

Memo on U.S. Offshore Wind Development

Linus Ghanadan, U.S. Maritime Administration

Background on offshore wind in the U.S. and globally

In March 2021, the Biden Administration set the target for the U.S. to achieve 30 GW of offshore wind electricity generation capacity by 2030.¹ For context, 30 GW equates to 2.6% of total 2021 U.S. generation capacity from all sources (i.e., from natural gas, coal, renewables, etc.).² Moreover, 10 U.S. States have established state-level targets for 2027-2040, which sum to 49.5 GW by 2040.³ Currently, the U.S. only has 0.4 GW of offshore wind capacity, but domestic capacity is projected to reach over 15 GW by 2026, with several projects off the Northeast and Mid-Atlantic coast expected to be completed by then.⁴ In addition, the Biden Administration has announced plans to lease federal waters in the Gulf of Mexico, Gulf of Maine, and off the coasts of North and South Carolina, California, and Oregon to wind power developers by 2025.⁵ Furthermore, as of 2022, global offshore wind capacity is 55.9 GW,⁶ almost all of which is in either China (26.3 GW) or Europe (28 GW). Based on announced projects with financial closure, global capacity is expected to increase to over 145 GW in 2026, with countries such as the U.S., South Korea, and Vietnam entering the market.⁷ Regarding future costs, market analyses from various research, government, and consultancy groups projects the levelized cost of electricity (LCOE) for offshore wind to drop below \$60 per MWh by 2030, as developers gain more experience and continue to learn how they can decrease costs.⁸ For comparison, LCOE for U.S. natural gas, the cheapest fossil fuel for domestic electricity generation, was about \$34.78 per MWh in 2020, though this figure raises to \$62.58 when considering \$27.80 of social costs for emitting carbon dioxide and methane (i.e., future economic damage resulting from emissions).⁹ This was calculated using the social cost figures determined by the U.S. Government Interagency Working Group on Social Cost of Greenhouse Gases in 2021, as well as U.S. natural gas data from the U.S. Department of Energy and International Energy Agency.^{10,11,12}

Background on offshore wind vessels

According to a 2022 report from the American Clean Power Association, at least 26 vessels are necessary per offshore wind project across all stages.¹³ Of these 26, 15-20 are typically required to be Jones Act vessels, depending on how U.S. Customs and Border Protection (CBP) rulings apply to the specific installation strategy being used. Under the Jones Act, any vessel used in U.S. domestic trade is required to be U.S.-built, U.S.-owned, and U.S.-crewed. For offshore wind projects, a Jones Act vessel is typically required for carrying crew or materials between a U.S. port and the offshore construction site. Furthermore, the table on page 3 summarizes DOE concerns regarding eight vessels that pose supply chain risks to reaching 30 GW by 2030. According to a DOE report updated in June 2022, a shortage of wind turbine installation vessels (WTIVs) poses a high risk, and potential shortages of seven other vessels represent moderate risks.¹⁴ It is worth noting that shortages of WTIVs, cable lay vessels, scour protection vessels all pose risks despite the CBP generally allowing for the use of foreign-flag vessels. This is due to current and projected future global supply shortages of these vessels, demonstrating that increasing domestic supply is important regardless of Jones Act requirements. Moreover, given that estimated construction time for these vessels are up to three years, it is likely essential for construction to begin in the next year if such vessels are to assist in achieving the 30 GW target. In June 2022, the Biden Administration, seeking to increase the incentive for U.S. shipbuilders to construct these vessels, designated offshore wind vessels as “Vessels of National Interest,” prioritizing these applications for admittance into MARAD’s Federal Ship Financing Program (often called Title XI program).¹⁵ This program provides U.S. shipbuilders with full faith and credit loans at longer terms and lower interest rates than traditional private loans. However, despite the Biden Administration’s effort, several MARAD officials cite insufficient funding for the program as a fundamental flaw making the action unlikely to have any major impact.

Potential scenarios for U.S. development

If uncertainty regarding the availability of vessels continues to dominate the offshore wind industry, U.S. politicians may face increased political pressure to issue a temporary Jones Act waiver for the industry. Not only would this approach

Memo on U.S. Offshore Wind Development

Linus Ghanadan, U.S. Maritime Administration

likely be ineffective due to global vessel shortages, but the approach would also stifle offshore wind knowledge and experience in the domestic maritime sector, which would jeopardize long-term U.S. energy security. If foreign-flag vessels become the predominant first movers in the U.S. offshore wind industry, the industry is likely to become dependent on foreign-flag vessels for the continued construction and maintenance of wind farms, even following the expiration of a temporary Jones Act waiver. Being the first movers in this new industry would provide foreign-flag vessel operators and crew members unique knowledge and experience that would likely prove necessary to assist offshore wind developers as the industry continues to grow and expand. As a result, any temporary Jones Act waivers would likely need to be continuously extended to allow for growing offshore wind development. Such a long-term dependence on foreign-flag vessels for U.S. electricity production would threaten domestic energy security, as future foreign conflicts and supply chain disruptions would have the potential to disrupt the production and transmission of electricity domestically. As the offshore wind industry develops, the energy security risk would intensify further, especially by 2050 when the DOE projects domestic capacity to reach up to 86 GW.¹⁶

Conversely, the best-case scenario for U.S. offshore wind development would be for U.S. shipbuilders to construct the necessary vessels for domestic projects, as this would ensure both vessel availability and long-term U.S. energy security. While using vessels that are U.S.-built and U.S.-crewed would likely be more expensive for developers, the impact on industry development could be mitigated with government incentives. Furthermore, the current lack of action among U.S. shipbuilders to construct these vessels can largely be attributed to the lack of such incentives, underscoring the need for better incentives to be implemented.

