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Getting ready for CLEANPOWER

Our April issue is here to serve as a bit of a primer for the CLEANPOWER 2024 show in Minneapolis, Minnesota, scheduled for May 6-9, 2024.

This month's issue has several interesting pieces that hopefully will keep you informed and get you excited for CLEANPOWER.

In addition to being a catalyst for the trade show, April also tackles the topic of training and workforce.

There are a lot of moving parts in the future of the renewables workforce, and our inFocus articles shine a spotlight on some of these issues.

In our cover story, Lacy McManus looks at how the industry will need to cultivate wind resources in the Gulf of Mexico, particularly local economic and workforce developers who are looking to diversify Louisiana's energy landscape through offshore wind production.

Our second main article looks at women in the energy industry. Caitlin Ritchie brings you a fascinating look at the history of women in the renewables sector and how those numbers continue to grow as more opportunities are being offered.

opportunities are being offered.

To get you ready for CLEANPOWER, in this month's Conversation feature, we talk with Rosanna Maietta, chief communications officer and senior counselor to the CEO of the American Clean Power Association. In the Q&A, she talks about what attendees can look forward to at this year's CLEANPOWER show.

This year's CLEANPOWER preview issue also includes an extra bonus. Now that CLEANPOWER is made up of many renewable-energy sectors, shuffling through the wind-only exhibitors might be a challenge.

To help with that, inside you'll find a list of all the wind-only exhibitors and their booth numbers. And, if the company is part of *Wind Systems'* online community, we've added those companies' wind expertise, website address, and a phone number contact. We plan to publish this list again in our May CLEANPOWER issue, so if you missed out on this month, be sure and contact one of our sales representatives so you can be included in May's print issue that will be distributed at the show in New Orleans.

I plan to be at the show. I hope I can stop by your booth and discuss editorial opportunities we can collaborate on for future issues.

Looking forward to seeing all of you in Minneapolis, and, as always, thanks for reading!



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Report: Record year for U.S. clean power installations in 2023

From American Clean Power

The American Clean Power Association (ACP) recently released its Clean Power Annual Market Report, highlighting a landmark year for U.S. clean energy with more capacity installed in 2023 than in any previous year. The industry added a total of 33.8 GW of new utility-scale clean energy projects, surpassing by 12.5 percent the previous annual installation record set in 2021. Solar and storage additions led the charge, shattering previous records for both technologies. Clean power accounted for most of the new power capacity installed.

The U.S. now has 262 GW of clean energy powering its grid, which is enough electricity to power the equivalent of 69 million American homes. As a result, the nation now generates 16 percent of its electricity from wind and solar. Clean energy can be found in 93 percent of congressional districts and in all 50 states. Future development looks promising, with the report finding project pipelines are reaching historic levels.

“Clean energy is fundamental to the American economy, accounting for more than 75 percent of all new power brought online last year; we are generating clean energy in every state and nearly every congressional district,” said ACP CEO Jason Grumet. “It has been a banner year for storage and solar, and there is real excitement over the 123 newly announced manufacturing facilities that will bring economic development to communities across the country. But despite these achievements, we need to make even greater strides to meet our shared energy security and net-zero goals. ACP will continue to advocate for improvements to siting, permitting, and planning processes.”

The land-based and offshore wind sectors faced challenges in 2023, delivering 6.4 GW of wind power capacity — the slowest year for new wind installations in a decade. This slowdown was attributed largely to policy uncertainty, high costs of capital, long permitting processes, siting barriers, and a challenging environment for building new transmission.



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

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DIRECTION

THE FUTURE OF WIND



TDI-Brooks' NAUTILUS will provide support for offshore wind projects and other subsea needs. (Courtesy: TDI-Brooks)

TDI-Brooks vessel NAUTILUS reaches U.S.

TDI-Brooks' latest dynamic positioning vessel, the RV NAUTILUS, reached the shores of the East Coast of the U.S. March 3. The DP2 vessel RV NAUTILUS from TDI-Brooks, with a length of 75 meters and built in 2000, after undergoing a six-month retrofit in Las Palmas, will provide support for offshore wind projects and various other subsea needs. It is equipped with advanced technology, including a Geomil Manta-200 CPT that can be deployed through the mid-ship moonpool of NAUTILUS. This system can penetrate the soil up to 40-50 meters, depending on its composition, to determine the soil's exact makeup. This data is crucial for identifying the best location and design for offshore developments like wind farms.

TDI-Brooks remains dedicated to the expanding offshore wind sector in addition to various scientific survey initiatives. Despite the robust demand for subsea services and the increasing needs of clients, the company is well-equipped to provide a wide range of offshore support services, including subsea operations, construction assistance, exploration and production support, ROV and diving services, as well as scientific marine research and survey mapping, and military assistance.

The NAUTILUS is a versatile vessel with one North American MCK-1240 upper forecastle deck STBD side SWL 7.1 ton crane, large accommodation (46 berths) and deck capacity. The vessel is outfitted with TDI-Brooks' complete geotechnical tool kit including a suite of innovative geotechnical tools for soil sampling and measurement. These include 0.5 and 1-meter box corers (BC), 6- and 9-meter piston corers (PC), 20-meter jumbo piston corers (JPC), cyclic t-bar instrument (TBAR), piezocone penetrometers including a 40-meter CPT-Stinger and 10-meter Gravity CPT tool (gCPT), newly acquired Geomil Manta-200 CPT, Neptune 3K and 5K vibracorers, and TDI-Brooks' designed pneumatic vibracorer. The Nautilus also has a Teledyne RESON full ocean depth multibeam echosounder (MBES) for performing hydrographic marine,



The wind energy proposal area is 8.4 miles from the New Jersey coast. (Courtesy: BOEM)

surface geochemical “seep-hunting” (SGE) and seabed heatflow surveys (HF).

TDI's mission is to “safely deliver high-quality oceanographic services, including acquisition, sampling, analysis and scientific interpretation, to the marine environmental, geochemical, geotechnical and survey marketplace.”

MORE INFO www.tdi-bi.com

BOEM begins New Jersey wind project review

The Bureau of Ocean Energy Management will initiate the environmental review of a proposed wind-energy project offshore New Jersey, which would deliver clean renewable energy to the region.

On March 18, BOEM published a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the Construction and Operations Plan submitted by Atlantic Shores Offshore Wind, LLC (Atlantic Shores). This is the 12th offshore wind-energy COP environmental review initiated under the

Biden-Harris administration.

At its closest point, the approximately 81,129-acre lease area, OCS-A 0549, known as Atlantic Shores North, is 8.4 miles from the New Jersey coast and about 60 miles from New York.

The Atlantic Shores proposal includes installation of up to 157 wind-turbine generators, eight offshore substations, one permanent meteorological tower, and two temporary metocean buoys — for a total of up to 168 offshore structures. The COP also proposes two potential export cable corridors that would make landfall at: (1) Sea Girt, New Jersey, and (2) in either the New York City area or near Asbury Park, New Jersey.

Since the start of the Biden-Harris administration, the Department of the Interior has approved the nation's first six commercial scale offshore wind projects, held four offshore wind lease auctions — including a record-breaking sale offshore New York and the first-ever sale offshore the Pacific and Gulf Coasts, initiated environmental review of 10 offshore wind projects, and advanced the process to explore additional Wind Energy Areas in Or-



egon, Gulf of Maine and Central Atlantic. The Department has also taken steps to evolve its approach to offshore wind to drive toward union-built projects and a domestic based supply chain.

“BOEM is continuing to implement the Biden-Harris administration’s clean-energy agenda, while maintaining a careful approach to prevent, reduce, and address any adverse effects on ocean users and the marine ecosystem,” said BOEM Director Elizabeth Klein. “As an integral part of our environmental assessments, we will continue to actively solicit feedback from Tribes; federal, state, and local government partners; the fishing community; and the public to help guide our actions.”

MORE INFO www.boem.gov

BOEM finalizes wind-energy area in Maine gulf

In support of the Biden-Harris administration’s goals for deploying 30 GW of offshore wind energy capacity by 2030 and 15 GW of floating offshore wind energy capacity by 2035, the



BOEM’s Maine wind energy area totals about two million acres offshore Maine, Massachusetts, and New Hampshire. (Courtesy: BOEM)

Bureau of Ocean Energy Management (BOEM) has finalized its designation of a Wind Energy Area (WEA) in the Gulf of Maine. The final WEA has the potential to support generation of 32 GW of clean energy, surpassing current state goals for offshore wind energy in the Gulf of Maine: 10 GW for Massachusetts and 3 GW for Maine.

BOEM published a notice in the Fed-

eral Register March 18 that announced its intent to prepare an environmental assessment of potential impacts from offshore wind leasing activities in the WEA. The notice initiated a 30-day public comment period. Another public comment period would occur if BOEM decides to move forward with a lease sale in the WEA.

The WEA totals about 2 million acres offshore Maine, Massachusetts, and New Hampshire, ranging from about 23 to 92 miles off the coast.

BOEM finalized the WEA after extensive engagement with the states of Maine, Massachusetts, and New Hampshire, Tribes, local residents, ocean users including the fishing community, federal government partners, and other members of the public. Based on the feedback received about natural and cultural resources and current ocean uses, the WEA represents an 80 percent reduction from the area BOEM initially identified for possible leasing and a 43 percent reduction from the draft WEA.

The resulting WEA avoids important areas for lobster fishing, North Atlantic right whale habitat, and other important fishing areas and habitats. Additionally, in response to initial con-

versations with Tribal Nations within Maine, the WEA strives to avoid a majority of the historical and present-day fishing grounds of those Tribes.

“BOEM is committed to maintaining strong collaboration with the states of Maine, Massachusetts, and New Hampshire as we advance our efforts in the Gulf of Maine,” said BOEM Director Elizabeth Klein. “We remain dedicated to engaging with Tribal governments, federal and state agencies, ocean stakeholders, coastal communities, and all interested parties as we progress through our environmental review.”

BOEM will seek to avoid or minimize remaining ocean use and resource conflicts in subsequent phases of the leasing process. BOEM will continue to consult with all Tribal Nations, the fishing industry, and other stakeholders who have an interest in the region to understand their concerns with potential offshore wind energy development within the WEA.

During two rounds of analyses to produce the draft and final WEAs, BOEM leveraged the ecosystem-based ocean planning model designed by the National Oceanic and Atmospheric Administration’s National Centers for Coastal Ocean Science (NCCOS). That model incorporates the best available data on Gulf of Maine natural resources, ocean industries such as fisheries and energy production, and national security activities to identify areas with high wind energy resource potential and fewer potential impacts to other ocean users and sensitive environmental resources.

MORE INFO www.boem.gov

Offshore wind report: U.S. capacity increases 800%

The U.S. offshore wind industry’s capacity has grown 800 percent, according to a new report published by the Oceanic Network.

The network has released its 2024 U.S. Offshore Wind Market Report. Among the findings:



The Oceanic Network’s 2024 report includes breaking details on events, market trends, supply chain advancements, and policy changes. (Courtesy: Oceanic Network)

The offshore wind capacity approved for construction by the federal government grew 800 percent — from 0.93 GW to 8.3 GW in 2023.

Developers terminated 51 percent of power contracts in place prior to 2023 and are seeking financial support for another 24 percent.

Despite setbacks, 2023 saw several key announcements of new manufacturing facilities, port infrastructure upgrades, and offshore wind vessels.

States spent much of 2023 working to create interstate cooperation frameworks in order to stabilize regional

markets, lower project costs, and increase economic benefits.

“Global economic challenges hindered our progress in 2023, bringing uncertainty to this new and growing market,” said Liz Burdock, founder and CEO of Oceanic Network. “However, with each step back, we’ve seen the industry press forward and are seeing a transformation in market fundamentals.”

