



Executive Insights

Is the Goal of 30GW of US Offshore Wind Achievable by 2030?

Key risks and opportunities in the offshore wind value chain

The U.S. offshore wind market is at an inflection point, with project development announcements significantly accelerating over the past two years. Key risks remain that may derail the timely rollout of the offshore pipeline. The most important of these are transmission constraints and associated required upgrades to the onshore grid. Supply chain and maritime infrastructure constraints may also pose substantial liabilities.

Given these risks, developers will need to closely monitor the build-out of onshore transmission grids and engage early with U.S. supply chain partners to meet state procurement requirements. Similarly, investors looking to play across the wind value chain are likely to find value in downstream opportunities as the U.S. supply chain develops.

State of the industry

There are currently 30 offshore wind projects planned in the U.S., corresponding to more than 35 gigawatts (GW) of total planned capacity (see Figures 1 and 2). As the first large-scale developments get underway, developers are establishing U.S.-based supply chains for the first time. For example,

in November 2020, Equinor announced an agreement as part of its winning New York state bid for two offshore wind projects (Empire Wind 2 and Beacon Wind 1) to assemble wind towers and transition pieces at the Port of Albany and to invest in port upgrades in the South Brooklyn Marine Terminal to create an offshore wind staging and assembling facility. Supply chains will likely continue to be U.S.-based at the urging of state legislators vying for local economic benefits.

Strong tailwinds today, with more to come

The Biden administration has set an aggressive target of 30GW of offshore wind by 2030. A number of initiatives to date have helped accelerate development, although the most significant expected tailwinds are yet to be enacted. While there is increasing legislative momentum behind the offshore industry, key uncertainties around policy specifics remain.

Over its first year, the Biden administration has announced a number of policies to accelerate offshore wind development, including:

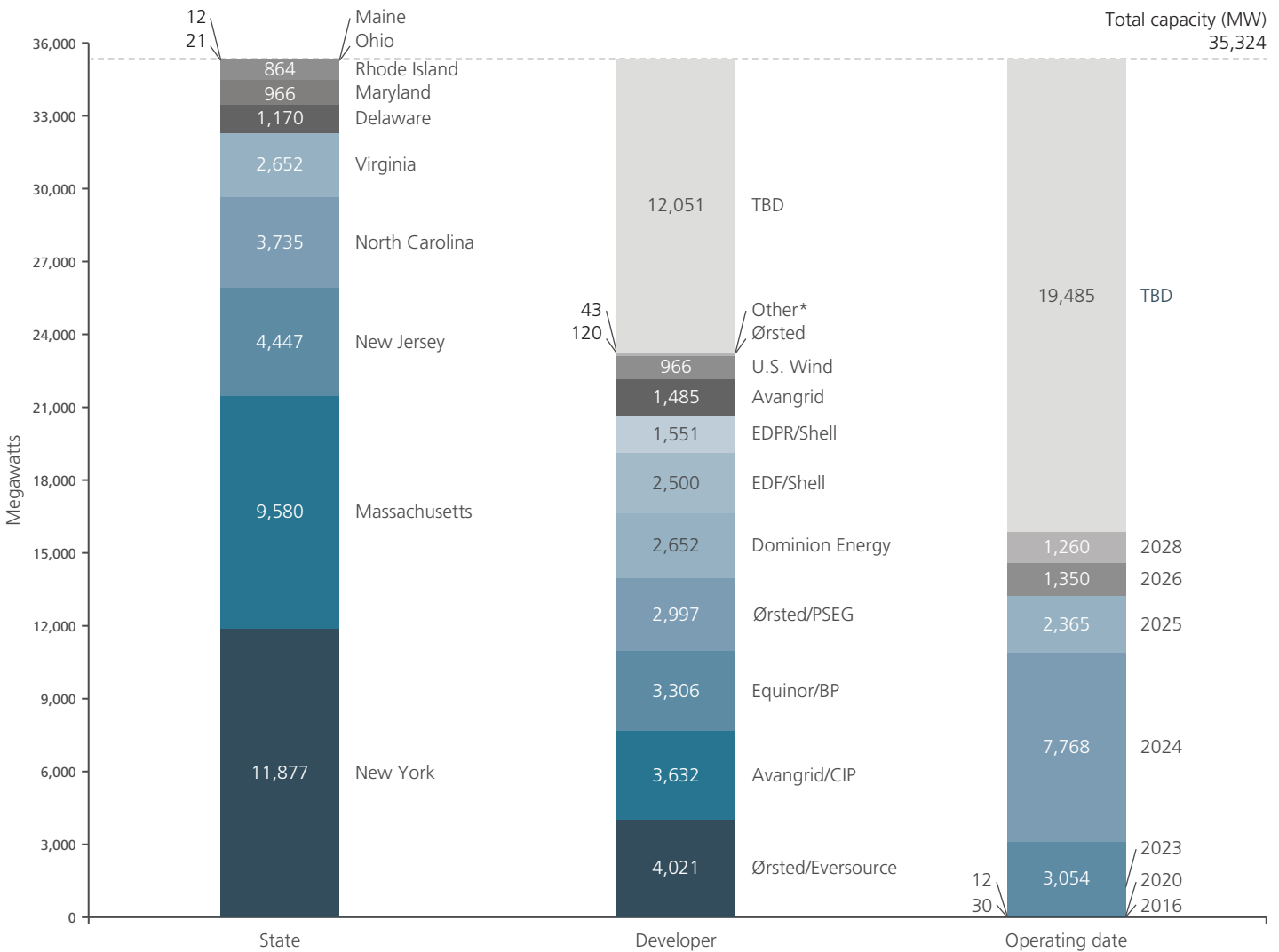
- Streamlining of the project approval process by the Bureau of Ocean Energy Management, including approval of the 800 megawatt (MW) Vineyard Wind 1 project in Massachusetts and a target to complete review of 16 construction-of-operations plans by 2025

