state's marine economy and environment."

Since the start of the Biden-Harris administration, the Department of the Interior has approved the nation's first nine commercial scale offshore wind projects with a combined capacity of more than 13 GW of clean energy — enough to power nearly 5 million homes.

In that time, the Department has held five offshore wind lease auctions — including a record-breaking sale offshore New York and the first-ever sales offshore the Pacific Coast and in the Gulf of Mexico. The Department also recently announced a schedule to hold up to 12 additional lease sales through 2028. On August 14, BOEM held an offshore wind-energy lease sale for two areas on the OCS off the Central Atlantic.

Construction activity on the research array is not likely to occur for several years. The lessee is first required to submit a Research Activities Plan to BOEM, which will undergo environmental analysis under the National Environmental Policy Act. Additional details on the timing of construction will become clearer as the permitting process progresses. ✈

MORE INFO www.boem.gov

IN FOCUS

OFFSHORE ▸ CANADA

THE RISING TIDE OF OFFSHORE WIND: STRENGTHENING AMERICAN COMMUNITIES AND ECONOMIES

Transition pieces
for the Coastal
Virginia Offshore
Wind project
being unloaded
for staging at
Portsmouth
Marine Terminal.
(Courtesy:
Oceanic
Network)





As more projects begin operation and the supply chain expands, the economic and environmental benefits of offshore wind will reach even more communities across the nation.

By **STEPHANIE FRANCOEUR**

The offshore wind industry is rapidly transforming the American energy landscape, bringing substantial economic benefits and job opportunities to communities across the nation. This burgeoning sector is not only a beacon of clean energy but also a catalyst for economic revitalization, both in coastal and inland areas. As the industry continues to gain momentum, it is crucial to understand the multi-faceted impacts of offshore wind projects on local economies, job creation, and the broader energy market.

AN INDUSTRY IS COMING TO LIFE

The offshore wind industry in the United States is experiencing unprecedented growth, driven by significant investments and robust federal and state commitments. With four commercial-scale projects under construction, including Ørsted's Revolution Wind and Sunrise Wind, Dominion's Coastal Virginia Offshore Wind (CVOW), and Avangrid and Copenhagen Infrastructure Partners' Vineyard Wind 1, the industry is set to add 5 GW of clean energy to the grid in short order. This capacity is enough to power more than 1.75 million homes and businesses, marking a substantial increase in renewable energy generation.

These projects have created a resilient and expansive supply chain that spans more than 30 states. The broader offshore wind supply chain has already attracted \$25 billion in investments and created thousands of jobs. The federal government has approved an additional 9.6 GW of projects for construction, coupled with more projects under review and the development of new lease areas. These advancements ensure a steady pipeline of contract work and project development that will continue to drive economic growth and job creation.

ECONOMIC RIPPLE EFFECTS

The economic impact of the offshore wind industry extends far beyond the immediate construction and operation of wind farms. Investments in supply-chain infrastructure, such as new cable manufacturing facilities in Chesapeake, Virginia; and Baltimore, Maryland, are critical to reducing the country's reliance on the global energy market and low-



The ECO Edison at its christening at the Port of New Orleans. (Courtesy: Oceanic Network)

ering local-energy costs.

Ports and transmission systems are also seeing significant investments. Equinor's \$861 million South Brooklyn Marine Terminal will employ 1,000 construction workers, while California is investing \$4.6 billion in transmission infrastructure and is set to vote on \$475 million in port upgrades in addition to \$435 million already provided by the U.S. Department of Transportation's Maritime Administration. These developments are unlocking future growth and providing greater market certainty, essential for the long-term success of the industry.

STATE-LEVEL INITIATIVES AND MARKET DRIVERS

States are playing a pivotal role in driving the offshore wind market. New York, New Jersey, Maryland, and Delaware have made significant strides in finalizing contracts, opening new offtake award rounds, and passing legislation to expand goals and ease transmission constraints. These efforts are essential for maintaining public and political support, ensuring the industry can deliver power reliably and affordably while creating jobs.

A recent study from New England by Synapse Energy Economics found that building out 9 GW of offshore wind could save ratepayers \$600 million annually on their utility bills. Initiatives like Oceanic Network's U.S. Offshore Wind Jobs Tour are spotlighting the thousands of Americans working to build the industry, both near the coast and in supporting factories far inland.

SOUTH FORK WIND: PROOF OF OFFSHORE WIND'S POTENTIAL

The South Fork Wind project, the nation's first commercial-scale offshore wind farm, exemplifies the economic and environmental benefits of offshore wind. This 12-turbine project generates 132 MW of clean electricity, enough to power more than 70,000 homes. The project has sparked nearly \$1 billion in new investments and created at least 2,000 manufacturing and construction jobs. The supply chain for South Fork Wind stretches across 19 states, demonstrating the nationwide economic impact of a single offshore wind project.

South Fork is a testament to the collaborative efforts of local communities, labor unions, government, and business.



Fincantieri Bay Shipbuilding, a company building an SOV in Sturgeon Bay, Wisconsin, for the CVOW project. (Courtesy: Oceanic Network)

The project is not only delivering clean energy to the Long Island power grid but has also created numerous new job opportunities, from electricians and ironworkers to engineers and technicians. The involvement of local businesses such as Haugland Energy Group, Elecnor Hawkeye, and Roman Stone highlights the significant role of local enterprises in the offshore wind industry.

PORTS: THE BACKBONE OF OFFSHORE WIND

Ports are critical to the success of the offshore wind industry. They serve as hubs for the assembly, storage, and transportation of wind-turbine components. Investments in port infrastructure are essential for supporting the large-scale deployment of offshore wind farms. These investments are bringing jobs to the maritime sector. The New Jersey Wind Port, for example, is expected to sustain 1,500 jobs when fully complete, with manufacturing facilities adjacent to long-term marshalling and assembly operations. The Port of Davisville in Rhode Island is also positioning itself as a key hub for long-term operations and maintenance needs.

The role of ports extends beyond logistics. They are central to the local supply chain, providing essential services

such as storage, bunkering, and secondary steel assembly. Ports such as the Port of Providence (RI), New Bedford Marine Terminal (MA), and New London State Pier (CT) have become bustling centers of economic activity, supporting offshore wind development and creating jobs.

SHIPYARDS SEE SPIKE IN ACTIVITY

American shipyards are playing a vital role in building the vessels needed for offshore wind operations. The ECO Edison, built by Edison Chouest Offshore, is a testament to the capabilities of U.S. shipyards. This state-of-the-art vessel was constructed by more than 600 workers across nearly 1 million work hours, with components sourced from 34 states. The vessel will serve as a floating homebase for offshore wind technicians, supporting Ørsted's Northeast wind farms.

The construction of the ECO Edison and other offshore wind-dedicated vessels, such as Fincantieri Bay Shipbuilding's SOV being constructed in Sturgeon Bay, Wisconsin, highlights the significant investments being made in the U.S. maritime sector. These vessels are massive projects in and of themselves, with many costing hundreds of millions of dollars and taking years to build. The involvement of Amer-



ican unions and local workers in the construction of these vessels also underscores the importance of domestic labor in the offshore wind industry.

COMMUNITY AND ECONOMIC REVITALIZATION

The economic development brought by offshore wind is transforming communities. In New England, thousands of residents are employed in designing, manufacturing, transporting, installing, and maintaining offshore wind farms. Ports such as New London, Providence, Norfolk, and New Bedford have become hubs of economic activity, supporting local businesses and creating jobs. Senesco Marine, a shipyard in Rhode Island, is a prime example of this activity, having doubled its workforce since March 2022 due to offshore wind projects.

The economic benefits extend beyond direct employment. Companies such as ThayerMahan in Connecticut have seen significant growth, with 75 percent of their revenue coming from the offshore wind sector. The redevelopment of ports in New London and Davisville has created hundreds of jobs and will continue to support economic growth for decades.

THE IMPACT OF THE INFLATION REDUCTION ACT

The passage of the Inflation Reduction Act (IRA) in 2022 has been a game changer for the offshore wind industry in the United States. This landmark legislation includes several provisions that significantly bolster the development and expansion of offshore wind projects. The IRA has just celebrated its second anniversary, so it's worth analyzing the impact it's had on the offshore wind industry.

One of the key components of the IRA is the extension and enhancement of tax credits for renewable energy proj-

ects, including offshore wind. The act provides a 30 percent investment tax credit (ITC) for offshore wind projects that begin construction before 2026. This tax credit is crucial for reducing the upfront costs, making them more financially viable and attractive to investors.

The IRA also allocates \$100 million for the planning, modeling, and analysis of interregional and offshore wind electricity transmission. This funding is essential for developing the transmission infrastructure needed to connect offshore wind farms to the grid. By improving transmission planning and coordination, the IRA helps ensure the electricity generated by offshore wind farms can be efficiently delivered to consumers.

Further, the IRA supports state siting and permitting authorities by providing funding to streamline the review and approval process for offshore wind projects. This support helps reduce the time and complexity associated with obtaining the necessary permits, accelerating the development of offshore wind projects toward operation.