“New power contracts that are resistant to broader economic pressures are being executed and states like New York, New Jersey, and Massachusetts remain dedicated to offshore wind development and investing in a domestic supply chain,” she said. “In 2024, we are seeing the market rebound with interest rates and inflation falling along with new supply chain capacity.”

The report included predictions for the industry in 2024, including the potential for three or more new lease auctions as the Bureau of Ocean Energy Management (BOEM) opens new areas in the Gulf of Maine, Central Atlantic, Oregon Coast, and the Gulf of Mexico.

By December, states could award as much as 15.5 GW of new power offtake, about 60 percent of that will be used to replenish lost contracts. Total capacity that is approved for construction will continue to rise to at least 14.6 GW, the report predicted. ↴

MORE INFO oceanic.org

CULTIVATING WIND RESOURCES IN THE GULF OF MEXICO

A small fishing vessel near wind turbines. While the majority of offshore wind contracts are now in states such as New York, New Jersey, North Carolina, and other East Coast areas, following the first Gulf of Mexico wind lease auction in August 2023, Louisiana contractors will now have an opportunity to expand their wind portfolios in proximity to their home bases. (Courtesy: Bob Brewer, Unsplash)



In order to capitalize on the U.S.'s clean-energy goals, local economic and workforce developers are looking to diversify Louisiana's energy landscape through offshore wind production.

By LACY MCMANUS

For generations, oil and gas production in the Gulf of Mexico has been a leading driver of employment across South Louisiana, creating and sustaining a strong and successful middle-class economy. As the lifeblood of many Louisiana communities, the energy industry's longstanding presence has permeated not only the region's culture, but also educational institutions by inspiring events such as the Shrimp and Petroleum Festival while simultaneously building offerings such as LSU's Petroleum Engineering program into one of the tops in the country. Through this longstanding legacy, energy jobs are disproportionately high in southeast Louisiana, with Lightcast estimating as 91 percent higher than comparable regions. The wages within this sector also bear tremendous impact, with annual energy earnings averaging \$165,572 in southeast Louisiana, 286 percent higher than the \$57,852 median household income in Louisiana.

Yet, there is a clear flip side to this high concentration and reliance on the energy sector: global downturns in oil and gas demand, as well as industry efficiencies that demand less workers to perform critical functions, have disproportionately affected the region. Estimates indicate Louisiana has lost 22,000 energy jobs between 2001-2020, representing the largest energy job loss in the country during that period. However, while the jobs have waned, the skills, expertise, and educational systems remain, creating an ideal avenue for workforce expansion into the Gulf's burgeoning wind sector and beyond. Currently, Oceanic Network reports that more than 20 percent of offshore wind contracts — nominally along the East Coast — are being carried out by firms from the Gulf coast. The contractors and labor undertaking these projects are directly leveraging experience engineering, constructing, and maintaining offshore energy assets in the Gulf, demonstrating the extraordinary transferability of skills from oil and gas to offshore wind.

STAYING CLOSE TO HOME

While the majority of offshore wind contracts are now in states such as New York, New Jersey, North Carolina, and



Local economic and workforce developers, alongside partner educational institutions, are all embracing the opportunity to diversify Louisiana's energy landscape through offshore wind production. (Courtesy: P Hsuan Wang via Pexels)

other East Coast areas, following the first Gulf of Mexico wind lease auction in August 2023, Louisiana contractors will now have an opportunity to expand their wind portfolios in proximity to their home bases — while leveraging local workforce channels that train a capable workforce and upskill experienced energy professionals. Per the National Renewable Energy Laboratory (NREL), the Gulf carries most of the nation's total technical potential capacity. Fortunately, Louisiana is now on track to release it: following the federal lease secured by RWE — with the potential to produce 2 GW of wind energy — Louisiana began permitting wind projects in nearshore state waters as well.

Local economic and workforce developers, alongside partner educational institutions, are all embracing the opportunity to diversify Louisiana's energy landscape through offshore wind production. Shortly after winning the Gulf of Mexico lease in 2023, RWE partnered with GNO, Inc. — the economic development alliance for the 10 parishes in Southeast Louisiana — to develop the Louisiana Offshore Wind Supply Chain as a resource to accelerate the engagement of Louisiana's offshore wind suppliers. This database revealed more than 123 Louisiana businesses that are operationally ready to support the national offshore wind supply chain and represents a capable pool of providers for future developers to partner with; 95 percent of these firms are small

businesses, and 42 percent have investment plans to prepare for the offshore wind industry.

EXPANDING EDUCATIONAL OPPORTUNITIES

Together, community colleges and universities are seizing the opportunity to expand their existing craft skills, STEM, and business programs to meet the demands of the Gulf's wind industry. In Chalmette, Louisiana, — 15 minutes from downtown New Orleans — Nunez Community College is on-track to be the first community college in the nation to offer several degree tracks that incorporate Global Wind Organization (GWO) curriculum and certifications. The college has partnered with Norway's Energy Innovations to deploy its industry standard GWO curriculum and is in the process of hiring instructors and purchasing equipment to offer expanded GWO training and outfit classrooms space with required equipment.

At the University of New Orleans (UNO), certificate programs in wind engineering are already under development, and the school's inaugural Wind Scholars program was launched in September 2023. As a result of roundtable conversations with industry, UNO was able to not only provide \$5,000 scholarships to this first cohort of five engineering students but also connect these scholars to internships with leading wind and energy companies in the Greater New



The development of offshore wind in the Gulf of Mexico may not only be key to achieving the federal goal of deploying 30 GW of offshore wind by 2030 but also to demonstrating the efficacy of an “all-of-the-above” energy strategy. (Courtesy: Mary Ray, Unsplash)

Orleans region. In addition to the Wind Scholars, the UNO College of Business has also launched a Supply Chain and Logistics concentration and is building an on-campus test bed to facilitate research and development of wind jackets and other turbine components.

Louisiana continues to build bridges between workforce, community college, and university partners to leverage the region’s competitive educational and labor advantages to fully meet the local wind workforce demand. According to the National Renewable Energy Laboratory (NREL), wind development in the U.S. will employ more than 44,000 workers in offshore wind energy by 2030 and nearly 33,000 more in communities supported by offshore wind energy activity.

ATTRACTING AND RETAINING EXPERTISE

The existential issue now facing workforce stakeholders in Louisiana is two-pronged: attracting new diverse talent into the energy industry and retaining/leveraging the expertise of the current energy workforce.

To capitalize on the opportunity of offshore wind and mitigate these issues, a coalition of higher education, community college, economic development, and industry partners recently submitted an application to the U.S. Economic Development Administration’s (EDA) Tech Hubs opportunity, seeking \$70 million in funding to advance the wind industry in Louisiana. If successful, this award would complement additional federal investments from both the EDA and the

National Science Foundation, with the potential to bring more than \$200 million to position Louisiana’s workforce, economy, and research and development as the central catalysts for the renewable energy evolution.

The development of offshore wind in the Gulf of Mexico may not only be key to achieving the federal goal of deploying 30 GW of offshore wind by 2030 but also to demonstrating the efficacy of an “all-of-the-above” energy strategy. As the United States embarks on an ambitious and aggressive path of energy independence and environmental sustainability, Louisiana stakeholders stand ready to answer the call and create new opportunities for our communities. ✈

ABOUT THE AUTHOR

Lacy McManus serves as the executive director of Future Energy at Greater New Orleans, Inc. (GNO, Inc.) where she advances a diverse coalition of higher education, community college, non-profit, and industry partners spearheading the clean-energy transition across South Louisiana. McManus has re-joined the GNO, Inc. team after nearly three years with Amazon Web Services’ (AWS) Education Programs. While at AWS, McManus worked globally with AWS’s internal sales teams, external customers and partners, and educational organizations to pipeline AWS learners into the cloud workforce. Prior to joining AWS, McManus served as the vice president for Strategic Initiatives at GNO, Inc. where she oversaw a portfolio of workforce, education, and environmental programs that enhanced the economic competitiveness of the GNO region.

WOMEN IN THE ENERGY INDUSTRY

The U.S. Office of Energy Efficiency & Renewable Energy (EERE) highlights many female leaders and innovators in the energy industry throughout history. (Courtesy: Shutterstock)

Women make up only 25 percent of the workforce in the energy sector and 32 percent in the renewable energy sector; however, despite the gender gap, women have historically contributed to advancing technology in the energy field.

By CAITLIN RITCHIE

Woman-identifying workers make up about a quarter of the workforce in the energy and power sectors. There is a similar pay discrepancy between genders in the renewable energy field, including the solar and wind sectors. In 2019, the International Renewable Energy Agency (IRENA) reported women made up only 32 percent of the renewable energy workforce, with the bulk of their roles in administrative positions. While this is more favorable than the gender gap in the total energy industry (where women only account for 25 percent of the workforce), significant imbalances remain.

The following are some important statistics about women in power and energy workplaces.

- Women account for 25 percent of workers in the overall energy sector despite making up 47 percent of the total national workforce.

- The International Energy Agency (IEA) reports female employees in the energy sector earn almost 20 percent less than their male counterparts despite accounting for skill levels of ability, education, and previous experience.

- Within the energy industry, female-identifying workers make up 32 percent of the renewable energy workforce and 22 percent of workers in the oil and gas sector.

- Women have the highest representation in the solar energy sector, accounting for 40 percent of the workforce. Most of the female-held jobs in the solar field are administrative positions.

- In the wind-energy sector, women account for 21 percent of the workforce. Like in the solar field, most of the positions held by women in wind energy are administrative.

While the gender gap has improved over the decades, there remains room for diversification in the energy industry. That said, it's important to point out that women have already made significant contributions to the energy sector. SaveOnEnergy celebrates the accomplishments of women in power and energy industries.

Despite historically accounting for a smaller percentage of the workforce, women have broken ground as leaders in the energy industry throughout the years.

The U.S. Office of Energy Efficiency & Renewable Energy (EERE) highlights many female leaders and innovators in the energy industry throughout history. These women contributed to the growth of the clean-energy field, and their work helped create a promising future of innovation. Here's a quick recap of some important efforts women have made in the energy industry over time:

- In the 1850s, Eunice Foote's experiments with atmospheric gasses led to the discovery of the greenhouse effect.

One of Foote's male colleagues presented her findings in 1856, and Foote did not receive credit for her research until 2011.

- In the 1930s, Mária Telkes' research into solar technology led to her invention of a solar-powered desalination kit to make seawater drinkable for pilots and sailors during World War II. She later made many other significant contributions to the solar industry, including her creation of a solar-powered home heating system.

Women continue to drive the energy sector forward. From improving the electrical grid to developing new batteries for electric vehicles, there's no shortage of female innovators.

TOP ENERGY CAREERS FOR FEMALE WORKERS

IRENA estimates that by 2050, there will be roughly 29 million jobs in the renewable-energy sector. As renewable energy such as wind and solar become a more common power source in the U.S. and the job market grows, more women may seek employment in the renewables industry.

As the energy industry and job market evolve, workers in the industry become more valuable. Increased access to STEM resources and education can help women break into fast-growing, high-paying career opportunities in the energy industry.

IRENA recommends policy changes to help close the gender gap in the energy workforce. Equal training opportunities, improved parental leave, and flexible work hours are a good place to start. Salary transparency and career growth opportunities help support networking and mentorship for women in this field.

SOLAR ENERGY CAREERS FOR WOMEN

Solar panel installers are one of the fastest-growing trade careers in 2024, according to the U.S. Bureau of Labor Statistics. Between 2022 and 2032, solar panel installer employment is expected to increase by 22 percent, with an average projection of 3,500 job openings each year. This job has a median salary of just more than \$45,000 annually.