Is the Goal of 30GW of US Offshore Wind Achievable by 2030? was written by **Amar Gujral**, Managing Director, and **Alex Beltes**, Senior Consultant, in L.E.K. Consulting's Energy practice. Brittany Foley, Associate, also contributed to this report. Amar is based in Houston, and Alex is based in New York.

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Figure 1
US offshore wind projects based on capacity (MW), by state, developer and operating date



*Other developers include Fred. Olsen/LEEDCo (21MW), New England Aqua Ventus (12MW) and Shell/Atkins/Ocergy (10MW)
Source: NREL Offshore Wind Market Report, 2021 Edition; DOE; BOEM; developer and OEM websites; press releases; and proposals

- On Oct. 12, 2021, a plan by the Department of the Interior to identify and lease federal waters in additional geographic territories by 2025, including in the Gulf of Mexico and off the mid-Atlantic and West coasts
- In March 2021, an announcement of \$230 million in funding for port infrastructure investments and expansion of the Department of Energy (DOE) debt capital loan program to provide access to \$3 billion in funding for offshore wind

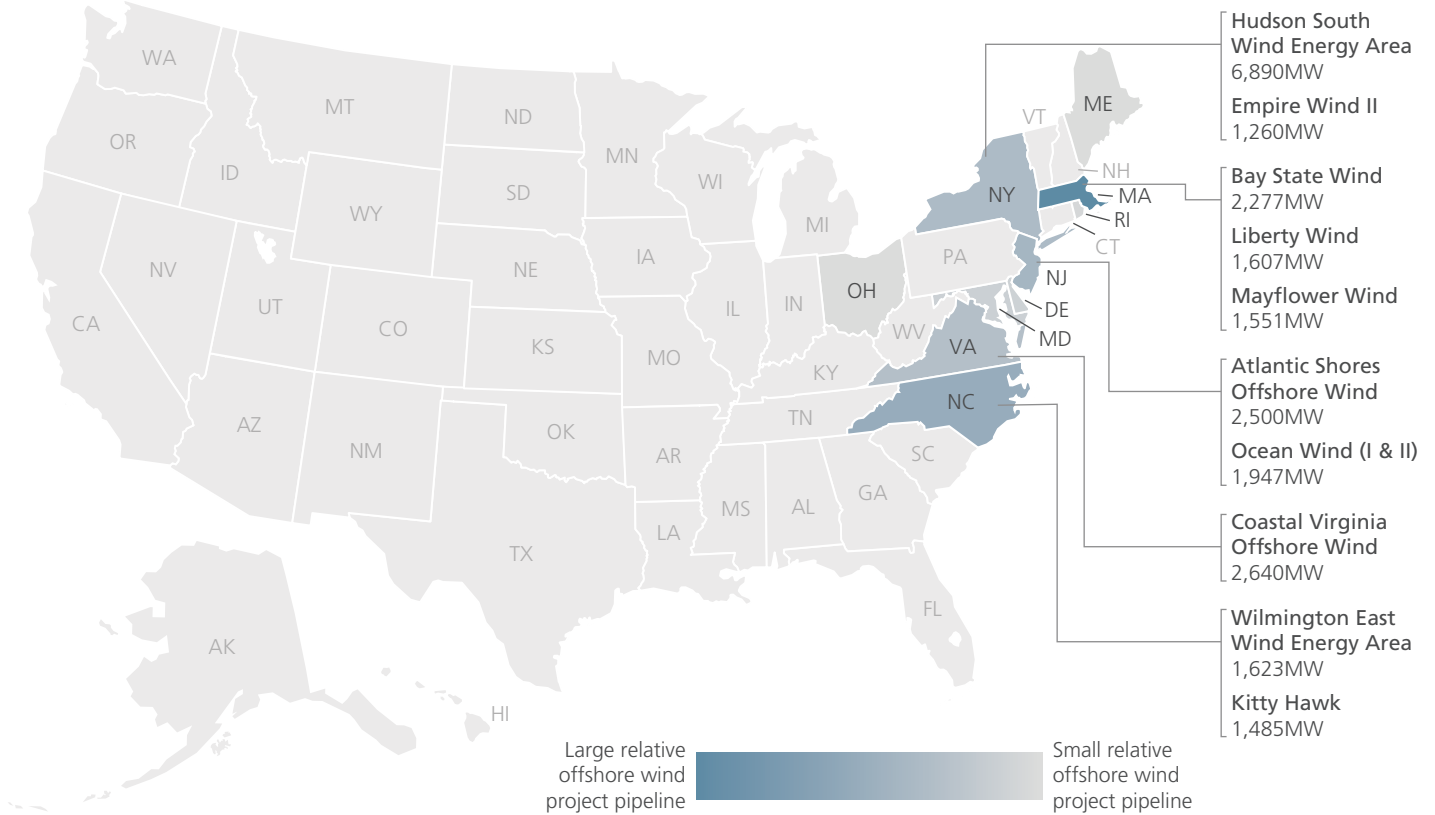
On Nov. 15, 2021, Congress passed the administration's \$1 trillion infrastructure bill into law. While the bill includes a \$65 billion investment in grid infrastructure, the majority of this spending

is allocated to resiliency upgrades of existing transmission lines, which are unlikely to support the offshore wind market's development. However, the \$2.5 billion allocated to establish a Transmission Facilitation Program may help. This program is for the DOE to develop "nationally significant transmission lines" to improve access to clean energy.¹

