



JOBS & WORKFORCE DEVELOPMENT

What you should know:

- Offshore wind development in the U.S. has the potential to create tens of thousands of new jobs as the local supply chain and support infrastructure are constructed.
- Many of the jobs associated with the construction and operations stages of offshore wind development require skilled labor and typically use project labor agreements to secure the participation of trade unions.
- Jobs in the earlier stage of project planning and development include professional services such as engineering, surveying, and permitting. Labor services are also needed to construct the ports and onshore infrastructure needed to build the wind farms.
- The jobs and investment associated with offshore wind development will help grow local economies. Further, the processes associated with lease area auctions or energy procurement often include requirements or mechanisms that support investment in local and disadvantaged communities.

Offshore Wind Supply Chain

The national offshore wind energy target of 30 gigawatts (GW) by 2030 requires the creation of a domestic supply chain to produce thousands of components for this burgeoning energy sector, while creating tens of thousands of U.S. jobs (Shields et al., 2022). The offshore wind supply chain includes many components that are required to build out the offshore wind sector. A comprehensive study by the Special Initiative on Offshore Wind (SIOW) - [Supply Chain Contracting Forecast for U.S. Offshore Wind Power – The Updated and Expanded 2021 Edition](#) - details the key industry components required to achieve a \$109 billion utility scale build-out of 30 GW of capacity by 2030. This supply chain is conservatively estimated to include more than:

- 2,057 offshore wind turbines and towers at a forecasted expenditure of \$43.9 billion;
- 2,110 offshore turbine and substation foundations at a forecasted expenditure of \$17.0 billion;
- 8,000 kilometers of export and array cables at a forecasted expenditure of \$12.9 billion;
- 53 offshore and onshore substations at a forecasted expenditure of \$10.3 billion;
- other forecasted capital expenditures of \$16.0 billion covering project management, insurance, legal and financing fees, contracting costs, and other miscellaneous project costs;
- forecasted development expenditures of \$6.16 billion; and
- forecasted operational expenditures of \$2.83 billion (SIOW, 2021).

The U.S. economy will benefit from building up a domestic offshore wind supply chain and creating opportunities for public and private groups to invest in projects that support multiple aspects of the process, such as creating local production facilities, updating port infrastructure, constructing offshore wind specific vessels, and updating the onshore electricity grid.



The offshore wind supply chain remains largely global, with a growing number of U.S. offshore energy and onshore wind suppliers preparing to enter the industry. At the heart of the emerging U.S. supply chain are 18 announced major manufacturing facilities, 10 shipyards with offshore wind vessel orders, and 29 ports under development to support the industry (Business Network for Offshore Wind (aka Oceantic Network), 2023a). With project installation at Vineyard and South Fork Wind, the U.S. supply chain will have provided the first domestically manufactured offshore substation (made in Texas), the first U.S. manufactured export cables (made in South Carolina), the first run of critical steel foundation and tower components (made in Rhode Island), alongside the ongoing manufacturing of the first U.S. made monopiles (made in New Jersey).

Many states are working to attract supply chain facilities by making significant offshore wind power procurement commitments to help meet their clean energy targets. Forecasted procurement schedules across these states suggest that when offshore wind power contracting slows down in one state, the momentum will increase in other states and continue to drive the supply chain potential of this massive and growing industry. Click [here](#) for an interactive map of the supply chain activity in the United States.

Job Creation

Based on available data from mid-2023, there are more than 4,100 companies in all 50 states that are looking to support the U.S. offshore wind industry, up 54% since the passing of the Inflation Reduction Act. Further, 90% of supplier contracts in the U.S. market for offshore wind exist with companies that are either headquartered or have a presence in the U.S (Business Network for Offshore Wind (aka Oceantic Network), 2023b).

As the industry grows in the next decade, offshore wind development is expected to boost jobs in the following five industry segments:

- Development: Jobs associated with site assessment, plant design, permitting, financing, project management, and other pre-construction activities.
- Manufacturing and supply chain: Jobs from design and engineering of components, to production of parts, to the assembling of the components.
- Ports and staging: Jobs such as terminal crews, logistics, and management roles located portside.
- Maritime construction: Jobs operating at sea to install projects, including the marine crew, engineers, and installation crews.
- Operations and maintenance (O&M): Jobs that involve operating and maintaining a project during its lifetime, including turbine technicians and plant managers, as well as vessel operators and crew.

To meet the target of 30 GW of U.S. installed offshore wind capacity by 2030, average annual employment levels (full-time equivalent [FTE]/year) are estimated at 15,000 and 58,000 jobs based on a minimum 25% and maximum 100% domestic content or domestic labor driven scenarios, respectively (Table 1) (Stefek, et al., 2022).

Table 1. Average employment levels, based on 30 GW of installed offshore wind capacity. (Stefek, et al., 2022)

Industry Segment	Expected Average Annual Employment Levels (Full Time Equivalent/ year) between 2024 and 2030
Development	800 to 3,200
Manufacturing and supply chain.	12,300 to 49,000



Ports and staging	400 to 1,600
Maritime construction	500 to 2,100
Operations and maintenance (O&M)	600 to 2,300

Many offshore wind energy industry roles associated with the construction and operations phases require specialized training and relevant experience in a skilled trade, whereas other roles require advanced degrees (e.g., bachelor's degree or higher) that often support science, technology, project development, financial, and engineering roles that are needed at an earlier development stage. The Inflation Reduction Act prioritizes the hiring of offshore wind workforce from adjacent industries (i.e., maritime, oil and gas, and land-based wind energy industries), providing an opportunity for an equitable transitioning of livelihoods and communities dependent on fossil fuel economy, while retaining talent and wealth of experience from the adjacent industries.