Overall, the Inflation Reduction Act has provided a significant boost to the offshore wind industry, driving investment, expanding development opportunities, and supporting the necessary infrastructure for long-term growth. The law's provisions are helping to create a more favorable environment for offshore wind projects, ensuring the industry can continue to advance while contributing to the nation's clean-energy goals.

CHALLENGES AND FUTURE PROSPECTS

Despite the significant progress, the offshore wind industry faces challenges. The need for consistent contracts and orders is crucial for maintaining job stability and driving investment. Decision-makers must prioritize projects that meet regional needs and expand the development pipeline to ensure long-term success.

The future of the offshore wind industry is promising, with continued support from federal and state governments. As more projects begin operation and the supply chain expands, the economic and environmental benefits of offshore wind will reach even more communities across the nation. The industry is poised to become a cornerstone of America's clean-energy economy, driving economic growth and job creation for years to come. ↴

ABOUT THE AUTHOR

Stephanie Francoeur is senior vice president of marketing and communications at Oceantic Network. She joined the Network in June 2024 to provide strategic and operational leadership for the organization's marketing and communications efforts, developing comprehensive strategies that help achieve the Network's business goals. Working closely with the leadership team to advance the Network's mission, visibility, and reputation, Francoeur's team manages all corporate communications functions and drives awareness of U.S. market and supply chain intelligence, products, and services for its members and the wider ocean renewables industries.

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BUILDING THE SOV FLEET TO SUPPORT THE CLEAN-ENERGY OPPORTUNITY OF A NEW AGE

The ECO Edison is the first U.S.-flagged Jones Act offshore wind farm SOV. (Courtesy: ABS Bureau)

As the industry begins to expand and country decarbonization targets are met, construction and maintenance of U.S. offshore wind projects will need a combination of expertise requiring a variety of specialist support vessels.

By DR. WEI HUANG

March 2024 marked the start-up of operations from America's first utility-scale offshore wind farm in federal waters, a remarkable milestone for an industry gearing up for rapid growth. The 12 turbines that make up South Fork Wind, a joint venture between Ørsted and Eversource, generate 132 MW of clean energy off the coast of New York, powering about 70,000 homes per year in Long Island and the Rockaways [1].

With three projects under construction and 37 more in development, the U.S. wind market is growing fast. Market analysis, as reported by the American Clean Power Association (ACP), predicts the industry will have 14 GW of offshore wind deployed by 2030, rapidly building to 30 GW by 2033 and 40 GW by 2035. According to the ACP, there are currently 12 GW of projects with active offtake agreements, including 4 GW under active construction at Vineyard Wind, Revolution Wind, and Coastal Virginia Offshore Wind [2].

There's huge potential for offshore renewable energy, with more than 4,200 GW of resource potential, offshore wind could meet today's U.S. electricity demands by more than three times [3]. At the federal level, there are plans for three lease sales in the second half of 2024 for the Central Atlantic, offshore Oregon, and the Gulf of Maine [4].

Industry watchers will keep a close eye on the remaining lease sales, and the outcome of state solicitations for projects off the northeast coast over the course of H2 2024, as these will be useful checks on the pulse of the market and its capacity to realize that nation-sized resource potential on a meaningful timescale.

THE SOV CAPACITY GAP

Building, installing, connecting, and maintaining these new offshore power centers will require a sizeable fleet of specialist vessels. According to one industry report, there are more than 40 new vessels currently on order or under construction to support the fledgling offshore wind industry, including 28 Crew Transfer Vessels (CTV), seven Service Operation Vessels (SOV), two different types of installation vessels, and two tugs and two barges to support offshore wind operations and maintenance [5].

In comparison to traditional offshore wind service operations using crew transfer vessels (CTVs) or helicopters, an SOV promises a range of operational benefits for both wind-farm operators and service teams, including enhanced safety and comfort for technicians, accelerated on-site service, increased weather availability, and improved productivity for the project. SOVs offer superior operational flexibility through the ability to include modular accommodation modules on the deck area, making them suitable for mul-

tiples offshore construction projects, potentially including conventional oil and gas developments.

When it comes to the day-to-day workhorse of the offshore wind fleet, the SOV, there's a need for an additional five to eight vessels on top of the seven in the report because there's a two-and-a-half- to three-year lead time on design and construction, which effects the progress toward the 2030 target. This means offshore wind projects in the pipeline need to clear commercial, financial, and regulatory hurdles in a timely fashion so ship owners have the confidence to place orders for new SOV capacity with the backing of long-term O&M contracts. New builds under construction are Edison Chouest's SOV for Equinor's Empire Wind 1 project off Long Island, New York, and a purpose-built vessel for a joint venture between ESVAGT and Crowley, known as CREST Wind, which will enter into service in 2026 at Dominion Energy's Coastal Virginia wind farm.

FUTURE-PROOFING THE FLEET

Determining whether to pursue a new build or a conversion to fill this capacity gap will be a complex calculation on a case-by-case basis with cost, schedule, feasibility, and capacity all weighing on the decision. Another key factor that must be considered is the sustainability challenge all stakeholders in the maritime industry face, especially those in the renewable energy industry. When compared to a conversion, a new build is easier to futureproof to accommodate essential decarbonization measures such as: dual-fuel capabilities, hydrogen fuel cells, innovative hull design, or AI-controlled systems optimization.

Take for example, the ECO Edison, the first U.S.-flagged Jones Act offshore wind farm SOV, which was delivered earlier this year and classed by ABS. It combines a raft of green technologies to deliver meaningful reductions in fuel consumption and greenhouse gas emissions. The ECO Edison was engineered and constructed by Edison Chouest Offshore (ECO) for long-term charter to service Ørsted's and Eversource's South Fork, Revolution, and Sunrise Wind projects off the Northeast Coast.

The 80-meter-long vessel will serve as a floating year-round home base for 60 wind-turbine technicians, who will service and maintain the wind turbines throughout their life cycles. The vessel can operate on diesel-electric power to reliably meet EPA Tier 4 emission standards and can be converted to dual-fuel methanol. It also features a proprietary ECO Variable Frequency Drive to reduce fuel consumption and greenhouse gas emissions.

Vessel owners should consider future proofing to accommodate the changing regulations and demands of this in-



New builds under construction are Edison Chouest's SOV for Equinor's Empire Wind 1 project off Long Island, New York. (Courtesy: Visualisation: Eirik Hamre Clausen/Equinor)

dustry. Offshore turbines continue to grow in size, which can complicate the logistics of maintaining them offshore, for example, when transferring crew, equipment, or cargo between a floating offshore wind turbine and SOV.

ABS can help by providing comprehensive design and technical reviews and undertaking classification/certification services to help mitigate risks and enhance safety ABS has guidance and requirements [6] for wind-farm support vessels, which were developed from our existing rules in conjunction with the feedback from stakeholder workshops in 2023 while also advancing industry knowhow and delivering technical review solutions to help meet the evolving needs of this fast-developing industry.

A TRANSITIONING INDUSTRY

There is no question that change has to happen. As the industry begins to expand and country decarbonization targets need to be met, construction and maintenance of offshore wind projects calls for a combination of expertise that is comparatively new to the U.S. market and requires a variety of specialist support vessels. It's clear that members of the maritime world and the offshore wind industry at large — commercial, financial, and regulatory — need to increase their dialogue and collaborative efforts — and fast — to drive the required development of the U.S. offshore wind market within reach of the administration's offshore wind targets.

By working hand-in-hand with the maritime industry and offshore wind developers, we're working toward a more efficient, safer, and greener future for us all. ↗

ABOUT THE AUTHOR

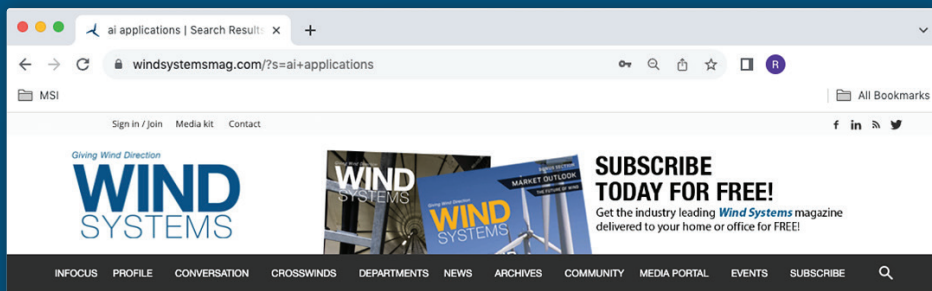
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In 1998, Dr. Huang joined ABS in the engineering department providing engineering plan review and approval. She has participated in research and rule development for marine and offshore structures with the ABS Europe Division in London and the ABS Americas Division, ABS Corporate Technology, and ABS Global Offshore in Houston. In her current role, Huang provides strategic insight and direction on initiatives and programs within the global offshore market with a keen focus on windfarm installation and service vessels, especially in the U.S. Huang received a doctorate degree in civil engineering from the University of Portsmouth in the U.K. She also holds a master of science degree in ocean engineering, and a bachelor of science degree in Naval architecture from Shanghai Jiao Tong University in China. Huang is a professional engineer licensed by the Texas Board of Professional Engineers and a chartered engineer registered with the U.K. Engineering Council.