IRENA's 2022 study on women in solar industry careers revealed that solar panel manufacturing positions had the highest rate for employing women (47 percent). At the time of the report, women only accounted for 12 percent of solar panel installer positions.

While there are many opportunities for improvement in closing the gender gap, the solar industry offers significant promise. The solar industry provided approximately 4.3 million jobs in 2021, accounting for a third of all renewable energy job opportunities.



According to a 2020 study by IRENA, women represent 21 percent of the wind-energy workforce. (Courtesy: Shutterstock)



Despite historically accounting for a smaller percentage of the workforce, women have broken ground as leaders in the energy industry throughout the years. (Courtesy: Shutterstock)

WIND ENERGY CAREERS FOR WOMEN

The wind energy industry offers similar opportunities for women in energy careers. In 2023, the U.S. Bureau of Labor Statistics noted that wind-turbine service technician is the

fastest-growing career, estimated to increase by 45 percent between 2022 and 2032.

According to a 2020 study by IRENA, women represent 21 percent of the wind-energy workforce. Most female-held positions were administrative (35 percent) and non-STEM (20 percent) jobs. IRENA noted the main barriers to entry for women in the wind-energy industry include cultural and social norms, outdated hiring practices, a lack of awareness about opportunities, and unfavorable workplace policies, among others.

OTHER ENERGY CAREERS FOR WOMEN

Career opportunities exist for women outside the solar and wind industries, too. Civil engineers, chemical engineers,

and information system managers are typically among the highest-paying roles in the overall energy industry.

Based on 2021 information from Data USA, women account for:



While the gender gap has improved over the decades, there remains room for diversification in the energy industry. (Courtesy: Shutterstock)

- ▣ 16.6 percent of civil engineers.
- ▣ 19.2 percent of chemical engineers.
- ▣ 28.5 percent of information system managers.

WOMEN IN STEM

Women make up a varying percentage of the science, technology, engineering, and mathematics (STEM) workforce. For example, the Pew Research Center noted women account for the majority of workers in health-related jobs but are underrepresented in computing and engineering roles. According to BestColleges.com, only 27 percent of jobs across all STEM fields are held by women. (BestColleges.com is also owned by SaveOnEnergy's parent company, Red Ventures.)

According to the U.S. Bureau of Labor Statistics, STEM careers will increase by 10.8 percent from 2022 to 2032. The median annual wage is approximately \$53,000 higher than non-STEM occupations.

Considering the anticipated increase in overall STEM job prospects, the number of opportunities for women in STEM occupations will likely continue to grow.

SCHOLARSHIPS FOR WOMEN IN STEM

Women interested in expanding their training and education in STEM fields can apply for a variety of scholarships to

help fund ongoing education. BestColleges.com offers a list of scholarships specifically designed for women interested in STEM.

While women tend to make up less of the workforce in the energy sector, they have consistently contributed to advancing energy technology throughout history and into the present day. Female industry leaders have opened doors for future leaders, narrowing the gender gap, creating invaluable research, and improving the quality of the energy industry. ↵

Editor's note: Unfortunately, the studies and surveys referenced in this article did not include or reference participants who identify as transgender, nonbinary, gender nonconforming, genderqueer, agender, or genderless.

ABOUT THE AUTHOR

Caitlin Ritchie is a writer within the energy industry, specializing in deregulation, energy efficiency, and solar power. Ritchie aims to provide clear and straightforward guidance to help readers make informed decisions. Her writing and research have been cited by Snopes, The Washington Post, The American Solar Energy Society, and other major sources. This article is courtesy of Safe on Energy (www.saveonenergy.com/resources/women-in-energy).

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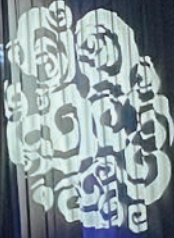
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LEADING THE CHARGE

CLEANPOWER
LEADING THE CHARGE



A list of wind-related businesses exhibiting at the premier clean-energy trade show.

With CLEANPOWER 2024 focusing on wind energy, solar energy, and battery storage, looking for wind-only or wind-hybrid businesses might be challenging. To help with your show decisions, Wind Systems offers this list of wind-related businesses exhibiting at the show along with their booth numbers.

The highlighted companies are part of the Wind Systems community, our online resource for locating products and

services that are exclusive to the wind-energy industry. These companies also have their wind-focused expertise and contact information included here.

If you'd like to be a part of our community section and have your company highlighted for our May issue that will be distributed at CLEANPOWER, contact Kendall DeVane at kendall@windssystemsmag.com.

For any late booth additions or changes, please refer to the floorplan at cleanpower.org/expo.

3S Lift

Booth #: 1028

ABS Wind

Booth #: 840

AC883 Nordic Trade Services

Booth #: 434

Aegis Onshore, Inc.

Booth #: 3427

Aerones

Booth #1238

Altura, a division of IRISNDT

Booth #: 848

American Clean Power

Booth #: 2027

American Wire Group

Booth #: 1448

Vendor for wire and cable services: cable management, cable engineering and design, supply chain procurement, logistics, and transportation, and emergency response services.

800-342-7215

www.buyawg.com

Anemometry Specialists

Booth #: 1037

Applied High Voltage

Booth #: 2848

Arctura, Inc.

Booth #: 722

ArcVera Renewables

Booth #: 1434

Ascend Analytics

Booth #: 3107

Avid Controls, Inc.

Booth #: 1041

Bachmann Electronic GmbH

Booth #: 1220

Automation, grid measurement, CMS.

43 5522 3497-0

www.bachmann.info

Barnhart Renewables

Booth #: 2146

Barr Fabrication Field Services

Booth #: 1440

BayWa r.e. USA LLC

Booth #: M-3648

BazeField AS

Booth #: 1639

BGB Technology Inc.

Booth #: 648

Rotary transmission solutions.

804-451-5211

www.bgbinnovation.com

BHI Energy

Booth #: 730

Bladefence

Booth #: 1133

Campbell Scientific, Inc.

Booth #: 1039

Carlson Wind

Booth #: 3319

Castrol / BP Lubricants

Booth #: 2928

Industrial oils, lubricants, industry expertise

877-641-1600

maps.castrol.com

Clobotics Corporation

Booth #: 1540



CMC Anchoring Systems

Booth #: 3534

Composites One

Booth #: 2748

ConverterTec Service GmbH

Booth #: 3434

Cooper & Turner Industries, Inc.

Booth #: 1213

Cross Country Infrastructure Services, Inc.

Booth #: 1640

Dakota Riggers & Tool

Booth #: 1033

Dellner Bubbenzer

Booth #: 747

DeTect, Inc (ADLS)

Booth #: 1214

Deutsche Windtechnik

Booth #: 1419

Diamond WTG Engineering & Services

Booth #: 1248

DNV

Booth #: 1840

Electrical Consultants, Inc.

Booth #: 2219

EMA Electromechanics LLC

Booth #: 1428

Emerson

Booth #: 1354

Wind SCADA and APM software, retrofit turbine and pitch controls, comprehensive cybersecurity solutions, and expert support.

800-445-9723

www.emerson.com/ovation-green

ENA Electronics Inc.

Booth #: 718

ENDIPREV

Booth #: 2120

Ensa North America

Booth #: 447

Epsilon Associates, Inc.

Booth #: 1736

Ernst Schad

Booth #: 1935

Express 4x4 Truck Rental

Booth #: 1014

Firetrace International

Booth #: 1309

Fire protection solutions in the wind industry.

www.firetrace.com

Fischer Block, Inc.

Booth #: 2420

Five Star Products Inc.

Booth #: 1034

Forte Renewables

Booth #: 3235

Fulcrum3D
Booth #: 640

GE Vernova
Booth #: 2627

GME Supply/Gearcor
Booth #: 1134

Hailo Wind Systems USA
Booth #: 3530

Hanes Supply, Inc.
Booth #: 1408

Heico Fastening Solutions
Booth #: 1740
Fastening products for securing critical bolted joints.
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www.heico-lock.us

Helwig Carbon Products, Inc.
Booth #: 3136

Hine Hydraulics Corp.
Booth #: 2419

Holt Aerial (formerly Kardie Equipment)
Booth #: 3533

Hubbell Renewables
Booth #: 3207

Integrated Power Services
Booth #: 1708

INS Engineering
Booth #: 3627

ITH Bolting Technology Carbon Products, Inc.
Booth #: 3136
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www.ith.com

ITW Performance Polymers (ITW Plexus)
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J&J Energy Solutions
Booth #: 1116

KK Wind Solutions
Booth #: 540

Kurz Wind
Booth #: 3242

LiftWerx
Booth #: 2655

Lighthouse Global Energy
Booth #: 1047

Logisticus Group
Booth #: 2456

Malloy
Booth #: 1040
Wind bearing distributor.
605-336-3693
www.malloywind.com

MBA Energy & Industrial, LLC
Booth #: 3440

Mersen USA PTT Corp
Booth #: 1628
Technical solutions for all motor and generator applications.
800-526-0877
www.mersen.us

Midpoint Bearing
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MISTRAS Group
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Provider of integrated technology-enabled asset protection solutions.
609-716-4000
www.mistrasgroup.com

Morgan Advanced Materials
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Mortenson
Booth #: 2428

Natural Power Consultants
Booth #: 2639

Nearthlab
Booth #: 1227

NGC Renewables
Booth #: 1747

NRG Systems
Booth #: 1140
Serves global renewable energy industry with measurement equipment, turbine control sensors, and turbine health monitoring systems.
www.nrgsystems.com



Olsson

Booth #: 3147

Pearce Renewables

Booth #: 2827

Phazebreak Coatings, Inc.

Booth #: 2114

Environmentally safe ice mitigation system that improves energy output in the wind energy, hydroelectric, aviation, and marine sectors.

913-626-9503

www.phazebreak.com

Phoenix Contact USA, Inc

Booth #: 2438

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www.phoenixcontact.com

Pitbull Shredding Solutions LLC

Booth #: 437

Point Lighting Corporation

Booth #: 1656

Power Climber Wind

Booth #: 1619

POWER Engineers, Inc.

Booth #: 1839

PowerFactors

Booth #: 1663

PPG

Booth #: 2057

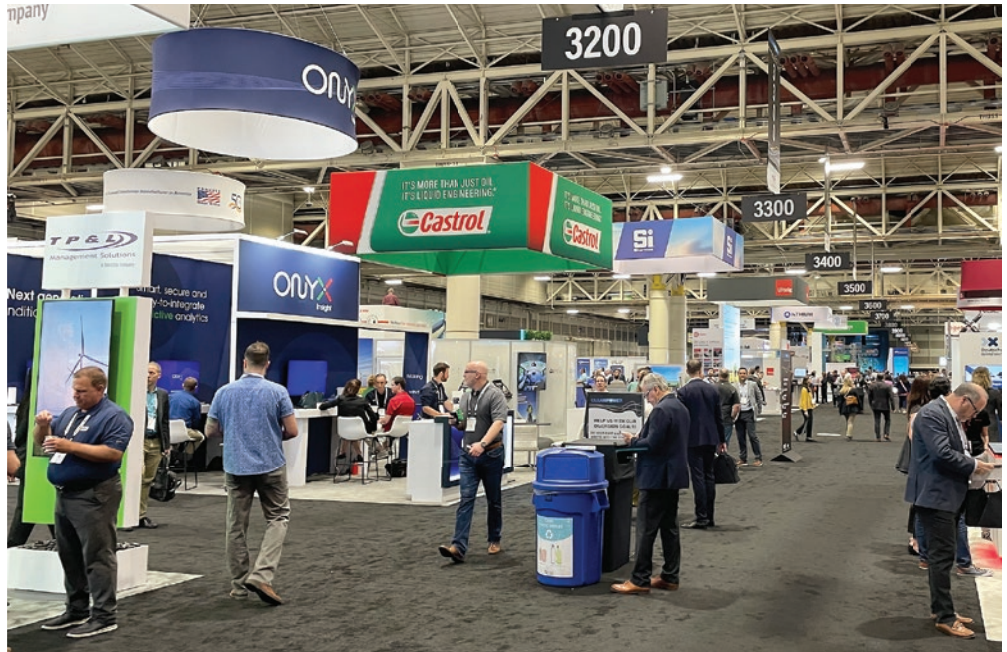
PSI Repair Services, Inc.