Policy options

Like offshore wind electricity generation itself, constructing offshore wind vessels represents a new and emerging industry, facing uncertainties and high up-front costs that can be alleviated using tax incentives. Thus, an incentive for shipbuilders could model the federal tax incentives provided to offshore wind developers, such as the Business Energy Investment Tax Credit. Congress expanded this tax credit to include offshore wind projects in 2020, making developers who complete projects prior to 2026 eligible to receive a federal tax credit worth 30% of capital expenditures.¹⁷ Providing a similar tax credit to shipbuilders constructing offshore wind vessels would likely catalyze industry development, though this would require Congressional action.

Two options not requiring Congressional action involve using MARAD's Port Infrastructure Development Program (PIDP) or Title XI program. Though PIDP grants are traditionally only used to provide federal funding for infrastructure improvement projects at U.S. ports, the language dictating the scope of eligible projects is quite broad, suggesting MARAD could encourage shipbuilders to apply for these grants to help them cover the high up-front costs posed by offshore wind vessel construction.¹⁸ Annual PIDP funding has nearly tripled since the 2021 Bipartisan Infrastructure Act, meaning the program is now in a better position than ever to assist with this MARAD priority. Furthermore, MARAD could choose to increase Title XI funding, which would make the Biden Administration's designation for offshore wind vessels more impactful. According to MARAD's FY2023 budget proposal, Title XI funding is set to receive \$3M of new Congressional funds.¹⁹ This would bring the program's total subsidy available to \$38.5M, which MARAD estimates is enough to give out \$515M worth of new loans. As previously mentioned, several MARAD officials have emphasized that this funding is insufficient to provide the necessary incentive. Therefore, for FY2024, MARAD could propose to significantly increase Title XI funding, counteracting this measure by decreasing the PIDP funding request. For example, MARAD could double Title XI's subsidy to \$77M, while still providing \$644.5M to PIDP. Since MARAD's overall budget would stay the same, it is unlikely that Congress would raise issue with such a request. Beyond the \$450M that Congress has directly appropriated to PIDP, MARAD is given a great deal of flexibility for how to spend the additional funds. The Biden Administration has already directed MARAD to use Title XI to support offshore wind development, so increasing

Memo on U.S. Offshore Wind Development

Linus Ghanadan, U.S. Maritime Administration

Title XI funding can be thought of as just the next step to ensure that MARAD can carry out this White House directive in an effective manner.

Table: Supply chain risks to reaching 30 GW target

Vessel type*	Estimated cost*	Estimated construction time*	Number of existing Jones Act vessels*	Estimated peak demand to 2030*	Risk to 30 GW target*	Jones Act requirements**
Wind turbine installation vessel (WTIV)	\$250M-\$600M	3 years	0 (1 under construction)	5	High	Can be foreign-flag vessel (if feeder vessel strategy used)
Cable lay vessel (CLV)	\$200M	3 years	0	4	Moderate	Can be foreign-flag vessel
Scour protection vessel	\$200M	3 years	0 (1 under construction)	2	Moderate	Can be foreign-flag vessel (if rocks/foundation not yet present)
Service operation vessel (SOV)	\$50M-\$100M new, \$10M-\$50M retrofit	2-3 years	0 (2 under construction, multiple oil and gas vessels which could be adapted)	13+	Moderate	Must be Jones Act vessel
Crew transfer vessel (CTV)	\$5M-\$10M	1-2 years	3	58	Moderate	Must be Jones Act vessel
Feeder barge/vessel	\$150M-\$200M new, \$10M-\$20M retrofit	Depends on design	20 jack-ups, 44 barges	10	Moderate	Must be Jones Act vessel
Heavy lift vessel	Depends on design	Depends on design	18	Depends on installation strategy	Moderate	Must be Jones Act vessel
Anchor handling tug supply vessel	\$100M-\$200M	2 years	Limited supply	2	Moderate	Must be Jones Act vessel

*Data from U.S. Department of Energy (Updated June 2022); ²⁰**Data from U.S. Maritime Administration (August 2022)

¹ [White House Press Release \(March 2021\).](#)

² [U.S. Energy Information Administration, U.S. Department of Energy \(July 2022\).](#)

³ [Global Wind Energy Council \(June 2022\).](#) Page 95

⁴ [U.S. Department of Energy \(August 2021\).](#) Page 41

⁵ [U.S. Department of Interior \(April 2022\).](#)

⁶ [Global Wind Energy Council \(June 2022\).](#) Page 56

⁷ [U.S. Department of Energy \(August 2021\).](#) Page 41

⁸ [U.S. Department of Energy \(August 2021\).](#) Page 74

⁹ [International Energy Agency \(December 2020\).](#)

¹⁰ [Interagency Working on Social Cost of Greenhouse Gases, U.S. Government \(February 2021\).](#)

¹¹ [U.S. Energy Information Administration, U.S. Department of Energy \(November 2021\).](#)

¹² [International Energy Agency \(February 2022\).](#)

¹³ [American Clean Power \(Updated May 2022\).](#)

¹⁴ [National Renewable Energy Lab, U.S. Department of Energy \(Updated July 2022\).](#) Page 36

¹⁵ [U.S. Maritime Administration \(June 2022\).](#)

¹⁶ [U.S. Department of Energy \(2015\).](#)

¹⁷ [Congressional Research Service \(April 2021\).](#)

¹⁸ [U.S. Maritime Administration \(February 2022\).](#)

¹⁹ [U.S. Maritime Administration \(March 2022\).](#)

²⁰ [National Renewable Energy Lab, U.S. Department of Energy \(Updated July 2022\).](#) Page 36