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PLANNING A STRONGER RENEWABLE SECTOR IN CANADA

The industry in Canada added 2.3 GW of new installed capacity in 2023 — that includes wind, solar, and storage. (Courtesy: Siemens Gamesa)

Despite a few challenges, Canada is still determined to meet its net-zero carbon goals, but to do so will require a strong electricity game plan to drive economic growth, create jobs, and position the country as a leader in the global-energy transition and a good place to do business.

By **KENNETH CARTER** ▸ Wind Systems editor

Although Canada did see a relatively good year for renewable growth in 2023, the country fell short of the trajectory needed to meet its net zero targets. That's not to say the year was disappointing; it just didn't meet expectations.

However, there has been good news to report in the world of Canadian renewables.

"The industry in Canada added 2.3 GW of new installed capacity in 2023 — that includes wind, solar and storage," said Vittoria Bellissimo, president and CEO of the Canadian Renewable Energy Association (CanREA). "Of that 2.3 GW, more than 1.7 GW was new utility-scale wind. So, Canada now has a total installed capacity of more than 21.9 GW of wind, solar, and storage, including 20.4 GW of utility-scale wind and solar energy nationwide."

CHALLENGES

Those gigawatt tallies are impressive to be sure, but progress has been uneven across the Canadian landscape: Renewable energy challenges in several provinces have served to slow the country's original net-zero goals, according to Bellissimo.

"Alberta paused applications of new renewable projects back in August of 2023," she said. "They've since resumed the applications, but with additional requirements, and began redesigning the structure of the electricity market. All this has created market uncertainty."

But, Bellissimo said, other provinces have managed to pick up the pace since last year.

"British Columbia, for example, is running a procurement right now for 3,000 GWh/year, and they'll be running subsequent procurements after this," she said. "Saskatchewan has ongoing activity, as it looks to acquire 3 GW by 2035. Manitoba is looking to figure out ways to build more renewables. Ontario has just finished running the largest battery storage procurement in North America, and they are looking at buying energy now."

In Quebec, there is a need for 150 to 200 TWh of additional energy supply, and Bellissimo said that will come from renewables.

"Hydro-Québec will be building large facilities in Northern Quebec, and they'll be running procurements as well," she said. "Atlantic Canada is also really interesting right now, with onshore renewables as well as offshore on the table with real potential, as well as green hydrogen potential. For the last two years, our annual industry data reports were dominated by growth in Alberta. Two years ago, Alberta represented 75 percent of the country's growth, and last year it was over 90 percent, but now the growth is becoming really diversified across Canada."

CONTINUING DEVELOPMENT

In addition to policy uncertainty, other challenges facing the advancement of renewables in Canada include the changing face of the market structure, revenue streams, incentives, and supply chain constraints, according to Bellissimo. These challenges certainly aren't unique to Canada, as the U.S. also is facing similar hurdles in its continued development of renewable energy.

"With the need for a more robust grid infrastructure, we will come up against limits on interconnections," she said. "The windiest areas of the country aren't necessarily the areas with the best access to transmission, so we need to start looking at that: Where are we going to build projects, going forward? Do we have the transmission capacity to get that power to market?" Global supply chain issues also have affected availability and cost components for wind and solar projects and storage, according to Bellissimo.

"Developing North American manufacturing and supply networks can help mitigate this risk, so we're watching closely," she said. "We need to manage tariff implementation in a way that offers supports to industry to make sure we don't slow the energy transition. And we need investments in grid modernization — and energy storage in particular — to facilitate the integration of more renewables and to ensure higher levels of renewable penetration and reliability."

THE NEED FOR INTEGRATION

Although technical advances in renewables manufacturing are important, Bellissimo said advancements in integration are even more so.

"I default to Alberta examples, because I'm based in Alberta, but what we need to be able to do here is manage the ramp rates on our system," she said. "We need to be able to forecast better and integrate that forecasting into system approaches. And we need to match the tools that system operators have in their toolkits with the real conditions on the ground. If we need more ancillary services to integrate more renewables, we have to figure out a way to incentivize those." Even with Alberta beginning to embrace more renewable energy projects, the province is in need of more energy storage than it has today, according to Bellissimo.

"This province has 190 MW right now, and we will need more," she said. "Alberta has had a lot of renewables growth in recent years, so we need some energy storage to help make the integration of renewables quite a bit easier. Alberta recently approved a tariff structure called Demand Opportunity Service that will allow energy storage facilities to receive a reduced rate for transmission service, as long as they can prove a business case."



In June, Canada passed the Clean Energy Tax Credits law, which should provide a significant boost to Canada's renewable energy sector. (Courtesy: Jaq Murillo)

This new tariff structure is expected to reduce barriers to entry for transmission-connected energy storage facilities in Alberta, which is needed to manage everything from ramping to ancillary services, according to Bellissimo.

“On the wires side, it will help reduce costs to customers,” she said. “In my opinion, though, it’s not enough to spur the type of development we need. What I’ve been saying in Alberta is that we need to be able to stack revenue options. If there is stackable revenue — with it being an open market in Alberta — maybe a storage facility gets a certain amount of revenue from ancillary services and is able to get a certain amount of additional money from arbitraging the energy market. The barriers to entry are reduced because we have a tariff that’s no longer cost prohibitive. That’s what storage needs to get off the ground in Alberta.”

Unfortunately, Bellissimo said it’s not the same in other provinces.

“In Ontario, storage was procured, so there are government-backed, long-term contracts to provide energy storage,” she said. “In Alberta, we rely on the energy-only market, so there’s no long-term contracting available. So, it is a challenge. We have lots of work to do, but I do think there’s much more interest than there has been in the past, and I look forward to seeing more of it come online.”

CLEAN ENERGY TAX CREDITS LAW

But there is hope on the horizon. In June, Canada passed the Clean Energy Tax Credits law, which should provide a

significant boost to Canada’s renewable energy sector, according to Bellissimo.

“It encourages more investment and accelerates the transition to a low-carbon economy,” she said. “We at CanREA have been at the table with Finance Canada since August of 2022, advocating for a Canadian response to the Inflation Reduction Act in the United States. The Clean Technology ITC allows companies investing in renewable energy and energy storage projects to recoup between 20 and 30 percent of their capital costs as a refundable tax credit. With this bill, the government has put Canada on track to stay economically competitive in what we see as a rapidly digitizing and electrifying economy. And it will give investors confidence that Canada will remain competitive in the long term. This Clean Tech ITC will remain available until 2034, which is good for long-term incentives and understanding what the market will look like going forward.”

ENHANCING CANADA’S COMPETITIVENESS

The new tax credits serve to enhance Canada’s competitive position in global markets as well as attract investments, according to Bellissimo.

“We need a strong renewables sector, and we need a strong electricity game plan to drive economic growth, create jobs, and position Canada as a leader in the global energy transition and a good place to do business,” she said. “We need policy certainty. I think that’s something that some provinces are doing a good job of demonstrating, and others need

to work on it. No investor wants to be putting money down while the ground beneath their feet is moving. We need to be very, very clear that this is what the market looks like going forward. So, for jurisdictions that are buying renewables on behalf of their ratepayers, what's really helpful is predictable procurement schedules."

The other piece to that puzzle, according to Bellissimo, is the corporate PPA.

"You've seen a lot more of this in the U.S. than we have in Canada, where the only province that allows customers to buy their own renewable electricity is Alberta," she said. "Some other Canadian markets are looking to come up with their own type of mechanism to enable a version of a corporate PPA, but we haven't got that perfected yet. We are working hard to try to set up market structures where customers can make their own decisions on electricity."

WEATHER EVENTS

With the threat of climate change increasing, driving Canada toward a net zero carbon future becomes even more paramount, especially in the face of recent weather events.

On July 16, an unprecedented amount of rainfall caused a blackout in Toronto.

"There was more rain in one day than what Toronto sees in an average month," Bellissimo said. "There was some flooding at a Hydro One transmission station. Originally, 3,300 customers were out of power. Eventually 167,000 customers were out of power. One of the things we can learn from this — and not just this but any other extreme weather event — is we're seeing more of them in the age of climate change, so we need much more resilience on our grid. And that resilience can come from things like effective distributed energy resources: They don't rely on large-scale transmission to get their power to market — the supply is located closer to the load, and I think we'll see more and more of that."

But catastrophic climate events haven't been limited to Toronto, Bellissimo said they are happening across the country.

"I'm Albertan; we've seen a lot of wildfires, and it's scary, and it impacts everything," she said. "We've also seen significant hail and flooding. We need more resilient electricity systems going forward. We're going to all need to work together to look at that. When CanREA ran our Operations Summit, which is the biggest get-together for wind, solar, and storage operators in Canada, we focused on the theme of 'operating in a changing climate,' because that's what operators do: They are on the front lines, and they are the ones seeing how it's playing out."

MORE WORK TO DO

To that end, Canada definitely has a lot of balls in the air when it comes to meeting the country's net-zero carbon targets, but even that is in flux a bit, according to Bellissimo.