Booth #: 1707

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www.psi-repair.com



Remtech S.A.

Booth #: 3314

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www.remtechinc.com

Renewable Concepts

Booth #: 634

RNWBL

Booth #: 2108

Robur Group USA Inc.

Booth #: 1814

Asset performance management services for the wind power generation industry, providing inspection, maintenance repair and performance diagnostic and enhancement services.

832-294-0688

www.robur-group-usa.com

Run Energy LP

Booth #: 1849

SCADA International

Booth #: 3020

Sendero Energy Services

Booth #: 2258

Sentrex Wind Services

Booth #: 914

Shell Lubricants

Booth #: 2720

Industrial lubricants and oils.

www.shell.us/wind

Sherwood Electromotion

Booth #: 1739

Sky Climber Renewables

Booth #: 1940

Wind turbine access platform solutions for wind turbine maintenance.

888-559-7297

www.skyclimber-re.com

SkySpecs

Booth #: 1519

Spares in Motion

Booth #: 2353

System One

Booth #: 1711

Tech Safety Lines, Inc.

Booth #: 3047

Technostrobe

Booth #: 522

Telener 360 LLC

Booth #: 1636

Tennessee Valley Infrastructure Group

Booth #: 1738

Torkworx, LLC

Booth #: 2455

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torkworx.com

TWR Lighting Inc.

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UL Solutions

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Vortex Inc.

Booth #: 1433

Wanhe Filtration, Inc.

Booth #: 3334

Weidmuller

Booth #: 1128

Williams Form Engineering Corp.

Booth #: 1912

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616-866-0815

www.williamsform.com

Wind Access Engineering Inc.

Booth #: 1854

Wind Secure

Booth #: 1612

Wind Solutions LLC

Booth #: 1658

windtest north-america, inc.

Booth #: 907

wpd wind projects inc.

Booth #: 1320

WPred

Booth #: 535

Zephyr Wind Services

Booth #: 808

ZF Wind Power

Booth #: 3348

A photograph of several offshore wind turbines in a row, silhouetted against a bright sunset sky. The sun is low on the horizon, creating a strong glow and reflecting off the water's surface. The turbines are spaced out, with the largest one in the foreground on the left and smaller ones receding into the distance.

PROFILE

YOUWIND RENEWABLES

ACCELERATING OFFSHORE WIND DEVELOPMENT

Youwind covers the logistics sequence, optimization, and weather-downtime minimization of an offshore wind project. (Courtesy: Shutterstock)

Youwind Renewables integrates engineering and cost data to efficiently model key technical and financial indicators and assess the viability of offshore wind projects.

By **KENNETH CARTER** ▸ Wind Systems editor

There's no denying that constructing an offshore wind farm is a monumental undertaking. Thousands of parts are constantly in motion before a single turbine actually begins to spin.

Those early stages of offshore wind planning and development can make or break a project, so it's important that the pre-planning phases are as accurate as possible.

Helping to ensure that success lies in the hands of Youwind Renewables.

"At Youwind, we have developed an IT platform in which we streamline and optimize the early phases of offshore wind development at a global scale; we have joined together engineering modeling with financial modeling and data," said Anna Rivera, founder and CEO of Youwind Renewables. "We have this magic triangle to cover called 'data-driven decision making' in the early stages. Our comfort zone is the pre-construction years where we want to lower and minimize the cycle on that part of a lifetime of a project."

INTEGRATED IT PLATFORM

Youwind's platform includes four, fully-integrated apps, according to Rivera.

"We have four apps that are fully integrated, and we answer the key questions in the first phase, starting from where the best place is to dedicate engineering resources to go deeper into the analysis," she said. "We also look at what is the best configuration of a wind farm. This can start with the setup of components, but it's also how to place these offshore components. This layout optimization part has a greater role compared to onshore wind."

Once Youwind knows where to build and what to build, the company also tackles the aspects of how to build, according to Rivera.

"We cover all the logistics sequence, optimization, and weather-downtime minimization," she said. "All these wrap up into our mother calculator app Youwind model to always have an overview on your business case, no matter how many technical changes you do to your project."

Youwind's offshore web-based solution is designed with a usability mindset, according to Rivera.

"(Like others), we have also suffered using tools where you need to be highly expert in the field to be able to run one simulation, so this is something that we wanted to tackle at Youwind — it's an IT platform made from experts," she said. "But it is made for a wider range of users in the industry. We do have experts in our portfolio using it, but also new players coming in do not need to be that technically oriented to benefit from Youwind."

POSITIVE INDUSTRY RESPONSE

Youwind was incorporated in 2019, but the work that went

into its creation began in 2017 according to Rivera, and so far, the response from the wind-industry sector has been positive.

"We are proud of saying that we do have some of the key players worldwide in our portfolio, so that's been our, let's say, acceptance stamp," she said. "Our product is actually helping. We do have real experience on reducing the development time by 80 percent in the first phases. What do I mean by that? We have clients that, with the same team, managed to increase the number of markets they were screening from two markets to 10 markets. That is the way we've calculated this number. But of course, when we discuss this with experts, we are an ally with them because the number of projects is increasing globally. Our tools help to do that scouting in a very fast way without losing that accuracy, so the experts can focus on what really matters in their scope, and the ones that are not so expert can get that whole overview."

Being a software as a service (SaaS) company, Youwind's first sales came more than two years ago, according to Rivera.

"We do have these clients repeating and renewing their annual subscriptions, so we are confident that we're providing a service that matters to our clients and that's what we continue to do," she said.

CREATING A TRUST WITH CLIENTS

With all the intricate parts that go into planning an offshore wind farm, Rivera said it is Youwind's duty to work with its clients in order to create a trust.

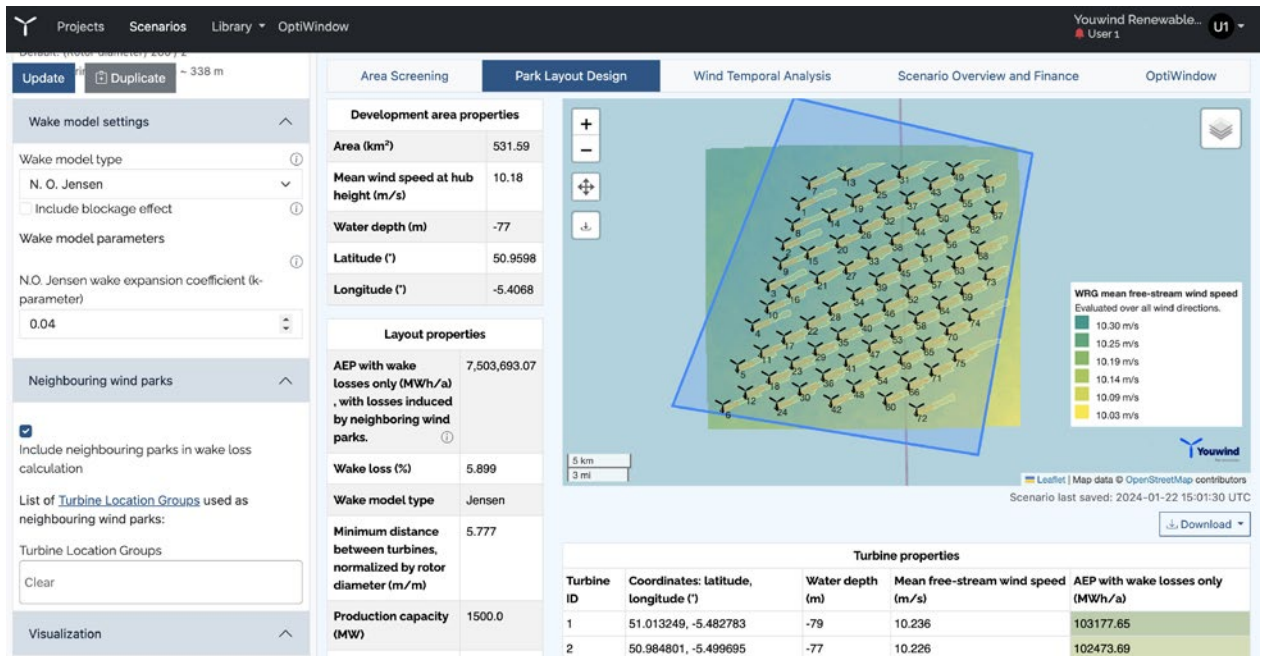
"On one side, we have the authorities claiming what the deployment should be in order to have a proper green transition, and on the other side, we're seeing the real deployment rate of offshore wind; there are a lot of challenges," she said. "The supply chain, for instance — 2023 was an inflection year, but we want to help bridge that gap by being able to make decisions with all the data in an accurate, faster way."

Being able to supply that information is what helps form trust with clients, according to Rivera.

"We create that trust with our clients in the beginning of the value chain on a project, so that we're working with them, not only on the very, very early stage, but as these projects evolve, our tools are also evolving with them to provide features the clients are actually asking for," she said. "So, we make sure that the baseline has been very robust; that's how we get the acceptance, but we are always continuing to provide the answers to the innovative questions and challenges that such a new industry has. We don't settle."

EVOLVING WITH THE INDUSTRY

That evolution of its product is essential in an industry that is also constantly evolving. Some of that evolution will in-



Youwind Renewables has developed an IT platform in which it streamlines and optimizes the early phases of offshore wind development at a global scale. (Courtesy: Youwind Renewables)

volve working with the fledgling development of floating offshore wind, according to Rivera.

“We see floating wind as a part of the industry that will definitely grow; the wind that can be harvested thanks to having a mature floating industry is actually very promising, and we need to follow the trend on that,” she said.

Youwind is growing its competencies in the floating wind sector, and some of that involves what the company has already accomplished in the existing offshore wind sector, according to Rivera, which often means following a client’s needs.

“Our clients are actually very big companies, so we’re also supporting them in order to break that silo thinking with our tools, and that’s part of becoming the standard on offshore wind,” she said.



