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

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

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

By DR. WEI HUANG

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

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

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

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

THE SOV CAPACITY GAP

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

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

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

FUTURE-PROOFING THE FLEET

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

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

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

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

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

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

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

A TRANSITIONING INDUSTRY

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

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

ABOUT THE AUTHOR

Dr. Wei Huang is the director, Global Offshore at ABS Bureau.

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

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