"Canada is planning to have a carbon-free economy by 2050, and right now, there's a regulation looking to decarbonize the electricity grid by 2035 that hasn't been passed



The windiest areas of the country aren't necessarily the areas with the best access to transmission. (Courtesy: Siemens Gamesa)

yet but is in discussions, called the Clean Electricity Regulations," she said. "The CER has allowances for fossil fire generation, if it's needed, to facilitate the transition. We will see what happens with that regulation as it moves forward."

In addition to that, Bellissimo said there are a lot of jurisdictions across Canada that are benefiting from legacy hydro assets, which already have predominantly clean grids.

"British Columbia, Manitoba, and Quebec have very, very clean, hydroelectric dominated grids, and Ontario has been very clean historically," she said. "It used to be about 92 percent clean. They're running more gas now, so it's gone down to about 87 percent, but still comparatively fairly clean. The grids that'll have the most difficulty decarbonizing are in the Prairies, Saskatchewan, and Alberta, which predominantly rely on fossil fuels. In Atlantic Canada, Nova Scotia and New Brunswick will also have larger challenges as they go forward."

To meet those goals and to continue to battle climate change will take a lot of commitment, as Canada faces both headwinds and tailwinds to achieve that target date, according to Bellissimo.

"It's a long laundry list, but I think the momentum is in our favor," she said.

ELECTRICITY TRANSFORMATION CANADA

As part of that commitment, CanREA is hosting Electricity Transformation Canada, its annual electricity conference, October 21-23 in Calgary.

"It's the largest electricity conference in the country," Bellissimo said. "Last year, we had more than 2,500 people. Participants include renewable energy companies, energy storage companies, utilities, system operators, governments and sectors that are undergoing electrification, as well as a wide variety of energy thought leaders and professionals. It's always a really good show. It's where deals are done in Canada." ✌

MORE INFO

electricity-transformation.ca

PROFILE

LS GREENLINK

CLEARING THE WAY FOR MAKING CABLE

When constructed, LS GreenLink's Chesapeake facility's VCV tower will be about 660 feet high. It will be the tallest building in Virginia. (Courtesy: LS GreenLink)

When LS GreenLink's new HVDC undersea cable manufacturing plant in Chesapeake, Virginia, goes online in 2027, it is expected to be a boon to U.S. offshore wind's development as well as a producer of American jobs.

By **KENNETH CARTER** ▶ Wind Systems editor

To move the energy being generated by an offshore wind farm to the mainland, miles and miles of cable are needed to connect those spinning turbines to an onshore transmission grid.

It's easy to overlook the important function of these undersea cables since the ocean waves hide them from view.

But essential they are — and as U.S. offshore wind continues to grow, it has become even more essential that these cables be manufactured efficiently and in locations near where they will be needed.

That local presence is closer to reality as LS GreenLink recently announced the building of a new facility in Chesapeake, Virginia, that will produce high-voltage DC cables (HVDC) for the U.S. offshore wind industry, according to LS GreenLink Managing Director Patrick Y. Shim.

DECADES OF EXPERIENCE

LS GreenLink is going to be purely based in its operation in Virginia; however, the company's umbrella company has been manufacturing cables since the 1960s.

"Although LS GreenLink is a new entity that we set up for the new operation in Chesapeake, Virginia, its parent company, LS Cable & System LTD, is a global cable manufacturer based out of South Korea," Shim said. "It's one of the largest cable manufacturers in the world, so we're a highly established company. We are one of the top major cable manufacturers, both for energy and communications cables. We have a presence globally, and we've been doing business in the U.S. for many decades already."

When deciding on where to build the site, the company had narrowed it down to two locations along the East Coast, according to Shim.

"We spent about two years looking at a number of sites throughout the East Coast, and the last two sites we identified to be suitable for us were in the southern Virginia area and the Hampton Norfolk area — one being Chesapeake, where we decided to go," he said. "The only reason why we decided not to go to Norfolk was because the Norfolk side was a 30-year lease site, whereas Chesapeake is a site that we could buy and control. It's not that Norfolk wasn't as good as the others, it was a choice between wanting to own it vs. leasing it."

BREAKING GROUND IN 2025

Currently, LS Greenlink has the 100-acre site under contract and it is going through the permitting process from the city level to the state level up to the federal level. Once that is finished, Shim said the company plans to break ground the first quarter of 2025.

"In fact, we are hoping to break ground around the same time as the IPF event that's happening in Virginia Beach, so

we're shooting for around that timeframe," he said. "Our goal is to be up and running by third quarter of 2027."

Cable manufacturing factories like the one being built by LS GreenLink are unique in that they have to be very tall, according to Shim.

"We need to have a very tall structure — what we call a VCV tower," he said. "Our tower is going to be about 660 feet high. It will be the tallest building in Virginia — and not only the Commonwealth of Virginia, but between Philadelphia and Charlotte. This will be, by far, one of the tallest structures being built in the region."

USING GRAVITY IN MANUFACTURING

That height is needed for the manufacturing of the cables, according to Shim.

"We need to center the core of the cable, and what we use the height for is for the gravity," he said. "It is one big gravity machine, basically. We feed everything from the top and use gravity to center the core of the cable, and that's part of our manufacturing process."

These cables can be tens of miles long and are produced in one, continuous piece. As the cables are manufactured, Shim said, they are spooled onto massive carousels or turntables — like a cassette tape — positioned near a pier. Once there, the cables can be re-spooled from carousel to carousel onto waiting vessels that will transport them to the wind farm for installation.

"We're going to actually have a significant pier coming up pretty far because our vessels also can be 600-foot-plus-long vessels," he said. "There's a gangway that connects the carousel to the vessels. Everything that we use to manufacture cables come in by truck. Everything leaves by vessels, because once we have these tens-of-miles-long cables, we cannot transport them out using rail or truck because they're so big. The volume's so large. Everything goes directly onto the cable-length vessel, and from there, it goes to the project site."

COMPANY ROOTS

LS as a company, although not a household name, was spun from electronics manufacturer LG. LS split from LG about 20 years ago, according to Shim.

"From our days being part of LG, we're a very innovative company, and it's all about quality and excellence of our technology," he said. "We make sure our products are by far one of the best out there. We don't put our name on products that we don't believe in having our name on. I think, pretty much, not just LS products, but all the LG affiliate companies that used to be part of LG are all about the quality of the product. We continue to make significant investments on R&D, and not just on innovation, but also on whatever we sell that we'd be proud to have our name on."



The cables that will be manufactured can be tens of miles long and are produced in one, continuous piece. As the cables are manufactured, they are spooled onto massive carousels or turntables — like a cassette tape — positioned near a pier. (Courtesy: LS GreenLink)

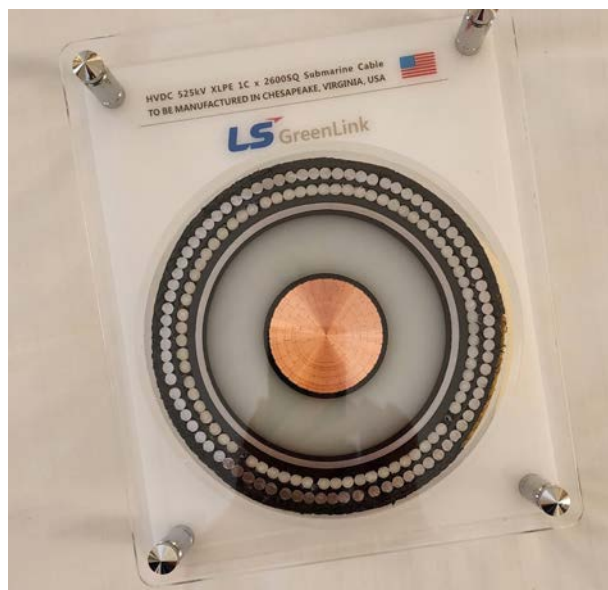
To that end, Shim re-emphasized LS GreenLink is not a company that's starting from scratch.

“Our cable business, LS Cable & System, has been around since the '60s, so we are not a startup, but over the years, we've been making significant money investments into the offshore wind industry,” he said. “In fact, we've been one of the leaders in the offshore-related power cable industry for a long time. We've been a supplier to many of the offshore wind projects in the U.S., so we've been around. We decided to set up LS GreenLink because we're a new entity, given that that will be manufacturing in the U.S., so it is an extension of an existing business.”

LS Cable & System has been involved in multiple offshore wind projects worldwide for decades, according to Shim.

“We've been very active in the U.S. and Europe and also Asia as well — We are one of the top three firms in the world,” he said. “We're very much involved in pretty much every major offshore wind project. As you know, a lot of these subsea cables are not just used for offshore wind. They can be used for any kind of underwater power transmission. There are a lot of interconnection projects out there, so we're very active globally. Most of our manufacturing is being done in South Korea, but with this project announced recently in the U.S., we continue to grow globally.”

Part of the investment in making LS GreenLink's cable factory a reality was being able to take advantage of the recent Inflation Reduction Act's 40 HC program, according to Shim. With that in place, LS Cable was awarded a \$99 million tax credit. “I believe we're one of the largest recipients of the award, so we are receiving \$99 million worth of investment tax credit,” he said. “It's not free money; it's based on performance. We also are finalizing our state and local incentive



A sample of the HVDC cable that will be manufactured in Chesapeake initially. (Courtesy: LS GreenLink)

package, which is another \$50 million, which are, again, all performance based. There's about \$150 million worth of federal-, state-, and local-level incentives coming. Our project cost is expected to be over \$680 million, so there's a significant investment for us.”