Once Youwind knows where to build and what to build, the company then tackles the aspects of how to build. (Courtesy: Youwind Renewables)

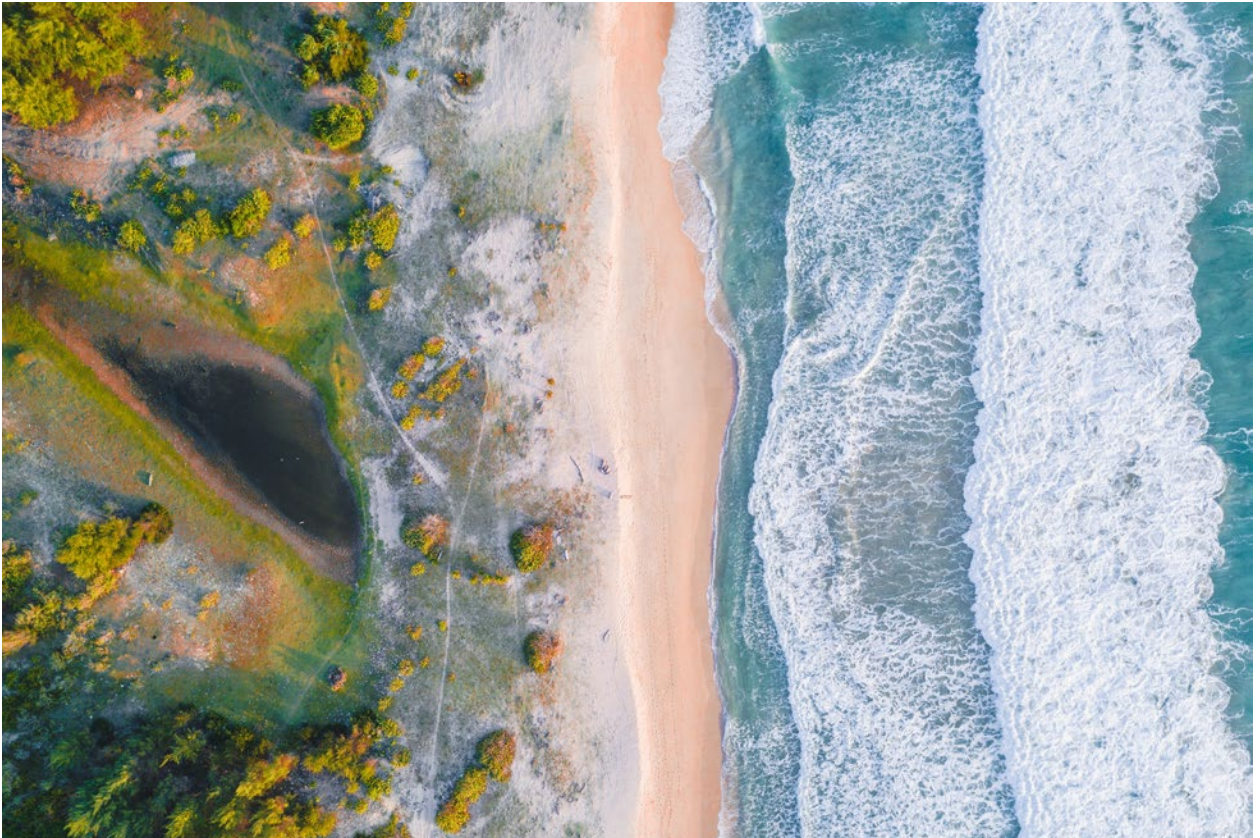
VINDICATING CHALLENGES

When building a client’s project plans, Rivera said Youwind is always up to new challenges mainly because she remembers when everyone was saying having one IT solution for an offshore wind project was too complicated.

“The fact that we have been in the field for many years gives us a good temperament for accepting new challenges; we are very proud of the expert team we have, and that when

a client comes with a challenge, we can provide a solution proposal for them, and if that’s exactly what they’re searching for, then we go and implement it,” she said. “If the client thinks that’s appropriate, then we insert it in our IT platform as a new feature. The customer has appreciated that agility. That’s where they also appreciate Youwind being a small company — that agility to treat the client as special.”

Being a fairly new company, Rivera said bringing in Youwind’s first customers was quite the milestone.



Youwind covers the pre-construction years where the goal is to lower and minimize the cycle on that part of a lifetime of a project. (Courtesy: Youwind Renewables)

“As a SaaS company, the first clients are a memorable moment, meaning you create something from scratch, and a big company believes in what you created and decides to pay for it — that’s the key,” she said. “That was 2021. That was a big accomplishment.”

INDUSTRY ACHIEVEMENTS

To complement that achievement, Rivera also pointed out Youwind was named a best startup finalist at the Copenhagen Wind Europe Fair, as well as getting a couple of EU R&D projects funded.

“We have several R&D EU funded projects, very ambitious projects, in which we have been awarded with the funding, and we will be a part of a very renowned consortia in terms of universities,” she said. “We have projects that will give answers to future problems, so we are going to come up with the solutions as the problems come. This is thanks to working with the best research institutes globally like TU Delft and DTU.”

As Youwind continues to address and conquer the challenges presented in offshore development, Rivera reiterated that she expects floating wind to mature and grow quickly.

“Floating wind is going to take off,” she said. “It will still take time because the level of investments and the risks in-

volved are still maturing. We do already have support on floating technology. We think that it’s going to be the standard due to the amount of wind to harness in areas where only floating wind is possible. It’s really promising. Offshore wind might not be the total solution to climate change, but I believe it’s a very relevant part of it. This organic growth that the industry has is going to materialize in real gigawatts feeding the needs at global scale.”

WHAT’S IN A NAME?

That will be a win-win for the world, and a win for Youwind, whose name is a play on “you win,” according to Rivera.

“We said, ‘We want the client to win time.’ ‘Youwin’ was the initial name, and then my brother said, ‘Why don’t you add the D? You’re such geeks on wind.’ So, that’s how it was born; that’s how the name came about,” she said.

And with that philosophy, Youwind will endeavor to offer go-to software solutions that will continue to be customer oriented, according to Rivera.

“We want to be that boutique, highly qualified expert team, to serve our clients, to just go faster, and accelerate the decision making in offshore wind,” she said. ↪

MORE INFO youwindrenewables.com



Rosanna Maietta

Chief Communications Officer and Senior Counselor to the CEO ▸ American Clean Power Association

“Our program aims to provide attendees with the information they need to make critical business decisions.”

CLEANPOWER 2024 will open in Minneapolis, Minnesota, May 6-8. To help our readers get ready for the event, *Wind Systems* recently talked with ACP’s Rosanna Maietta on what attendees can expect when they get there.

▸ This year’s CLEANPOWER show will be in Minneapolis, Minnesota. What about this venue made it ideal for the 2024 show?

Hosting our conference in Minneapolis is a great opportunity to demonstrate the value of clean power in the Heartland. We have an exciting line up showcasing the latest innovations and trends across all technologies. The clean-energy industry is booming, riding a wave of tremendous growth thanks to an influx of investments. We’re excited to bring Minnesota business leaders and clean-energy buyers to the stage to discuss the critical role clean energy is playing in their companies.

▸ How will this year’s show differ from what attendees experienced in New Orleans last year?

The core mission of CLEANPOWER, uniting leaders from across the utility-scale wind, solar, and energy storage sectors for targeted networking, dealmaking, and top-level industry insight-remains consistent — but, this year in Minneapolis, we’re taking everything to the next level. Expect an opening reception like no other in the U.S. Bank Stadium (home of the Minnesota Vikings), a powerful Women’s Leadership Forum, and of course, more attendees and exhibitors than ever before. We’re excited to provide a home for the next generation of clean-power leaders by welcoming the Collegiate Wind Competition and KidWind Challenge project to the event.

▸ If I were a first-time exhibitor, what should I expect from this year’s show?

The show floor is almost completely sold out for this year’s event, so my biggest piece of advice for anyone considering

exhibiting would be to reach out to our team as soon as possible. ACP’s exhibition team works hard to ensure exhibitors receive a maximum return on investment from their booth at CLEANPOWER. This is the place to be if you’re trying to get in front of the movers and shakers in the clean-energy industry. You can’t miss it.

▸ What issues should I expect presenters to address?

Our theme this year is “Powering America’s Future.” Our program aims to provide attendees with the information they need to make critical business decisions – from nascent industries like green hydrogen to timely issues like improving the permitting process and tackling supply-chain challenges. With five different stages hosting concurrent sessions throughout CLEANPOWER, we’ll cover everything from top-level insights including market projections to the nitty-gritty of FERC’s 2023 interconnection order.

▸ What kind of networking opportunities will be available for attendees?

We’re excited to debut a brand-new event app at this year’s CLEANPOWER, which will allow attendees to better focus on the areas and reach the people that matter to them and their business. The app will launch in April, allowing registered attendees ample time to make use of the networking feature to set up meetings and make the most of their time in Minneapolis.

We’re also continuing daily networking breakfasts outside the exhibit hall, conference happy hours, and bonus networking activities like the RNWBL golf tournament, the Power Up 5K Fun Run and 2.5K Walk, and topical networking meetups.

Attendees can register for the brand-new women’s forum, EMPOWERHER, co-located with CLEANPOWER this year, for access to targeted women’s+ networking. ↪

MORE INFO cleanpower.org/expo

BRIGHT IDEA

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You'll find topical articles, company profiles, and interviews with industry insiders, and timely wind energy news.

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James Fisher and Tokyo Gas Engineering Solutions have signed a joint collaboration agreement to deliver offshore wind operations and maintenance services in Japan. (Courtesy: James Fisher Renewables and Tokyo Gas Engineering Solutions)

CONSTRUCTION

James Fisher, Tokyo Gas to collaborate

James Fisher and Sons and Tokyo Gas Engineering Solutions have signed a joint collaboration agreement to provide construction and operations and maintenance (O&M) services.

The partnership, signed in Tokyo February 6, will focus on Japan's offshore wind market, aligned to the region's target of delivering 10 GW of offshore wind by 2030. Together, James Fisher and TGES will support customers to deliver efficient and effective operations at a crucial point in time for the industry, with a significant number of projects due to be under construction or operational by the end of 2030.

"We are excited to partner with TGES at such a crucial time in the country's energy transition, recognizing that industry collaboration is a critical enabler to delivering 36 to 38 percent of total energy capacity from renewables, by 2030," said Jean Vernet, James Fisher CEO. "James Fisher will provide the guidance, expertise and exceptional services, alongside TGES' strong engineering expertise, extensive local knowledge and established supply chain, providing customers with high-quality, cost-effective construction support and O&M services. This not only builds on our capability to deliver offshore wind services in Japan; it aligns with our long-term ambitions for the Northeast Asia Pacific region."

"Offshore wind plays a crucial role in the decarbonization of Japan and its stable operation is critical to supporting energy decarbonization. TGES'

strength in engineering and O&M know-how in energy infrastructure, combined with James Fisher's extensive capabilities in offshore operations, will provide significant value in terms of low cost and high reliability for offshore wind projects, an important renewable energy source in Japan," said Yasuhiro Konishi, TGES CEO.

The James Fisher Renewables team has already delivered 29 offshore wind projects in Asia Pacific through its local Taiwanese office, with a global portfolio of 6.1 GW. The company's knowledge of the offshore wind sector will complement TGES' experience in liquefied natural gas and gas-fired power plants, alongside established local infrastructure and deep-set understanding of the Japanese market, particularly in engineering and O&M.

To further support this partnership, and in response to the growing skills gap facing the offshore wind industry,



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The Enerpac tower flange alignment tool deployed to correct tower section ovalization problems. (Courtesy: Enerpac)

engineers will be given the opportunity to enroll in the James Fisher Academy Senior Authorized Person pathway, which offers online, classroom, and field-based learning to provide employees with critical skills.

MORE INFO www.james-fisher.com

CONSTRUCTION

Enerpac introduces wind-turbine tower alignment tool

Enerpac has introduced the wind turbine tower flange alignment tool (TFA), allowing wind-farm installation contractors to eliminate costly project delays caused by non-conformity or ovalization of wind-turbine tower sections. The TFA solves bolt-hole misalignment problems by aligning the large internal pipe flanges between tower sections during assembly, allowing them to be bolted together.

Problems of misalignment are of-

ten only discovered during wind-turbine tower assembly. It is a growing problem for a wind industry sourcing tower components globally. Turbine towers are made up of cylindrical pipe sections with internal bolted flange connections bolted together. During fabrication, the tower sections can become ovalized, rather than perfectly cylindrical, especially if they are laid down for storage or transportation for an extended period.