The largest potential tailwind for offshore will come in the form of the \$1.85 trillion economic and environmental bill that is slated to be passed through a reconciliation process, though the likelihood of its successful passage is unclear. While the details of the policies anticipated by the bill are still unknown,

Figure 2

US offshore wind pipeline and major offshore projects by state



Note: Additional offshore wind call areas have been specified by the Bureau of Ocean Energy Management in California, Hawaii and South Carolina
 Source: NREL Offshore Wind Market Report, 2021 Edition; DOE; BOEM; developer and OEM websites; press releases; and proposals

the most consequential components of the bill will probably include an extension of investment and production tax credits over a multiyear period that is likely to be longer than any past extension; more importantly, credits will be in the form of direct payments instead of a tax liability offset, considerably increasing the upside for renewable energy developers. In addition, the bill will likely include investments in transmission capabilities beyond those included in the infrastructure bill.

Key risks could delay on-time development of the offshore pipeline

Despite the positive momentum in the policy environment for offshore wind development, a number of key risks to the offshore wind pipeline remain. These risks may delay the timely completion of projects, or may even cause specific projects to be canceled due to cost overruns. The timeliness and cost competitiveness of the first large-scale offshore wind projects to come online (e.g., the Martha's Vineyard project) will be important milestones that will be monitored closely by offshore wind market stakeholders in order to assess the viability of remaining projects in the pipeline.