FACTORY IS A U.S. PROJECT

That being said, Shim pointed out that, although the company is from South Korea, the facility will be a U.S. project.

“Although we are a company in South Korea, only two things are coming from Korea: One is capital, and the second is the technology,” he said. “All our employees will be Americans locally in the U.S.; our raw materials come from the U.S. All our products will be made by Americans in America using American products. So, this is something that — although we are a foreign company — is really an American project.”

One of the most impressive aspects of the new cable manufacturing facility is that, even though it’s three years out from producing its first cable, Shim said they are currently approaching potential customers. “The backlog of the supply chain is pretty significant, so we are already talking to our customers,” he said. “They’re looking for cables years out. We’re already talking to customers about things that will be manufacturing in years ahead. We are pretty confident that this factory will be very successful from Day 1. We’re planning to be up and running by third quarter of 2027. That’s a relatively short time from today, so we’re looking to have the customer base already in place, and we are doing very well on that already.”

PLANS FOR EXPANSION

Even though the factory hasn’t even broken ground yet, Shim said they are already thinking ahead about expansion plans.

“We want to continue to build and grow the operation,” he said. “The site that we have under contract is 100 acres, and we’re only using about half of it right now. We have a lot of expansion opportunities around that. There are a lot of things that we want to do with the rest of the site. And the industry, as you know, is growing pretty rapidly. Although there are some hiccups here and there, if you look at the industry globally overall, there’s significant growth. We hope to grow with the industry and also be able to service our customers quickly as possible with quality products.”

Those expansion plans are just part of the confidence LS GreenLink has in the U.S. offshore industry, despite a few challenges the sector has faced in the last few years, according to Shim. “Companies like us are not concerned about the next year or the next two or three to four years; we always look decades ahead,” he said. “Whatever happens in the next year or two, yes, it does concern us sometimes, but we’re really, really in it for the long run. In the U.S., we’ve seen other stakeholders in the industry that came and left or postponed their projects. This cable-manufacturing facility we’re building, we’re coming in for the long run. That’s why we wanted to purchase a site and control it, and we have expansion plans, because we’re more concerned about the next hundred years rather than the next 10.”

MORE INFO www.lscns.co.kr/en/main.asp

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The graphic features a background of wind turbines against a sunset sky. A network of white lines connects several circular icons: a Wi-Fi symbol, a Facebook 'f', a YouTube play button, a speech bubble with a person icon, a magnifying glass, and a stylized 'X'.



Lars Persson

Sales Project Manager ▸ AB Volvo Penta

“One notable reason that the offshore marine sector has come to appreciate the Volvo Penta IPS is its enhanced operational safety and its ability to operate in higher sea states.”

▸ Tell us about the collaboration between Volvo Penta, MHO-Co, and Danfoss Drives. How did it come about?

The collaboration between the three companies started with our desire to validate new hybrid propulsion drivelines for our Volvo Penta Inboard Performance System (Volvo Penta IPS).

As a company deeply embedded in the future of propulsion design, we saw the need for hybrid solutions and sought a partner with expertise in electric machines and control systems. This led to our initial collaboration with Danfoss Drives. Danfoss brings invaluable knowledge in electric machines and energy management, which goes hand-in-hand with our experience of propulsion systems and marine gensets.

The next step was partnering with the right operator and vessel, which is where MHO-Co comes in — they are the perfect fit for this collaboration. The company is open to innovation and has the ideal vessels for hybrid technology. The partnership started in 2021 and has since evolved, leading to the successful launch of the MHO-Balder and MHO-Boreas this year. The two vessels showcase a fully integrated hybrid system that sets a new standard for marine efficiency and innovation.

▸ What makes the new CTVs — the Boreas and the Balder — the next step in electric mobility?

The MHO-Boreas and MHO-Balder represent a significant leap in electromobility. They are serial hybrid vessels, which means that, unlike traditionally powered vessels, there is no direct diesel propulsion. Instead, the propulsion is electric with the electric power coming from multiple sources.

They utilize a combination of battery power and marine gensets, which allow the vessels to switch between power sources depending on operational needs. The ability to run

only the necessary number of gensets helps to optimize fuel consumption.

As you know, CTVs operate in challenging environments, having to maintain steady positions in often rough seas and high winds. This means they require advanced propulsion systems that offer precise maneuverability and adaptable power based on whether they are travelling at high-speed for long distances or low speed whilst positioning alongside a turbine or platform. A serial hybrid system is ideal for a CTV.

▸ What involvement did Danfoss have with the design and construction of these vessels?

We worked hand-in-hand with Danfoss to develop a fully integrated hybrid propulsion system. Danfoss was responsible for providing key components such as the DC-grid and the energy management system — essential for controlling the energy flow around the vessels. Their expertise in electric machines and control systems was instrumental in integrating the electric system with our Volvo Penta IPS. This collaboration means that the MHO-Co vessels can operate with maximum efficiency, flexibility, and reliability whilst being adaptable to future marine power advancements.

▸ How does Volvo Penta IPS function? How does it work?

Volvo Penta IPS is a sophisticated propulsion technology that is designed to enhance maneuverability and efficiency. At its core, the technology features twin forward-facing counter-rotating propellers, which are mounted at the aft of a vessel, beneath the hull. This pushes water directly backwards, creating a powerful thrust and reduced torque, leading to smoother operation. The counter-rotating action also contributes to more precise and controlled maneuverability as the technology can efficiently direct thrust in multiple



The MHO-Boreas and MHO-Balder represent a significant leap in electromobility. (Courtesy: MHO-Co)

directions, including sideways. This advanced capability enables vessels to move sideways and perform precise maneuvers. Volvo Penta IPS technology ultimately leads to a more responsive, agile, and efficient vessel that allows for tight turns, improved docking and precise positioning, all critical in offshore operations.

▣ **Is that what makes it unique or are there more elements that make it that?**

It's a standout technology due to the unique combination of features that blend excellent propulsion efficiency with exceptional maneuverability. It's distinguished by its ability to integrate these two critical requirements into a single system. Unlike other systems on the market that may excel in one or the other, Volvo Penta achieves both, making it a unique, versatile and operationally excellent choice for CTVs.

▣ **What gives the Volvo Penta IPS the ability to offer energy consumption levels below that of a traditional drive train?**

There are several factors that contribute to its propulsion efficiency. For one, the forward-facing counter-rotating propellers reduce drag and enhance thrust, which directly translates to lower energy consumption vs. the traditional propeller setup. The hydrodynamic shape of the complete Volvo Penta IPS also plays a critical role, reducing resistance and drag in the water. In diesel applications, the exhaust system is integrated within the drive leg. Overall, we designed the Volvo Penta IPS with efficiency in mind.

▣ **Can you describe your power-of-plenty model?**

It's essentially an advanced approach to optimizing power

usage and redundancy. The philosophy revolves around an intelligent energy management system, making sure only the necessary number of generators are active at any given time, running at energy efficient load points. The generators not needed are off and thereby saving running hours. The gensets onboard are variable-speed since the high-voltage grid is DC.

There's also a battery bank that stores energy for propulsion and onboard systems during low-energy-demand periods. The vessels can operate in fully electric mode for short durations using stored energy.

During nighttime, hotel loads can run on stored energy in the battery banks, thus providing a silent vessel.

▣ **Is there anything else you would like to add that we didn't talk about?**

One notable reason that the offshore marine sector has come to appreciate the Volvo Penta IPS is its enhanced operational safety and its ability to operate in higher sea states. Unlike waterjets, which can experience thrust breakdowns when big waves pass, Volvo Penta IPS propellers are deeper in the water and thrust breakdowns are less likely. The Volvo Penta IPS uses its thrust for precise steering, which is available also at zero speed through the water, reducing the risk of accidents, particularly when pushing on a wind turbine. CTV operators rely on dependable and efficient systems to perform critical support roles.

Overall, the Volvo Penta IPS is the ideal solution for this ever-growing industry. ✌

MORE INFO

www.volvopenta.com/en-us



Mammoet's first Liebherr LR12500 crane has a 200m hook height. (Courtesy: Mammoet)

► CONSTRUCTION

Mammoet takes delivery of LR12500 crawler crane

Mammoet has received its first Liebherr LR12500 crane. With a capacity of 2,500t and a 200m hook height, it will help to ensure the constructability of future energy and infrastructure developments.

Seeking greater build efficiencies, projects across a range of sectors are increasing the size and scope of prefabricated construction methodologies. As a result, assurance is needed that today's project planning will match tomorrow's equipment. Energy projects in both the nuclear and oil & gas sec-

tors will rely heavily on high capacity lifting equipment to bring forward the date of first power, while increasing the cost-effectiveness of the build phase in the case of new construction, and reducing downtime in the case of turnaround projects.