The Enerpac tower flange alignment tool is built to aid the alignment of large flanges on the inside of wind-turbine towers during assembly and installation. It can be used onshore and offshore for aligning/de-ovalizing large internal pipe flanges up to 65mm. Reflecting the breadth of wind-turbine towers, there are a range of flange alignment tools: mechanical (hand operated) up to 4.5-ton alignment force, 13.5-ton, 16.9-ton, and 20.5-ton alignment force.

“Contractors are buying monopiles and transition pieces (TPs) from all around the world; when delivered, they find boreholes are misaligned and TPs are oval rather than circular,” said Erik



Weidmuller USA's BLADEcontrol monitoring system with web-based visualization provides powerful insights on the condition of wind turbine blades. (Courtesy: Weidmuller)

Roos, director Wind Industry Tools & Solutions (EMEA), Enerpac. "The Enerpac wind turbine tower flange alignment tool enables installers to make corrections onsite or offshore quickly and efficiently."

Weighing as little as 40 pounds, the Enerpac tower flange alignment tool is supplied in a handheld carry case. The 4.5-ton alignment force, hand-operated mechanical TFA includes a torque wrench. Higher alignment forces TFA requires an external hydraulic pump such as the portable, battery powered, Enerpac SC-Series.

MORE INFO www.enerpac.com

INNOVATION

Weidmuller set to showcase products at CLEANPOWER 2024

Weidmuller USA, a provider of smart industrial connectivity and automation solutions headquartered in Richmond, Virginia, will be exhibiting at CLEANPOWER 2024 in Minneapolis, Minnesota. Weidmuller will showcase some of its latest solutions for the clean power industry: BLADEcontrol®

rotor blade monitoring system with WebVis data visualization, the Weidmuller Battery Connector (WBC), PV DC Combiner Boxes, and LED lights for wind-turbine use.

The BLADEcontrol rotor blade monitoring system has been used to increase the yield of 5,900 wind turbines since 2004. With BLADEcontrol, customers can detect performance and structural issues for blades and turbines such as aerodynamic imbalances, trailing edge cracks, spar web delamination, blade bearing damage, blade tip damage, and pitch and yaw alignment deviations. With the BLADEcontrol system, customers gain access to the WebVis data visualization and analysis suite. The overview dashboard highlights single turbine and fleet-wide diagnostics, allowing the detection of anomalous behavior, reducing unplanned downtime.

With the addition of the Weidmuller Battery Connector, Weidmuller offers a full suite of energy storage products to cover the power, data, and signaling needs required in a wide array of battery energy storage system applications. The WBC facilitates the transfer of electrical energy between the battery cells and the application, allowing the connection of the battery

modules in a few steps. Whether in smaller storage systems for home use or in large battery containers, the WBC covers a range of applications with its sizes from 100A up to 350A.

Weidmuller's durable LED lights offer a ready-to-fit solution for lighting, emergency lighting, and power supply. This collection of LED lights includes the FieldPower® Mono LED RC, FieldPower Duo LED RC, Weidmuller Industrial Power LED, and Weidmuller Industrial Tube LED. The FieldPower MONO and DUO LEDs are available with round connectors, designed for illuminating the tower and hub of a wind turbine generator.

Weidmuller will be at booth #1128 at CLEANPOWER 2024.

MORE INFO www.weidmuller.com

INNOVATION

Fraunhofer conducts boulder detection campaign

The Fraunhofer Institute for Wind Energy Systems IWES has conducted a boulder detection campaign in the Baltic Sea on behalf of Baltic Power

for the foundations of Baltic Power's planned wind turbines.

It applied the surveying technology along the planned subsea cable routes for the first time. The Manta Ray G1 measuring system allows the detection of boulders up to 100 meters below the seafloor, as well as the survey of shallower objects along cable corridors. The technology, developed by Fraunhofer IWES, makes it possible to minimize risks posed by boulders during the installation of wind turbines, offshore substations, and cables.

It is necessary to investigate how many potential rocks are in the immediate vicinity of the planned corridors in the subsurface and determine the locations of boulder fields. The cable-laying ships can then lay the power cables along the explored corridors while avoiding the detected boulders.

Baltic Power, a joint venture project between ORLEN and Northland Power, is planning to install an offshore wind farm in the Baltic Sea with a total ca-

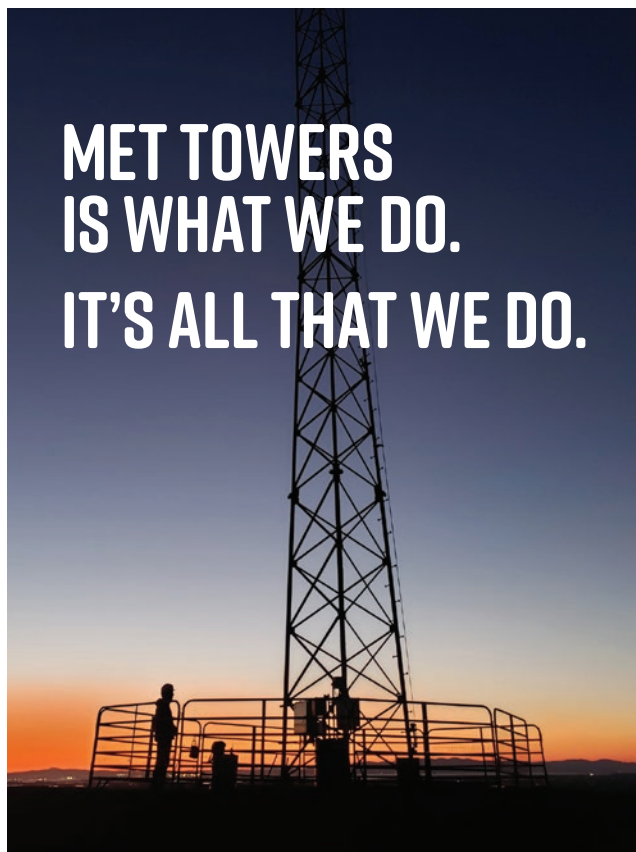


The Manta Ray G1 measuring system detects boulders in the seafloor. (Courtesy: Fraunhofer Institute)

capacity of up to 1.2 GW. The farm will be comprised of 76 wind turbines and two offshore substations. Boulders in the area can pose risks during the installation process, and the cable corridors also need to be surveyed to ensure

the subsea cables can be installed with the lowest risks.

The cables connect the wind turbines to the OSS and those, in turn, to the power lines on land. The project got underway in January 2023, and



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the IWES project team completed the required offshore data acquisition in summer 2023, which was followed by data processing and interpretation.

The Manta Ray G1 measuring system allows the scientists at Fraunhofer IWES to locate boulders at depths of up to 100 meters below the seafloor. The Manta Ray G1 comprises a towed array equipped with seismic sensors (hydrophones) and positioning systems. During the acquisition, the hydrophones pick up the sound waves emitted by a signal source and reflected or diffracted by the subsoil. This makes it possible to map the sediment layers and to detect rocks in the sub-seafloor. This method of diffraction imaging allows tracing of the acoustic energy diffracted by the boulders to its point of origin.

The IWES team also surveyed sub-sea cable corridors with the Manta Ray G1 technology for the very first time. For the customer, detection of boulders along the cable routes is equally important.

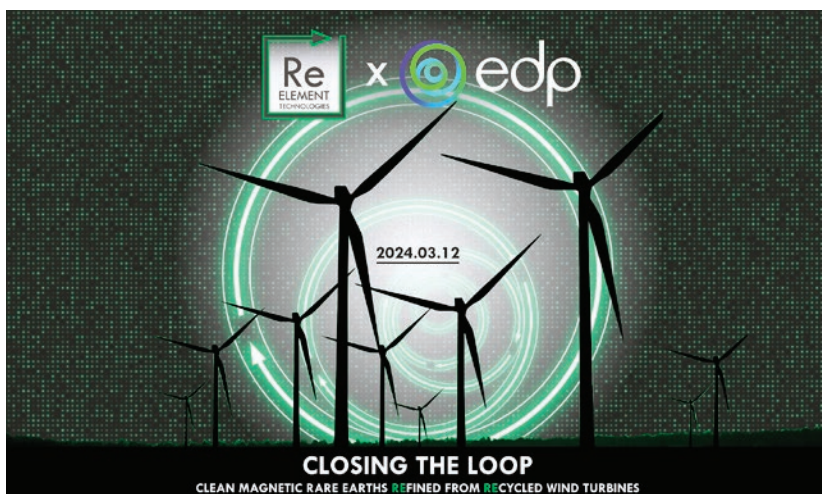
“We are proud to be able to help the renewable industry implement wind-farm projects faster and in a more efficient manner, thereby minimizing risks,” said project coordinator Gino Frielinghaus, head of department sub-surface Investigations at Fraunhofer IWES. “Our research work and successfully completed industry projects continue to validate our method, and we also satisfy industry requirements more comprehensively. This motivates us to further improve our seismic measurement methods, and we look forward to applying our expertise in further project.”

MORE INFO www.iwes.fraunhofer.de/en

INNOVATION

ReElement, EDP Renewables team up

ReElement Technologies Corporation, a provider of high-performance refining capacity of rare earth and critical



ReElement and EDP's focus is efficient recycling of neodymium-based permanent magnets from decommissioned wind turbines. (Courtesy: ReElement Technologies, EDP Renewables)

battery elements, has partnered with EDP Renewables North America, a North American leader in the renewable energy sector, to advance sustainable practices in the wind-energy sector through the EDPR NA's Close the Loop Program. The focus of this collaboration is efficient recycling of neodymium-based permanent magnets from decommissioned wind turbines into magnet-grade rare earth elements, contributing to the development of a circular supply chain for renewable energy equipment and inputs.

The partnership leverages EDP Renewables' expertise in wind energy and ReElement's advanced critical mineral refining technology for rare earth and critical battery element. Neodymium-based permanent magnets, commonly used in clean-energy applications such as wind turbines and electric vehicle motors to enhance efficiency, are critical components of the renewable energy landscape. By recycling these magnets, EDP and ReElement aim to reduce the environmental impact associated with the production and disposal of wind-turbine components as well as the primary extraction and common processing methods used in the production of critical and rare earth mineral inputs.

“We are thrilled to partner with EDPR to address the environmental

challenges associated with neodymium-based permanent magnets,” said Chris Moorman, ReElement chief commercial officer. “ReElement's critical mineral refining process is a game-changer, providing a sustainable solution for recovering and refining a broad range of critical minerals. Our flexibility to refine multiple feedstocks utilizing a smaller, scalable, and significantly more environmentally safe method enables us to provide valuable solutions to the supply chain challenges we face today. Our approach not only facilitates the recycling of wind-turbine components but also significantly reduces the environmental footprint. We applaud EDPR NA and are thankful to have this collaborative opportunity to lead the world in delivering real solutions. The next generation of the electrified economy relies on responsible practices, and through this partnership, we are collectively setting a new standard for sustainability in the renewable energy sector.”

EDPR NA and ReElement anticipate that this collaboration will set a precedent for responsible and sustainable practices in the renewable energy sector, fostering a circular economy that extends the life cycle of the critical and rare earth elements required to fuel technology. Unlike traditional mining and processing methods, mostly used in China, ReElement's process of

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recycling permanent magnets is about three times more environmentally safe, aligning with the commitment to sustainable practices in the renewable energy industry.

MORE INFO www.reelementtech.com
www.edpr.com/en

INNOVATION

Transponder controls obstacle lights for Netherlands wind farm

Lanthan Safe Sky's transponder system (known as the aircraft detection lighting system) at Wind Farm Koningspleij in Arnhem, Netherlands has been activated. Thanks to this system, the red obstacle lights of the wind turbines only turn on when aircraft traffic is detected. This significantly reduces the nuisance of the red lights for those living near the wind farm. The Environment and Transport Inspectorate (ILT) has approved the detection system at the four wind turbines.