Benefits to the Economy

Local Economy

There are strong commitments from industry and governments to ensure that the construction, operations, and maintenance of these projects provide high-quality jobs and use increasingly more domestically manufactured materials (White House, 2022). The Bureau of Ocean Energy Management's (BOEM) auction rules were modified in 2022 to include multifactor bidding criteria in the auction process for offshore wind development sites. Bidding credits can be allocated from the overall bid price to invest in local supply chain commitments, workforce development, and/or community benefits. In addition, state procurement processes require certain in-state or in-region economic development.

Local communities can benefit from offshore wind development through the use of community benefit agreements. For example, the Sunrise Wind project has a Host Community Agreement with the town of Brookhaven, Long Island that provides local investments in exchange for the 18 miles of real estate access needed for its cable to carry electricity from the developer's planned offshore wind power project. These investments include \$10 million for a National Offshore Wind Training Center in Brentwood; an operations and maintenance hub in East Setauket that will create up to 100 new jobs; \$5 million for a research and development partnership with Stony Brook University; and hundreds of union construction jobs to build the 18-mile underground transmission infrastructure and interconnection facilities (Long Island Business News, 2023).

Another example of local partnership and investment is the Attentive Energy One (AE1) Project, a 1.4 GW capacity project proposal, awarded by New York State Energy Research and Development Authority (NYSERDA) in January 2023. The project commits to supporting the Ravenswood's union workforce in the shift from a fossil fuel energy generating facility to one that supports renewable energy. This includes funding for training of the Ravenswood's Utility Workers Union of America (UWUA) Local 1-2 workforce, which would become the nation's first fossil fuel power generation staff to transition into operating offshore wind equipment. AE1 has also proposed a new IBEW training center, helping union workers in NY state gain skills needed for the construction of offshore wind facilities (PR Newswire, 2023).

The offshore wind projects currently under construction operate under project labor agreements (PLAs), which are collective bargaining agreements between a union and employer that cover terms of employment (Quinnell & Gallant, 2022). North America's Building Trades Unions (NABTU) have signed a national level Project Labor Agreement (PLA) with Ørsted, a leading developer in offshore wind energy in the U.S. The agreement commits to the use of an American union workforce to construct the company's U.S. offshore wind farms along the entire U.S. East Coast (NABTU, 2022). Similar community benefit agreements exist with different towns or organizations across the many states where offshore wind projects are being developed.



Coastal Economy

Ports are essential infrastructure for coastal communities and are integral to offshore wind development. The largest segment of port workers expected in the offshore wind sector includes the terminal crews involved in staging components and loading vessels. Ports supporting offshore wind energy activities will therefore support economic development in industrial waterfront communities by creating jobs and providing opportunities to hire from local and disadvantaged communities impacted by offshore wind development. Economic development organizations are actively engaged in many states along the East Coast of the U.S. to ensure a role for their states and coastal communities in offshore wind energy development. Connecting local workforce initiatives, education, and training programs with infrastructure investments in manufacturing factories, ports, and O&M is key to involving local community members. Due to the need for operational efficiency and proximity, NREL's Offshore Wind Workforce Assessment expects O&M jobs, such as offshore technicians and marine crew, to be sourced at up to 100% domestically in coastal communities near the operating wind power plant, directly benefiting the local community (Stefek, 2022).

Offshore wind is regulated to protect and monitor marine life and resources, which are so important to local coastal economies. Each project is responsible for mitigating the risks to fisheries, marine mammals and other protected species. Offshore wind developers have recognized the importance of addressing commercial and recreational fishery stakeholder concerns to ensure the sustainable coexistence of wind farms and fishing activities. This is being achieved through stakeholder engagement, fisheries impact assessments, fisheries liaison officers, marine spatial planning, fishing gear studies, vessel safety information, post construction monitoring, fisher compensation, and construction schedule adjustments. Developers also engage in extensive consultations with fishing communities, industry representatives, and other stakeholders early in the project planning phase to identify concerns, gather local knowledge, and incorporate feedback into the design and operation of the wind farm.

To comply with regulations, Protected Species Observers (PSO) are deployed to monitor, implement mitigations, and support the industry and academic marine activities where there is potential for those activities to impact marine protected species. Engagement with local Tribal communities and underrepresented populations to ensure pathways and accessibility to offshore wind careers, are important policy priorities within the Inflation Reduction Act. Wind farm developers are working to meet these goals through activities like the partnered program between SouthCoast Wind and RPS Group, a Tetra Tech Company. This partnership focuses on training under-represented groups, including Tribal members, to become PSOs at no cost to the individuals. This removes the financial barrier that could prevent the entry of an under-represented workforce into this sector and incorporates underrepresented groups into the earlier phases of wind farm development (RPS Group, 2023).

Primary and secondary educational programs play a key role in generating interest, awareness, and providing the educational foundation for students to pursue education and training in the offshore wind energy industry. Programs such as [KidWind](#) and the [U.S. Department of Energy \(DOE\) Collegiate Wind Competition \(CWC\)](#) are helping develop the future of wind workforce and collaborate with industry members and stakeholders to deliver these opportunities to communities (NREL, 2021).

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