Building the US offshore wind supply chain: how do we do it?

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Acknowledgements
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Executive summary
The US offshore wind industry is now cleared for takeoff. But does the US have what it takes to get this sector off the ground? After all, offshore wind farms do not appear out of nowhere. They are the product of a complex industrial supply chain that is highly dependent on customized assets and susceptible to logistics challenges. In the US, developing this supply chain could face significant challenges in terms of port and vessel restrictions.

With supply chain issues set to be a major theme at the June 2018 US Offshore Wind conference and exhibition in Boston, this white paper looks at the key challenges facing the industry as it undertakes to fulfill a project pipeline that has been long in coming.
Breaking down the supply chain

Building an offshore wind farm involves the construction, transport and installation of a range of major components, from the turbines and their foundations to substations and cabling. Each of these components has its own supply chain, which needs to act in concert with the others to ensure the smooth progress of project construction.

In this respect, all parts of the supply chain are equal: a project cannot be commissioned if one of the elements is missing. To gain an approximate idea of the relative complexity of each element, though, it might be useful to look at costs. Published offshore wind plant capital cost analyses\(^1\) have shown the biggest element is the turbines, followed by foundations and then logistics and installation, which in turn are heavily dependent on the nature of vessels and port facilities.

![Offshore wind plant capital cost breakdown. Source: Navigant.](image)

Turbines

The US has no offshore wind turbine manufacturing capacity today. Even the Haliade 150-6 MW turbines used in America’s first (and so far, only) commercial offshore wind farm, Block Island, by US manufacturer GE were manufactured in France, Spain, Germany and China\(^2\), although the towers were assembled locally in Rhode Island. And while the US has considerable onshore wind manufacturing capacity, getting the very large components needed for offshore wind farms from existing inland facilities to coastal ports is generally not feasible, so new or repurposed coastal manufacturing facilities are needed.

Conversely, almost all the states with active offshore wind projects under development hope to create long-term employment through manufacturing. Experts consulted by New Energy Update agree that the development of US-based offshore wind manufacturing would likely progress in stages, starting with elements such as towers and transition pieces and culminating in nacelles. Offshore wind manufacturing would also be highly dependent on having a large enough pipeline of projects under development to justify investment in new facilities.
Foundations

Compared to turbines, foundations represent a much more immediate supply chain opportunity for US manufacturing. Oil and gas industry suppliers in the Gulf of Mexico, for example, have ample experience in offshore jacket foundation manufacturing that has already been transferred into the offshore wind sector.

However, says Stephanie McClellan, director of the Special Initiative on Offshore Wind at the University of Delaware’s College of Earth, Ocean and Environment, “the transition will be easier for some than for others.” Jacket fabrication for an oil and gas platform, she says, “is a one off, rather than serial production where you’re needing to build 60 or 80.”

There is also still some uncertainty over whether developers will favor jackets, which can more easily be sourced in the US, or monopiles, for which there is much greater experience in Europe and no US supply.

Vessels

Of all the potential US offshore wind supply chain issues identified by experts, the availability of suitable installation vessels is likely the most important. European installation ships cannot carry out cabotage duties in the US because of the Jones Act, which says vessels transporting goods or passengers between two points in the country must be American flagged, owned and built.

As a result, when it comes to the supply chain, “the biggest challenge is installation,” says Boone Davis, principal at The Renewables Consulting Group.
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This will involve “identifying a suitable spread of vessels that are able to install current and next-generation foundations and turbines, within the constraints of the Jones Act, and port facilities available to individual projects,” he says.

Insiders are encouraged by various vessel announcements this year, such as SEACOR Marine Holdings’ subsidiary Falcon Global collaborating with the European installation vessel leader Fred. Olsen Windcarrier to develop appropriate vessels for the US market.

**Ports**

Another potential issue for the US offshore wind supply chain is suitable ports. The state of Massachusetts has taken the lead in trying to remedy this situation, with a major investment its New Bedford Marine Commerce Terminal. The Terminal development is part of wider plans by the state to build an offshore wind supply chain that the Massachusetts Clean Energy Center (MassCEC) estimates could deliver 1,000 construction jobs over eight years, based on a 400 MW pipeline of projects.

“We have the only port in the United States that has been engineered specifically to handle the heavy loads that are going to be required for projects to be deployed,” notes Bill White, senior director of Offshore Wind Sector Development at MassCEC.

**Support services and balance of plant**

One thing that does not look to be a problem for US offshore wind development is the availability of support services and capacity to install balance-of-plant assets such as substations and cabling. The substation is a significant opportunity for the US supply chain, says White, and MassCEC is already engaged in building capacity in this area. “There are several companies we are working with right now, to connect them with space,” says White.

McClellan says many potential maritime services players are already eying the US offshore wind sector with interest. “The service companies are ready to transition immediately,” she says. “Fabrication and manufacturing is going to take partnerships.”
Outlook and conclusions

While there is general optimism over the ability of US industry to assemble a reliable offshore wind supply chain, there are also uncertainties over details such as vessel supply that could lead to hiccups in the early stages of the development of the sector. These concerns are not likely to disappear any time soon.

As the industry grows and needs to install increasingly large turbines in increasingly large numbers, “we need to come up with port and vessel solutions that work together and support a business case for additional vessel investments,” says Davis. “Bridges, barriers and the ever-increasing size of turbine and foundation components present a real challenge to financing the new-build vessels that the industry desperately needs.”

What all experts agree on, nevertheless, is that the US market will likely be able to overcome any potential supply chain issues as long as the project pipeline is robust and reliable enough. Now that firm commitments to build out offshore wind are on the table, it will be vital to honor them.

References


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