Offshore wind turbine components are growing at a fast rate, with nacelles of 1,000t, tower sections of 2,000t, and jackets and monopiles of 3,000t in production. Companies across the sector need peace of mind that components planned can be transported and assembled by future equipment – as lead times increase, doubly so. Similarly, civil megaprojects will depend on high-capacity lifting equipment that allow more construction to take place away from the project site, with both cost and environmental benefits.

In all cases, the new LR12500 unit will support these construction methodologies, building in larger pieces to cut down integration and transport schedules. The LR12500 features a wide high-performance boom, which offers increased stability at reduced (self) weight.

Despite its large size, it folds into dimensions small enough to remain in-gauge. Both features increase the cost-effectiveness and sustainability of its mobilization. A 100-meter main boom and 108-meter luffing jib help the LR12500 to reach 200m maximum hook height. Dual engines with redundancy ensure high levels of reliability, as the crane can continue operation using just one power unit.

MORE INFO www.mammoet.com

► CONSTRUCTION

Offshore wind construction up 28 percent

The U.S. offshore wind market ramped up construction activities and saw several new vessels launched in the second quarter of 2024. In total, the U.S. reached 310 MW of installed offshore wind capacity, up 28 percent from last quarter. These and other key industry findings are detailed in Oceanic Network's U.S. Offshore Wind Quarterly Market Report, which highlights new vessel launches, regulatory advancements for several projects, and state-level developments that drove the U.S. market forward between April and June of 2024.

The Coastal Virginia Offshore Wind Project, Revolution Wind, and Vine-

yard Wind 1 are undergoing installation activities on the East Coast, with South Fork Wind already complete and delivering power to the grid. Once installation on the three projects is complete, they will provide more than 4 GW of energy to the grid, powering about 1.4 million homes. Also, in Q2, Equinor broke ground on its South Brooklyn Marine Terminal, projected to create more than 1,000 jobs in the construction of staging, pre-assembly, and operations and maintenance facilities for offshore wind. The New Jersey Wind Port, an offshore wind marshaling port, is also nearing completion.

"The U.S. offshore wind industry entered its second summer construction season, even bigger than last year, drawing on dozens of vessels across ports from Virginia to Massachusetts," said Sam Salustro, vice president of strategic communications at Oceanic Network. "These projects will multiply

installed capacity more than 13-fold. The next wave of supply chain and infrastructure development is well underway with new ports breaking ground and shipyards churning out vessels. Americans are at work out on the water, inside U.S. ports, and in factories and shipyards far from project areas."

Further market strength was showcased in the second quarter with the launch of the first U.S.-built service operations vessel (SOV) for offshore wind, along with the launch of two new crew transfer vessels that mark the fifth and sixth to be delivered in 2024.

"We're heading for a summer filled with monumental achievement brought by new vessels purpose-built to serve our industry," Salustro said.

The report identified several further industry advancements, including:

The Department of Interior announced a five-year plan for offshore

the power to control

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DNV, the independent energy expert and assurance provider, examined how digital twins can support the U.K.'s net-zero objectives in a new report. (Courtesy: DNV)



Russelectric's system control upgrades are a cost-effective alternative to equipment replacement. (Courtesy: Russelectric)

wind leasing, which includes up to 12 potential lease area sales through 2028.

The domestic supply chain notched advancements with \$300 million in new investments in shipbuilding and manufacturing across Louisiana, Maryland, New York, Ohio, and Texas.

More than 4 GW of projects are now undergoing installation activities.

New federal approvals increased ready to install capacity to more than 13 GW.

MORE INFO oceanic.org/2024-q2-u-s-offshore-wind-quarterly-market-report/

INNOVATION

DNV emphasizes critical role of digital twins

DNV, the independent energy expert and assurance provider, examined how digital twins can support the

U.K.'s net-zero objectives in a report, emphasizing the critical role of industry collaboration and trust in ensuring the substantial contribution of digital twins to the energy transition.

This report includes interviews with regulators, asset owners, consultancies, and government innovation agencies, revealing crucial insights into the U.K.'s path to net zero. The report, *Connected Digital Twin Insights*, explores the opportunities, benefits, barriers, and risks of connected digital twins in the U.K. energy sector and looks for the answer to a fundamental question: "How can I trust my digital twin?"

The UK's first Energy Digitalization Strategy outlined the necessity of a digitized energy system, as intelligent data-based systems can accommodate the influx of millions of new energy flows per second from emerging low-carbon technologies that will be connected to the grid in coming years.

With the country's energy CAPEX expected to rise (as projected in DNV's

Energy Transition Outlook U.K. 2024, digitalization offers cost-saving opportunities through smarter energy management, against a backdrop of volatility, unpredictability, and complexity. However, trust in the technology and data integrity is vital for the successful adoption of digital twins, with cyber security being a significant concern.

The report recommends creating a National Digital Twin to simulate and interconnect assets, processes, and systems – underscoring the need for trust and collaboration across the sector, essential for effective data sharing and integration.

"The U.K. energy sector stands on the brink of a remarkable transformation, leading us to an unprecedented level of interactivity and interconnectivity. Technologies like connected digital twins will underpin this transformation; the question becomes one of how the sector can harness their potential and add new impetus into the U.K.'s stalling energy transition," said Hari Vamadevan, senior vice president and regional director, U.K. & Ireland, Energy Systems.

"Collaborations in data sharing will play a pivotal role in realizing the benefits of connected digital twins, therefore enabling the role they can play in transforming the future energy system," said Justin Anderson, Digital Twin Hub director at Connected Places Catapult.

MORE INFO www.dnv.com

INNOVATION

Russelectric highlights system control upgrades

Russelectric, manufacturer of power control systems and automatic transfer switches, is highlighting its system control upgrades for critical power equipment for enhanced reliability, operational control, and ease of maintenance. These upgrades are a cost-effective alternative to equipment



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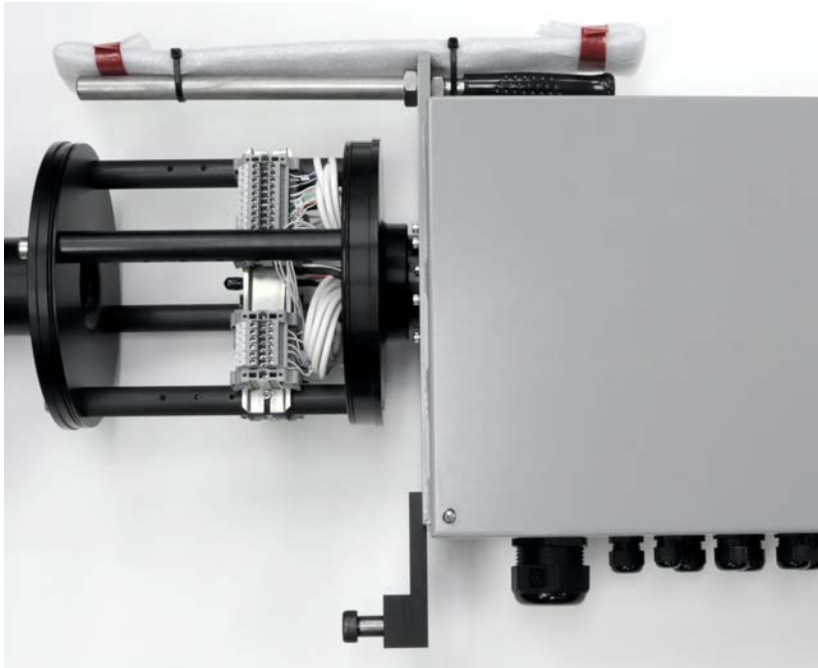


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To improve reliability and reduce maintenance costs for wind-farm managers, Moog has integrated its next-generation slip ring with a fiber optic rotary joint. (Courtesy: Moog)

replacement. By upgrading, customers can experience improved performance and capabilities, updated systems with the latest technology, and a prolonged lifespan for their mission-critical equipment.

Additionally, maintenance requirements are decreased, and serviceability is improved. Russelectric field engineers conduct the upgrades. All work is backed by warranty. These upgrades are completed in a fraction of the time compared to full equipment replacement, offering customers swift improvements without prolonged downtime.

Russelectric offers upgrades to automatic transfer switch/bypass isolation switch control systems during a scheduled shutdown to enhance switch operating accuracy and functionality. Control, monitoring, and communication protocols are upgraded to eliminate concerns about legacy component availability.

Russelectric will provide detailed information on the current system status through a dynamic one-line graphical interface, along with com-

plete alarm and event history for a quick problem response. In addition, optional TJC (The Joint Commission) reporting and optional remote system access are offered by Russelectric.

Many existing systems use legacy or soon-to-be obsolete PLC architecture. Russelectric will upgrade control systems to the latest technology with minimal program changes to improve performance and accommodate advanced communications. Most upgrades can be completed without interrupting critical loads or operational changes, with drop-in replacements available.

MORE INFO www.russelectric.com

MAINTENANCE

Moog slip ring increases turbine reliability

To improve reliability and reduce maintenance costs for wind-farm managers, Moog has integrated its



Technicians Warren Mills (left) and Jean Pieree Alcantara (right) complete GEV's new blade repair training course at Port of Blyth's Port Training Services turbine facility. (Courtesy: GEV Wind Power)

next-generation slip ring with a fiber optic rotary joint, or FORJ, as a direct replacement for the carbon-brush slip rings that control the blade pitch on 2.5-MW GE turbines and above.