Risk 1: Cost of onshore grid upgrades and interconnection points

Likely the most important roadblock facing offshore wind development is the significant cost of necessary grid upgrades and the question of how to allocate these costs among numerous stakeholders (including project developers, regulated utilities, independent system operators (ISOs) and ratepayers). PJM, the transmission organization for 13 mid-Atlantic and Midwest states, estimates that \$2.1 billion to \$3.2 billion in grid infrastructure upgrades will be required to support offshore wind in its territory through 2035.²

Given that the cost of grid upgrades is often allocated to the next project in line within a grid operator's interconnection queue, project developers may balk at the considerable investments required to connect their projects to onshore grids. This is especially true of announced offshore wind projects with estimated operating dates in 2028 or later that have not yet established a point of interconnection. Significant interconnection costs may delay project timing or even cause offshore wind projects to drop out of the queue.

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Risk 2: Maritime infrastructure constraints

U.S. ports will require investments to upgrade staging facilities to adequately serve the needs of offshore wind projects. Additionally, there is currently a lack of U.S. vessels capable of performing installations of offshore wind turbines in compliance with Jones Act regulations, although some U.S. installation vessels are expected to come online by 2023,³ mitigating the risk of the Jones Act as a constraint on the offshore wind market.

Risk 3: Requirements for U.S.-based supply chains

State legislators are increasingly setting requirements for U.S.-based component sourcing and manufacturing, which represent a hurdle for developers given the largely European-based supply chain of today's offshore wind market. However, this risk is being mitigated by several developers acting as first movers to bring assembly, finishing and staging facilities to the U.S. (although blade and nacelle manufacturing is expected to largely remain Europe-based). For example, in October 2021, Siemens Gamesa announced it would build a \$200 million offshore wind blade finishing facility at the Port of Virginia.⁴

In addition to the three risks above, developers cannot ignore additional risks that may derail the offshore pipeline, including potential cost overruns — we expect much scrutiny of the economics of the first large-scale projects, such as Vineyard Wind 1 and Revolution Wind (Rhode Island) — as well as sustained opposition from environmental groups and local residents and a shortage of U.S. skilled labor.

How developers and investors can win

Given the latest dynamics in the offshore market and the remaining risks to the pipeline, developers should closely monitor risks and consider mitigation strategies:

- Build-out of onshore grid networks will be the major risk for developers. The current interconnection cost-allocation process based on ISO interconnection queues leaves considerable uncertainty for transmission upgrades. Developers should closely monitor efforts by the federal government to centralize and accelerate transmission development, including through the establishment of the DOE Transmission Facilitation Program specified in the infrastructure bill.
- Early engagement with U.S. partners will be critical to establishing a pathway for a U.S.-based supply chain that

meets the requirements of state procurements, as has successfully been demonstrated by a handful of developers to date.

Similarly, investors looking to play across the offshore wind value chain should evaluate a number of key strategic considerations:

- Due to economies of scale, U.S. manufacturing of major components such as tower and foundation assembly and staging vessels will likely be concentrated in a limited number of locations, representing limited opportunity to enter into investment plays.
- However, attractive investment opportunities downstream and in services will likely surface as the U.S. market develops. Specifically, that includes investment in marine and port infrastructure, cabling, cable laying services, transport services, and inspection services (subsea and topside). Additionally, services around transmission and distribution development (e.g. utility tower manufacture and substation construction) may see benefits from offshore wind growth as well as the broader electrification tailwinds in the market today.

While substantial risks attend the achievement of 30GW of offshore wind by 2030, project development is well underway and the U.S. offshore wind supply chain is rapidly developing, representing a broad range of opportunities for developers and investors.

Endnotes

¹Department of Energy, "DOE Fact Sheet: The Bipartisan Infrastructure Deal Will Deliver For American Workers, Families and Usher in the Clean Energy Future," Nov. 9, 2021

²PJM Interconnection, "Offshore Wind Transmission Study: Phase 1 Results," Oct. 19, 2021

³OffshoreWind.biz, "US: New Jones Act Compliant Vessel on Horizon," Dec. 17, 2020

⁴Siemens Gamesa, "Global leadership grows: Siemens Gamesa solidifies offshore presence in U.S. with Virginia blade facility," Oct. 25, 2021

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