"We have actively informed the operators of the Gelderland wind farms about the subsidy for aircraft detection," said Ans Mol, Gelderland energy deputy. "The aircraft detection lighting system contributes to support at wind farms, and we aim to minimize nuisance as much as possible."

The Climate Agreement states the 30 RES regions will generate 35 TWh of renewable energy on land in the Netherlands by 2030. Gelderland's total ambition in 2030 is 6.5 TWh, of which about 2.5 TWh will come from wind energy.

Wind turbines with a tip height of more than 15 meters, as at wind farm Koningspleij, must by law be fitted with obstacle lighting. This lighting makes the wind turbines visible to air traffic. When an aircraft approaches the wind turbine at dusk or at night, the obstacle lighting switches on. And it switches off again when no aircraft is flying near the wind turbine.

A positive collaboration between the ILT and all parties involved, as well



Lanthan Safe Sky's aircraft detection lighting system offers relief for residents. (Courtesy: Koningspleij Wind Farm)

as a test flight, led to approval of the transponder system.

Koningspleij Wind Farm generates clean energy for about 13,000 households in the region. Together, the four wind turbines can generate 34.5 million kWh of energy per year, more than 5 percent of the total electricity consumption in Arnhem.

Three of the four wind turbines at Koningspleij Wind Farm were built together with residents from Arnhem and the surrounding area. There are 575 co-owners who participate in the wind farm through Rijn en IJssel Energy cooperative.

MORE INFO www.windparkkoningspleij.nl

INNOVATION

Vaisala, DNV unveil guidelines for scanning Lidars

Vaisala and DNV have released extensive guidelines for using scanning Lidars in a dual system configuration (DSL) for offshore wind resource assessment (WRA). The release of these guidelines helps improve dual scanning Lidar bankability and contributes to creating the International Energy Agency Task 52, recommended prac-

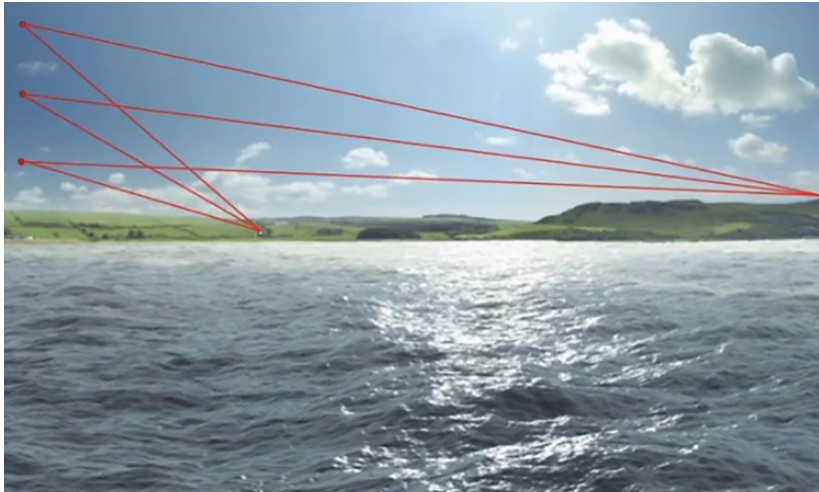
tice on using scanning Lidar measurements offshore.

Dual scanning Lidar is increasingly replacing meteorological masts for offshore wind park developments near the shore (up to 15 kilometers), enabling offshore wind-project developers to reduce extrapolation uncertainties and gain a more comprehensive picture of the wind resource at the planning areas. A major advantage is DSL can measure the wind speed and direction at multiple offshore locations remotely from the shore.

The guidelines detail a typical campaign workflow and the individual steps to maximize reliability and minimize uncertainties before a campaign begins, facilitating decision-making and making DSL technology more accessible to stakeholders across the wind energy sector.

The collaborative document outlines the different phases of a typical DSL campaign for wind resource assessment:

- ▣ Campaign planning.
- ▣ Lidar pre-campaign verification.
- ▣ Installation and commissioning.
- ▣ Operation and monitoring of the specific measurement campaign.
- ▣ Data processing.
- ▣ Uncertainty evaluation.
- ▣ Decommissioning and post-campaign verification.



Vaisala and DNV's collaboration outlines the different phases of a typical DSL campaign for wind resource assessment. (Courtesy: Vaisala, DNV)

The Dual Scanning Lidar Principle section explains the math for reconstructing horizontal wind speed and direction from two line-of-sight wind speed measurements, discussing factors influencing uncertainty such as beam geometry, mode of operation, scan parameters, and environmental conditions. The document also emphasizes proper setup, alignment checks, performance monitoring, data collection, and maintenance procedures and provides proprietary methods to calculate uncertainties of intermediate and final reconstructed values.

MORE INFO www.vaisala.com

INNOVATION

Axess wins floating wind platform contract

Axess Technologies has won a concept engineering study contract with Wind Catching Systems, a developer of floating offshore wind technology.

The scope of work entails an advanced handling system capable of efficiently replacing turbine blades and entire turbines, while also serving as a versatile work platform for inspection, maintenance and repair operations.

“Securing the project was a result of

our vast practical experience in executing lifting operations, operating lifting appliances, and conducting maintenance, along with a comprehensive understanding of rules and regulations,” said Marte V gen, Director – Products at Axess Technologies. “We are enthusiastic about leveraging our expertise in material handling to actualize this innovative and sustainable system for WCS. This comprehensive study aligns seamlessly with our strategy to enhance revenue streams from renewables, further solidifying our position as a key supplier of lifting solutions to the offshore wind industry.”

Wind Catching Systems is an independent technology provider to the

floating wind sector, aiming to create a product that maximizes power generation from a concentrated area. The Windcatcher is a highly scalable unit, based on mass-produced smaller turbines and at-sea replacement of individual turbines without the use of specialized ships or cranes. The result will be a concept with scaling potential, high acreage efficiency and drastically reduced operations and maintenance costs for floating wind.

MORE INFO www.axessgroup.com
www.windcatching.com

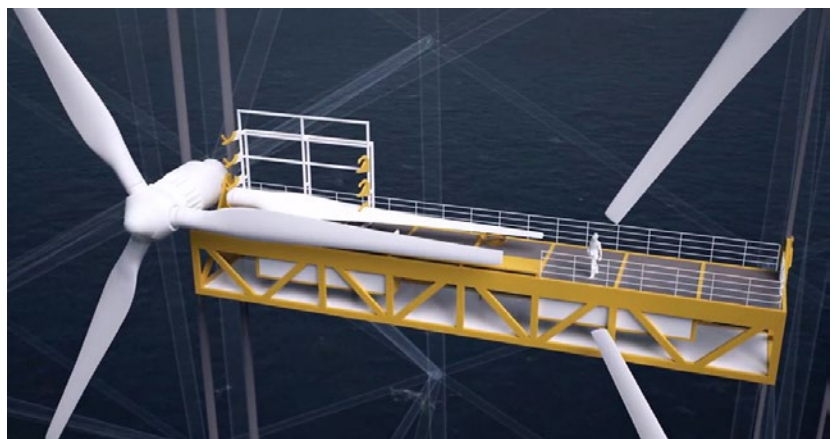
MAINTENANCE

KASK helmets, shades protect workers from heat stress, UV rays

KASK helmets are designed for workplace safety. By prioritizing the well-being of workers and protecting them from heat stress and harmful UV rays, companies can minimize risks and promote a healthy work environment. Ensuring workplace safety is of utmost importance, and the use of helmets and sun protection accessories is crucial in achieving this objective.

Heat stress can lead to fatigue, dehydration, and heat-related illnesses, which can impair

concentration and increase the likelihood of accidents. Moreover, pro-



Conceptual design of the elevator platform by Wind Catching Systems. (Courtesy: Axess Technologies)



KASK Neck Shade and Sun Shield provide effective protection against both heat stress and UVA/UVB (UPF 50+). (Courtesy: KASK)

longed exposure to UV rays can damage the skin, especially for individuals who regularly work outdoors for extended periods.

People are often unaware that UV rays can have the same intensity in May as they do in August, and that UV rays can still reach their skin even when the sky is partially cloudy.

KASK helmets are specifically designed to reduce heat stress thanks to internal ventilation channels that improve breathability and special inner padding that helps keep workers cool, dry, and comfortable. However, it is equally important to provide sun protection in hot and sunny conditions. Accessories such as the KASK Sun Shield and Neck Shade are essential in providing additional protection against the sun's harmful rays.

MORE INFO www.kask.com

MAINTENANCE

GEV Wind Power wins two safety awards

GEV Wind Power's track record in safety has been recognized with two industry awards. The wind-turbine blade repair and maintenance experts won the Innovation in Safety and the Safety Performance and Delivery accolades at Siemens Gamesa Renewable Energy's (SGRE) Annual Contractors Safety Conference for the Northern Europe and Middle East (NEME) region.

It is the second year in a row that



GEV's Group QHSE manager, George Guy (left), receives safety awards from Michael Larne, EQS manager major projects on/off Northern Europe and Middle East at Siemens Gamesa Renewable Energy. (Courtesy: GEV Wind Power)

GEV has won awards at SGRE's event which, this year, was held in The Hague.

GEV received the Innovation in Safety title for the development of new initiatives to improve safety rescue drills combined with skills training for Leading Edge Protection (LEP). LEP helps to combat leading edge erosion, which is the single largest maintenance-related issue in the wind industry.

GEV also received the Safety Performance & Delivery award for the record number of safety observations reported by GEV technicians during 2023.

"This is tremendous recognition for our team and underlines the pivotal

role our technicians play in setting industry standards and championing awareness of hazard free working environments," said David Fletcher, GEV Group's chief executive officer. "It is also testament to GEV's proactive approach to health and safety reporting from everyone within the company."

The awards build on GEV's success at the SGRE event where the company was named in 2023 the Major Projects Division Overall Winner for Safety Performance Delivery. GEV won the accolade for a significant increase in safety reporting across all divisions, led by its QHSE team and in-field technicians.

"We take immense pride in having a team that genuinely values the importance of health and safety," said George Guy, Group QHSE manager at GEV. "Our proactive approach ensures potential on-site hazards are identified and assessed promptly, whilst also highlighting positive safety practices. This not only allows our expert in-field team to work efficiently, but also minimizes downtime, and helps us to uphold an incident-free working environment."

GEV has evolved as a global leader in blade maintenance and repair through organic growth and acquisitions that build on its blade competence capabilities and in-house expertise across complex repairs, upgrades, and maintenance combined with specialist blade advisory, risk, and technology solutions.

Most recently, the Group acquired Rigcom Group, Australia's largest domestic independent service provider (ISP), which specializes in field de-

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ployed rotor blade maintenance and a range of height safety services.

GEV has more than 1,000 technicians worldwide and supports more than 200 projects across four continents including Europe, North America, and Asia with a network of operational bases in the U.K., U.S., Australia, Poland, and Denmark.

In GEV's 2023 financial year alone, 1,122 blades were maintained by GEV, enough to annually power 320,000 homes and save more than 1 million tons of CO2 emissions.

MORE INFO www.gevwindpower.com

MAINTENANCE

Snap-On introduces portable heavy-duty impact set

Snap-On Industrial's new Portable Heavy-Duty Impact Sets provide items technicians need to reliably transport their impact tools on the jobsite.

The 25-Piece Heavy-Duty Cordless Impact Set with Portable Storage (425IMCT) comes with an assortment of tools and is perfect for work in many industries. The set includes:

- 17-piece socket set with Snap-on Flank Drive® technology.