"Moog's new offering for 2.5-MW and higher GE turbines leverages our success providing more than 10,000 high-reliability pitch slip rings for GE turbines as well as thousands of FORJs into the wind energy market," said Larry Bryant, business development manager for wind-energy solutions at Moog. "We have a long track record of supplying rotary interfaces, and this new

slip ring-FORJ integration represents an enhanced iteration of our proven offering. Moog's experts designed our FORJ based on years of testing and delivering similar systems for the global wind market."

Carbon brushes need lubrication to maintain their contacts and signals; without it, they harden and require replacement.

Moog has designed its new slip ring as a "set it and forget it" product from the outset due to its fiber brush technology.

Pitch systems, which include slip

rings, control motion in wind-turbine generator systems, ensure efficient use of wind energy, and protect the wind turbine by adjusting the blades' angle of inclination.

Moog fiber brushes consist of a proprietary blend of high-end metals to ensure reliable transmission of power and data. According to Bryant, Moog's maintenance-free technology can easily achieve 100 million revolutions. Customers testing Moog's integrated slip ring and FORJ in the field have reported consistent, maintenance-free operation with no communication failures. Existing carbon-brush slip rings in many GE wind turbines create dust that disrupts power and communications, leading to downtime and unplanned maintenance.

For over a decade, the industry has recognized Moog's wind-energy slip rings for their high quality and performance. The latest integrated version, model WP7286-5N, incorporates a smaller footprint and weigh less than competing designs. Additionally, the integrated FORJ, model FO286, transfers data at higher rates via fiber optic output vs. Ethernet. This addition to the WP7286 product family allows Moog to support a larger number of wind-farm sites.

MORE INFO www.moog.com

MAINTENANCE

GEV launches U.S. training center in Texas

GEV is further investing in its network of training facilities to help bridge the global skills gap for technicians.

The group has established the North American Wind Academy at its U.S. headquarters in Texas. One of the first of its kind, the facility sees GEV become the first independent service provider of in-house accredited Global Wind Organisation (GWO) blade repair courses and trade testing programs to assess technician competence.



Vestas will be supplying 53 V236-15.0 MW wind turbines to OranjeWind in the Netherlands. (Courtesy: OranjeWind)

GEV has also built on the success of its U.K. training academy in Hull by introducing a new turbine training initiative that will allow technicians to conduct rope access procedures and technology applications at the Port of Blyth's Wind Turbine Training Facility.

With almost 600,000 technicians needed by 2027 to support the growth of the global wind industry, and wind-turbine technicians predicted to be one of the fastest-growing occupations in the U.S., GEV's new training facilities underline how it is working to meet the demand.

The company, which also has a training academy in Australia, has more than 1,000 technicians worldwide and has trained more than 300 people globally.

"The launch of these facilities is another significant development for GEV," said David Fletcher, CEO at GEV. "It is part of our wider global mission to further invest in and up-skill our dedicated technician pool while also building confidence for both technicians and clients on future projects. Offering certified training for newly qualified tech-

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nicians and ensuring technicians possess the specific in-field skills to excel on client projects globally is pivotal to enhancing technical competence and offering the best possible readiness for technicians.

The ability to offer in-house GWO courses has also been highly anticipated and is playing a crucial role in accelerating efforts to meet 2050 net zero targets."

The North American Wind Academy in Fort Worth was created in direct response to the rapid industry growth taking place across North America. Having recently installed a new platform structure and dedicated training equipment, GEV has successfully completed its first blade repair training, which involves assessing competence through dedicated blade repair scenarios. The training at the Wind Turbine Training Facility, which is run by Port of Byth's training division, helps address one of the biggest challenges voiced by technicians wanting to join

the industry — gaining relevant turbine experience, including rope access training.

GEV intends training technicians at its U.K. academy before using the 33 meter high turbine at Blyth to put their skills into practice in a real-world environment. The training reflects the practices and techniques expected for upcoming projects.

MORE INFO www.gevwindpower.com

► MANUFACTURING

Vestas receives 795-MW order for Netherlands wind farm

Vestas has received a firm wind turbine order for the OranjeWind offshore wind farm, formerly known as Hollandse Kust West VII, in the Netherlands.

Vestas will be supplying 53 V236-15.0 MW wind turbines and is responsible for the supply, delivery, and commissioning of the turbines.

Upon completion, Vestas will service the assets under a comprehensive five-year service agreement followed by a long-term operational support agreement.

"OranjeWind sets a high bar for technological innovations and sustainability, and we are delighted to deliver our solutions, including our offshore flagship wind turbine, for this project in the Netherlands," said Nils de Baar, Vestas Northern and Central Europe president.

"Our entire team is looking forward to working together with the OranjeWind project team on this exciting and ambitious wind farm in the North Sea."

RWE and TotalEnergies are entering a 50/50 partnership to deliver the OranjeWind offshore wind project. The project has an installed capacity of 795 MW, a grid connection capacity



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of 760 MW, and an excess capacity of 35 MW to use the connection capacity as efficiently as possible, even when production is lower.

The project site is about 53 kilometers off the Dutch coast in the North Sea. Wind turbine installation is expected to start in 2027.

MORE INFO www.vestas.com

► **MANUFACTURING**

Vestas receives 136-MW repower order in U.S.

Vestas has received a 136-MW order to repower an undisclosed wind project in the U.S. The order consists of 62 V120-2.2 MW wind turbines.

The order includes supply, delivery, and commissioning of the turbines, as well as a multi-year Operational



A U.S. Vestas repowering order consists of 62 wind turbines. (Courtesy: Vestas)

Support Agreement, designed to ensure optimized performance of the asset.

Turbine delivery begins in the third quarter of 2025 with commissioning scheduled for the fourth quarter of 2025.

MORE INFO www.vestas.com

► **MANUFACTURING**

BGB introduces wind aftermarket 'one stop shop'

BGB, a U.K.-based global engineering firm, recently announced the intro-

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FOR MORE INFORMATION
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LS Greenlink is at work on Virginia's first offshore wind manufacturing facility. (Courtesy: LS Greenlink)



BGB specializes in providing durable wind aftermarket parts. (Courtesy: BGB)

duction of a one-stop shop offering following the launch of its aftermarket wind brushes.

The engineering enterprise, which develops, designs and manufactures engineering applications for service companies, distributors and OEMs, including Danish manufacturer Vestas, has extensive experience in the wind market.

"We've been in the wind sector for over five decades – experience and customer intimacy has given us unique insight into the requirements and demands shaping our sector," said Tony Morgan, BGB's applications engineering manager.

"One of those demands is the growing need for repairs and the recycling of consumables. On some platforms, which previously used silver graphite

brushes, we have witnessed an increasing transition toward copper brushes as part of a broader move across the sector to more cost-effective alternatives."

The unveiling of its own brand of carbon aftermarket brushes, supplied by European wind partners, aims to fulfill the market need for providing replacement systems within the OE sector and adds to BGB's complete suite of in-house manufactured solutions which includes slip rings, brush holders and rotary unions.

The expanding range of carbon brush products offered covers many of the main patterns for Turbine OEMs and comprises generator phase brushes, ground brushes, lightning protection brushes, and those used on pitch control, yaw motors, anti-icer, deicer, and signal applications.

Tapping into the growing wind-power aftermarket, driven by the need for more sustainable solutions, as well as efficient maintenance and operation, BGB aims to use its expanding Spares and Repairs service, coupled with its on-site test facilities, to evaluate, test, replace, or repair worn and damaged brushes as well as offer a range of brush products for the aftermarket.

"We're proud to be playing a role in creating a more sustainable future," Morgan said.

MORE INFO www.bgbinnovation.com

MANUFACTURING

LS Greenlink at work on Virginia's first offshore wind facility

Oceantic Network, an organization working to advance offshore wind and other ocean renewable industries and their supply chains, applauded recent announcement from member company LS Greenlink of a new cable facility in Chesapeake, Virginia, representing the state's first offshore wind manufacturing facility.

Virginia Gov. Glenn Youngkin made the announcement to hail the step forward for the state's clean-energy industry, with the facility expected to cost \$681 million to construct and generate 330 permanent full-time jobs. The facility will produce next generation high-voltage direct current (HVDC) cables that are in high-demand globally.

The announcement follows another milestone for cable production when Network member company Hellenic Cables reached a final investment decision to purchase land for its new cable facility in Baltimore announced in April.

"Another day, another offshore wind announcement," said Liz Burdock, founder and CEO of Oceantic Network. "Hundreds of millions of dollars and hundreds of long-term jobs are being made possible by the strength of the U.S. offshore wind industry's momentum and potential. This year we've already seen \$2.2 billion in new manufacturing supply chain investments announced to produce steel, foundations, towers, and cables that will supply the U.S. industry for years and create good-paying jobs in places like Hampton, Houston, and the Ohio River valley. With the continued strong support from public officials, like Governor Youngkin, and industry leaders like Dominion Energy and LS Greenlink, we are seeing the Hampton Roads area transform into a hub of the U.S. offshore wind industry." 🌬️

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An aerial photograph of a white wind turbine standing in a field. The field is characterized by numerous concentric, circular furrows in the soil, creating a ripple-like pattern. The lighting is warm, suggesting a sunset or sunrise. The turbine is positioned in the lower right quadrant of the frame.