Snap-On's heavy-duty impact set provides everything technicians need to reliably transport their tools. (Courtesy: Snap-On Industrial)

- 3/4" drive universal joint.
- 3-inch, 7-inch, and 10- and 3/4-inch drive extensions.
- 18V 3/4-inch drive MonsterLithium cordless impact wrench set.
- All-weather resistant case with collapsible handle and wheels.
- Red and black colored tool control foam to securely house the tools.

MORE INFO www.snapon.com

MAINTENANCE

Mammoet to implement site hazard safety system

Mammoet is working with Rietveld, a specialist in fleet management and vehicle and machine safety systems, on a joint project to protect drivers and road users when mobile cranes are moving and maneuvering.

The project combines three different safety technologies and was commissioned by Mammoet to help its customers to meet stricter safety regulations. Testing is being carried out on one of its new Liebherr LTM 1070-4.2 70t mobile cranes.

The three-tier system includes Rietveld's OmniVue 360° camera system. Using a combination of cameras installed on the crane's chassis, it generates first and third-person images of the vehicle. This gives the driver a full 360-view from both inside and outside the cab, enabling them to see what pedestrians and other road users are seeing.

The second tier adds a series of sensors that detect people and obsta-



The joint project combines three different safety technologies and was commissioned by Mammoet to help its customers to meet stricter safety regulations. (Courtesy: Mammoet)

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cles within an adjustable safety radius around the crane. When the sensors detect a potential hazard, an acoustic signal alerts the driver. An LED warning panel also displays the section of the crane where the motion was detected.

The final tier, the “Halo,” draws a light boundary on the floor around the crane, giving those nearby a clear visual indication of the safe zone around it. This is especially important at sites where hearing protection is required. The boundary can be switched on and off manually and is set to automatically turn off when a certain speed is reached.

“By combining these three systems, Mammoet will improve safety, minimize accidents and damage, and give greater confidence to crane operators to create safer working environments,” said Ferdi Kivanc, project coordinator EMD at Mammoet. “We see this as a comprehensive system that will not only enhance crane safety, but also operator training in the future. Initial tests are promising, and I am very proud of the results.”

“When Mammoet approached us with what it wanted to achieve, we were delighted to offer our expertise,” said Frank Kanters, Rietveld account manager. “By working with its engineers to test the integration of our collision-prevention technologies, we have created something unique in crane safety solutions. We look forward to developing the system further and progressing to eventual rollout.”

MORE INFO www.mammoet.com

MANUFACTURING

Flender to acquire Eickhoff Wind Asia

German drive manufacturer Flender has reached an agreement with Eickhoff to acquire Eickhoff Wind Asia Pvt Ltd (EWA) with its assembly plant in Walajabad Taluk, India.

Established October 1, 2020, in India, Eickhoff Wind Asia Pvt Ltd (EWA)



Eickhoff Wind Asia in Walajabad manufactures and assembles wind energy gearboxes, catering to the Asia Pacific region's needs. (Courtesy: Flender)

specializes in the production of wind gearboxes. The facility has a test bench capacity up to 8 MW. It is in the greater Chennai area, close to Flender's existing facility.

One of the pillars in Flender's global footprint strategy is to expand and localize wind-turbine drive systems in India. Next to the investments in its own production sites in Kharagpur and Chennai, the acquisition of Eickhoff Wind Asia allows Flender to further scale up and accelerate in pace. This is required to meet the growing needs of the renewable energy transition.

“Next to scaling up quickly, it is key for the wind industry that its supply chain is sustainable, resilient, and affordable,” said Flender Group CEO Andreas Evertz. “A diversified global manufacturing and service footprint combined with a high degree of localization is key to achieve this. The acquisition is another strategic milestone to further expand our footprint based on the needs of our valued partners and the industry.”

“Together, we continue to provide the wind market with cutting-edge technologies and services,” said Aarnout Kant, president of wind at Flender. “Our partners will profit from increased capacity, availability and further reduced reaction times.”

MORE INFO www.flender.com/en

MANUFACTURING

Vestas wins Baja California wind-farm order

Vestas has won Sempra Infrastructure's 319-MW order for the Cimarón wind farm in Tecate, in the state of Baja California, Mexico. This is the third phase of the Energia Sierra Juarez Wind Complex that will have a total installed capacity of 582 MW.

The order includes supply and installation of 46 V163-4.5 MW turbines and 18 V162-6.2 MW turbines. Upon completion, Vestas will also deliver a 10-year service agreement (AOM 5000) that will optimize energy production while providing long-term business case certainty for the wind farm operations.

“We are proud to have been awarded a project by Sempra Infrastructure in Mexico, strengthening our long-standing relationship with this important player in the renewable energy ecosystem,” said Mehdi Hadbi, Senior Business Director for Vestas in LATAM North.

“We have been able to win trust from our customers in Latin America thanks to our reliable product offering and local team with strong execution and servicing capabilities. With the signing of this new contract, we consolidate our market position in Mexico and reinforce our commitment to the development of renewable energy in the country.”

“Our team has always worked dedicatedly, intensively and tirelessly, always investing in the country despite any market challenges, due to the broad potential we identify in Mexico to take on a leading role in the energy transition journey,” said Mario Barreiro Castellanos, country head for Vestas in Mexico.

Delivery is planned for the fourth quarter of 2024, while commissioning is expected for the fourth quarter of 2025. ✌

MORE INFO www.vestas.com

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(Courtesy: Laser
Photonics)



Clean technology lasers offer superior corrosion removal in myriad applications, while helping to solve some of the industry's most costly corrosion problems.

By DEL WILLIAMS

The global wind turbine operation and maintenance market is projected to grow from \$36.27 billion in 2022 to \$63.82 billion by 2029, at a CAGR (compound annual growth rate) of 8.4 percent, according to Fortune Business Insights as the industry takes an increasingly leading role in the global energy supply.

However, corrosion threatens this growth since it can often go unseen and hinder the power generation, operation, and uptime of wind turbines. The corrosion is typically found in locations such as wind-turbine AC/DC motors and DC generators, hydraulic and lubricating systems, switch-gears, control cabinets, and electrical enclosures.

Consequently, effective corrosion maintenance plays a key role in the efficient, profitable operation of wind turbines. Although wind turbines have an average life expectancy of 30-plus years, the high-performance coatings used have an expected lifespan of only eight to 10 years, so a reliable solution for coating removal and surface conditioning is essential.

The challenge is traditional methods of removing corrosion can be messy, laborious, time consuming, and can even pose serious health hazards.

Today, one of the easiest to use, most effective alternatives in the war against corrosion is the increasingly important category of industrial-grade, clean-technology lasers.

With this approach, precision laser-based systems are used to remove corrosion, contaminants, paint, and residues with a high-energy laser beam that leaves the substrate unaffected. Preparation and cleanup time are minimal, and the low-maintenance equipment can last decades. The technology minimizes operator exposure to potential environmental health hazards. In addition, no consumables are necessary.

CORROSION AND THE LIMITS OF CONVENTIONAL CONTROL

Any industry with metal infrastructure, processing equipment, or products exposed to water, fluids, moisture, or atmospheric humidity continually fights corrosion, which causes the deterioration and loss of a material and its critical properties due to chemical and electrochemical reactions of the exposed surface with the surrounding environment. Corrosion affects the microstructure, mechanical properties, and physical appearance of the materials.

The direct cost of corrosion includes a loss of materials, equipment, and production, plus the cost of repair, maintenance, and replacement. Additional losses can result from accidents, injuries, and even loss of life as well as payments to repair environmental damage.



Laser Photonics provides a new solution that safely pre-treats metal surfaces and removes corrosion. (Courtesy: Laser Photonics)

Within the industry's continual struggle against corrosion, one important niche area of corrosion control involves the pretreating of metal surfaces to remove corrosion and contaminants before coating or welding.

Although metal surface pretreatment is a small portion of corrosion control in the wind-power industry, it is crucial to ensure the safety, performance, and longevity of crucial wind turbine components.

Insufficient coating pretreatment can lead to inadequate protection from the environment, leading to potential coating failure, moisture entry, and accelerated corrosion as well as increased maintenance, early replacement, and warranty issues. Similarly, insufficient weld pretreatment to remove corrosion and contaminants can lead to weakened or failed welds and necessary rework as well as substantial safety, liability, and litigation risk.

A MORE EFFECTIVE WEAPON TO ELIMINATE CORROSION

In the wind-power industry, it is necessary to remove corrosion, residue, oil, grease, or paint before coating components or infrastructure to improve coating adhesion.

Toward this end, laser-based systems have significant advantages over traditional methods, starting with ease of use.

"With laser-based systems, an operator simply points and clicks a high-energy laser beam at the surface," said Wayne Tupuola, CEO of Orlando, Florida-based Laser Photonics, a leading provider of patented industrial grade CleanTech® lasers for cleaning and surface conditioning. The company's systems function either as mobile standalone units or can be integrated into production lines.

"The substrate is not affected by the laser, and the systems do not create any mess or byproducts," he said. "The ap-

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proach is eco-friendly, energy-efficient, and completes the job in approximately half the time of traditional methods when preparation and cleanup are considered. Also, no consumables are required.”

In the case of Laser Photonics, the laser systems are available in portable and stationary models ranging from 50 to 3,000-watts (a 4,000-watt version is in development) with chamber sizes from 3' x 3' in size to 6' x 12'. The systems can also be installed in manufacturing lines in cabinets or operated by a robotic arm.

The CleanTech lasers are used to refurbish wind-turbine components and infrastructure, such as when removing a previous coating along with any corrosion to facilitate the new coating's adhesion to the surface. The laser pre-treatment of metal surfaces can also be used to streamline various manufacturing processes by removing any rust from components.

Another common laser application involves pre-weld treatment to remove corrosion, mill scale, residue, and any impurities on the surface of the base material that would compromise the weld's effectiveness. It is essential to avoid any such contamination on a weld's surface, which could otherwise lead to a weakening of the weld's mechanical properties, requiring rework.

INCREASING LIFE EXPECTANCY

Laser treatment is also used for post-weld cleaning to increase the life expectancy and corrosion resistance of a welded joint.

Post-weld cleaning is important for stainless steel as well. The strength of stainless steel allows wind turbines to be built taller and more efficiently while providing corrosion resistance. However, welding can cause a “heat tint,” a discolored, thickened top layer on the stainless steel around the weld bead within the heat-affected zone that compromises corrosion resistance. Removing the heat tinted top layer is necessary to restore stainless steel's full corrosion resistance.

A further benefit of the laser systems is some of the most advanced units are designed to last for decades. For example, CleanTech laser systems can last for 50,000 to 100,000 hours. In addition, virtually no maintenance is needed after purchase, and no consumables are required.

Given the high cost of corrosion to the wind-power indus-



Laser Photonics CleanTech laser solution removes corrosion, contaminants, paint, and residue without damaging surfaces. (Courtesy: Laser Photonics)

try and the inherent limitations of typical control methods, lasers are becoming a best practice technique to combat it in facilities and in the field. Laser treatment effectively removes corrosion for many applications, minimizes cleanup time and operator exposure to potential environmental health hazards, lasts for decades, and requires no consumables. ↴

ABOUT THE AUTHOR

Del Williams is a technical writer based in Torrance, California. For more information on laser cleaning solutions for surface preparation, go to www.laserphotonics.com.



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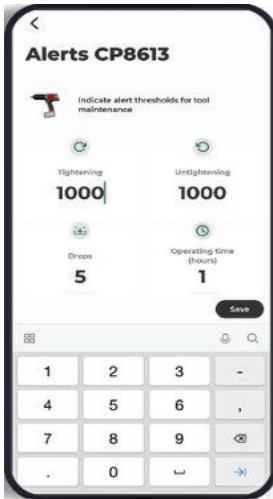
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