CROSSWINDS

THE FUTURE OF WIND

RENEWABLE ENERGY:

FORGING CRITICAL COMPONENTS
TO FIGHT CLIMATE CHANGE

As the global community seeks to use more alternative energy, increasing volumes of highly reliable and durable forged components will be required. (Courtesy: Shutterstock)

The availability of a wide range of forged components is helping to keep renewable energy projects on track and production reliable for the long-term.

By DEL WILLIAMS

The accelerated adoption of renewable energy plays a vital role in tackling climate change. In this endeavor, numerous clean, sustainable energy sources rely on essential forged components in turbines to reduce the emissions from fossil-fuel combustion contributing to global warming.

Whether wind, hydro, tidal, wave, current, geothermal, or biomass power, the process of converting energy often requires using turbines. The turbines, in turn, rely on components such as shafts, gears, and seamless rolled rings to capture, transmit, and amplify the mechanical motion necessary for power generation, according to Jeff Klein, director of sales for All Metals & Forge Group (AM&FG), an ISO 9001:2015 and AS9100D manufacturer of custom and standard open die forged parts and seamless rolled rings.

“Each of these forged components plays a critical role in the overall efficiency and reliability of the energy conversion process,” Klein said.

Open die forged parts and seamless rolled rings are used because they have superior properties and can endure the harsh environment and stresses present in these settings. Other factors can include exposure to high temperatures, salt water, and any abrasives in the air or water such as sand, dust, or dirt particles.

As the global community seeks to use more alternative energy, increasing volumes of highly reliable and durable forged components will be required. Until recently, acquiring many of these critical forged components could take a year or more due to shortages and bottlenecks in the supply chain, which could threaten the viability of a renewable energy project.

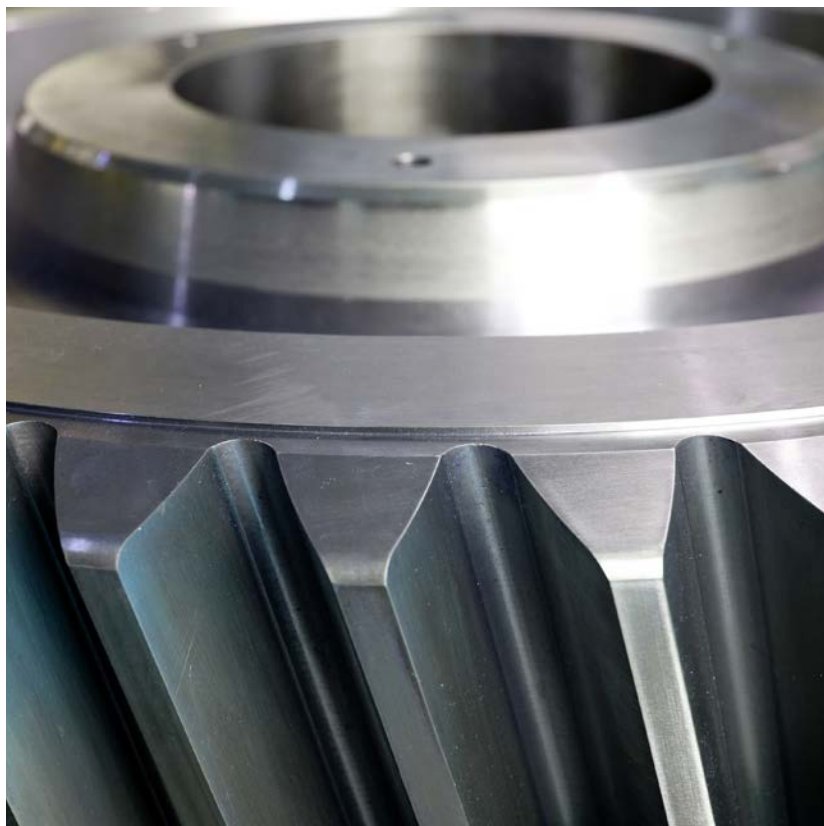
Now, leading forged part manufacturers have streamlined the process to less than two months for a wide range of durable custom-forged components, which helps to expedite project completion and lowers overall costs. The company produces a range of forged products that includes rings, discs, hubs, blocks, shafts (including step shafts or with flanges), sleeves, gear blanks, cylinders, flats, hexes, rounds, plates, and custom shapes. Carbon steel, alloy steel, stainless steel, nickel, titanium, and aluminum are among the materials used for forging. These

forgings meet rigorous industry specifications such as ASTM, AMS, AISI, ASME, SAE, GE, DIN, ASME B 16.5, ASME B16.47, and API 6A.

ESSENTIAL FORGED COMPONENTS FOR RENEWABLE POWER

The conversion of energy into electricity often involves a similar grouping of forged parts. Turbines typically consist of several key components, including blades or paddles to capture energy from the moving wind or water, a forged rotor shaft to transmit the rotational motion, and forged gears to increase the rotational speed as necessary. Other custom forged shapes may also be required such as drive shafts, step shafts, flanges, and flanged shafts for turbine parts, as well as structural components.

To withstand the harsh environments in which they are used, open die forgings and seamless rolled rings are known for their strength and durability, and are less likely to crack or warp, which is ideal for critical components that require high tensile strength.



Top custom forgers have now reduced the production time for renewable energy components from over a year to less than two months. (Courtesy: All Metals & Forge, LLC)



Renewable energy conversion relies heavily on precision-forged components such as shafts, gears, and seamless rolled rings. (Courtesy: Shutterstock)

“Depending on the metal and alloy, the forged parts and rings are also resistant to thermal and chemical damage, which further extends longevity while reducing the need for maintenance, repair, and replacement,” Klein said.

Open die forging is ideal for providing large, custom parts. As an example, AM&FG can produce seamless rolled rings or contoured rolled rings up to 200 inches in outside diameter, and custom forgings up to 40 feet long or 80,000 pounds. The company, which has been manufacturing and selling open die forgings and seamless rolled rings for more than 50 years, can also produce forgings for drive and tending ends and large cylinders in diameters that cover the sizes

needed in the power-generation industry.

While open die forging is typically associated with larger, simpler-shaped parts such as bars or blanks, the process enables the creation of “custom-designed” metal components.

Open-die forging facilitates the production of seamless rolled rings and other components to exact specifications with optimized mechanical properties and structural integrity. The rings can be produced in a variety of alloys, sizes, and shapes specific to the requirements.

RAMPING UP RENEWABLE ENERGY PRODUCTION
As demand for renewable energy accelerates globally, there

AD INDEX

Align Production Systems	3
American Clean Power	43
American Clean Power	50
American Wire Group.....	1
Bachmann Electronic Corporation	35
ColdSnap Towers.....	41
Elevator Industry Work Preservation Fund	39
Engineered Fluids	IBC
Malloy Electric	37
NTC Wind Energy.....	47
Oceantic Network	5
Sankosha	11
Stahlwille Tools LLC	47
TORKWORX LP.....	IFC
WINDSPEED.....	40
Winergy.....	BC

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is a growing need for new power generation turbines built from forged components such as rings, shafts, and gears as well as replacement parts for turbines already in use.


While the procurement of required components often takes a considerable amount of time, from 20 weeks to as much as a year, AM&FG has its own production facilities with strategic expandable capacity to expedite the process. This enables the company to deliver many custom forgings in a timeframe of eight to 10 weeks. To minimize any potential project delays or production downtime for the industry, the company also strives to provide quotes within 48 hours.

Furthermore, to optimize efficiency and reduce costs, the company frequently provides near-net-shaped forged parts with more refined surface finishes. Surfaces are within 2mm of finished machined dimensions, with a 250 RMS surface finish. However, it can provide 125 RMS or finer drill holes, and do contour forgings as needed. The company can also finish machine parts to within ± 0.001 inch of drawing dimensions. Some forge shops only offer raw unmachined parts (RMS 500 or “as forged”). In contrast, for example, AM&FG produces a better surface finish, saving machine shop time and equipment wear and tear.

In addition, the company conducts ultrasonic testing at zero expense to the customer to guarantee the absence of internal cracks, pits, or voids. This instills the utmost confidence in the quality of the parts, according to Klein.

“In many cases, All Metals & Forge Group can offer ultrasonically tested parts that are more affordable than raw forged rings or components,” he said.

As the world grapples with the challenges of global warming and the expanding renewable energy sector, the demand for forged components is expected to increase significantly.

To meet demand, industry professionals that work with experienced forging operations will have ready access to the reliable, durable components they need to keep their renewable energy projects and production on track — and keep climate change in check. 

ABOUT THE AUTHOR

Del Williams is a technical writer based in Torrance, California. For more information, contact All Metals & Forge, LLC at 973-276-5000; Canada, 416-363-2244; toll-free, 800-600-9290; or go to www.steelforge.com.

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