



Offshore Wind

MARKET REPORT

JULY 2024



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Offshore Wind Definitions & Acronyms

Definitions

Early development: A proposed offshore wind project that has secured a seabed lease with state and/or federal authorities but does not have an active procurement contract and has not begun construction. If a project's offtake agreement or OREC award has been terminated, it will be considered early development until a new offtake agreement has been signed.

Advanced development: For offshore wind, advanced development consists of projects that are not under construction but have secured offtake or have had successful bids in response to a state solicitation even if final offtake negotiations have not concluded.

Under construction: Construction crew has begun work on the ground at the project site. For offshore wind, under construction is defined as in-ocean construction.

Online: Project has reached commercial operation and is delivering electricity to the ultimate point of delivery.

Capacity: Project nameplate capacity. Unless otherwise stated, ACP reports capacity in MW-ac.

Lease: A defined area of seabed acreage awarded to offshore wind developers after a review of potential environmental and local impacts. Leases in federal waters are awarded through a competitive bidding process through BOEM.

Pipeline: Projects either under construction or in advanced development.

Project: One offshore wind facility located in a lease area. Some lease areas host multiple projects. Offtake agreements are organized at the project level.

Solicitation: Calls from individual states for proposals from developers to deliver offshore wind energy.

Please note that this report was updated on July 16, 2024, to incorporate new information and make corrections:

- Updated pages include: 1, 4, 5, 13, 18, 19, 20, 24, 26, 27, 46, 47, 48, 51.
- Early development capacity estimates increased from 44.2 GW to 46.1 GW and overall offshore wind capacity under development increased from 56.4 GW to 58.3 GW.
- The Federal Permit Tracking Table on pages 46-48 was updated to include BOEM announcements from early July 2024.

Acronyms

BOEM: Bureau of Ocean Energy Management

COP: Construction and Operations Plan

EIS: Environmental Impact Statement

IOU: Investor-Owned Utility

IPP: Independent Power Producer

GW: Gigawatts

MW: Megawatts

OEM: Original Equipment Manufacturer

OREC: Offshore Wind Renewable Energy Certificate

PPA: Power Purchase Agreement

RFI: Request for Interest, Request for Information

RFP: Request for Proposals

ROD: Record of Decision

WEA: Wind Energy Area

For detailed information on the federal leasing process for offshore wind, please see the appendix.

Executive Summary

The U.S. has 174 MW of offshore wind capacity online, with more than 58 GW of capacity under development. Within the 33 federal leases and four state leases in active development, there are 32 projects in early development, eight projects in advanced development, and three projects under construction. Early development projects are the largest segment of the pipeline, representing over 46 GW. There are over 8 GW of projects in advanced development, and over 4 GW of projects under construction.

The U.S. continues to lag other countries in operating offshore wind capacity, falling to 12th place globally at the end of 2023 from 10th place in 2022. China extended its lead for the top spot globally, increasing its capacity by 20% year-over-year to 37,775 MW of offshore wind capacity installed.

The largest U.S. offshore wind project to date came online in March 2024: the 132-MW South Fork Wind project off the coast of Long Island, New York. South Fork Wind joins the 30-MW Block Island project off Rhode Island and the 12-MW pilot phase of Coastal Virginia Offshore Wind.

Approximately 7.6 GW of offshore wind projects in the pipeline are expected to come online by the end of 2027.

New Jersey took the lead among the states for most offshore wind capacity in the pipeline. The Garden State has 5,252 MW of projects in advanced development. Virginia has the most offshore wind capacity under construction, with 2,587 MW.

BOEM has issued a Record of Decision (ROD) for nine lease areas, affecting twelve projects, as of July 2, 2024, up from two at mid-year 2023 – allowing these projects to move forward with construction.

Seven other projects have submitted Construction and Operations Plans (COPs), five of which have received a draft Environmental Impact Statement (EIS), moving them one step closer to a final decision.

BOEM held its first lease sale in the Gulf of Mexico in 2023, generating \$5.6 million from the winning bid.

Offshore wind capacity is expected to reach 14 GW by 2030, 30 GW by 2033, and 40 GW by 2035. Leading market consultants point to a slight delay in the country reaching the 30 GW milestone, while significant scaling drives deployment growth in the 2030s.

The clean power industry is on pace to invest an estimated \$65 billion in offshore wind projects by 2030. This is in addition to investments in critical infrastructure such as port revitalization and vessel construction.

The offshore wind industry is expected to support an estimated 56,000 jobs by 2030. This is up from roughly 1,000 offshore wind jobs today.

The information and data in this report was current as of June 30, 2024.

Executive Summary *(continued)*

FORWARD MOMENTUM

BOEM is planning to hold four lease sales in the latter half of 2024 in the following areas: the Central Atlantic, Oregon, the Gulf of Maine, and the Gulf of Mexico. The four lease sales will open nearly 1.9 million acres of federal waters to offshore wind development, potentially paving the way to more than 20 GW of future clean power generation capacity.

State solicitations could award procurement contracts for an additional 8,800–12,200 MW of offshore wind projects in the latter half of 2024, all located off the coast of the U.S. Northeast. States with ongoing or upcoming solicitations include New Jersey, New York, Massachusetts, Rhode Island, and Connecticut. Projects from previous solicitations with cancelled contracts could be rebid and may be selected in the new solicitations.

Contract cancellations and rebidding became a regular feature of the U.S. offshore wind landscape in 2023 and 2024; however, states have been quick to open new solicitations and streamline processes.

The information and data in this report was current as of June 30, 2024.

Offshore Wind Energy Market

1



Photo Credit: South Fork Wind

U.S. and Global Installed Offshore Wind Capacity, 2023

In 2023, there was **42 MW** of offshore wind online in the U.S. As of March 2024, there was **174 MW** of offshore wind online in the U.S.

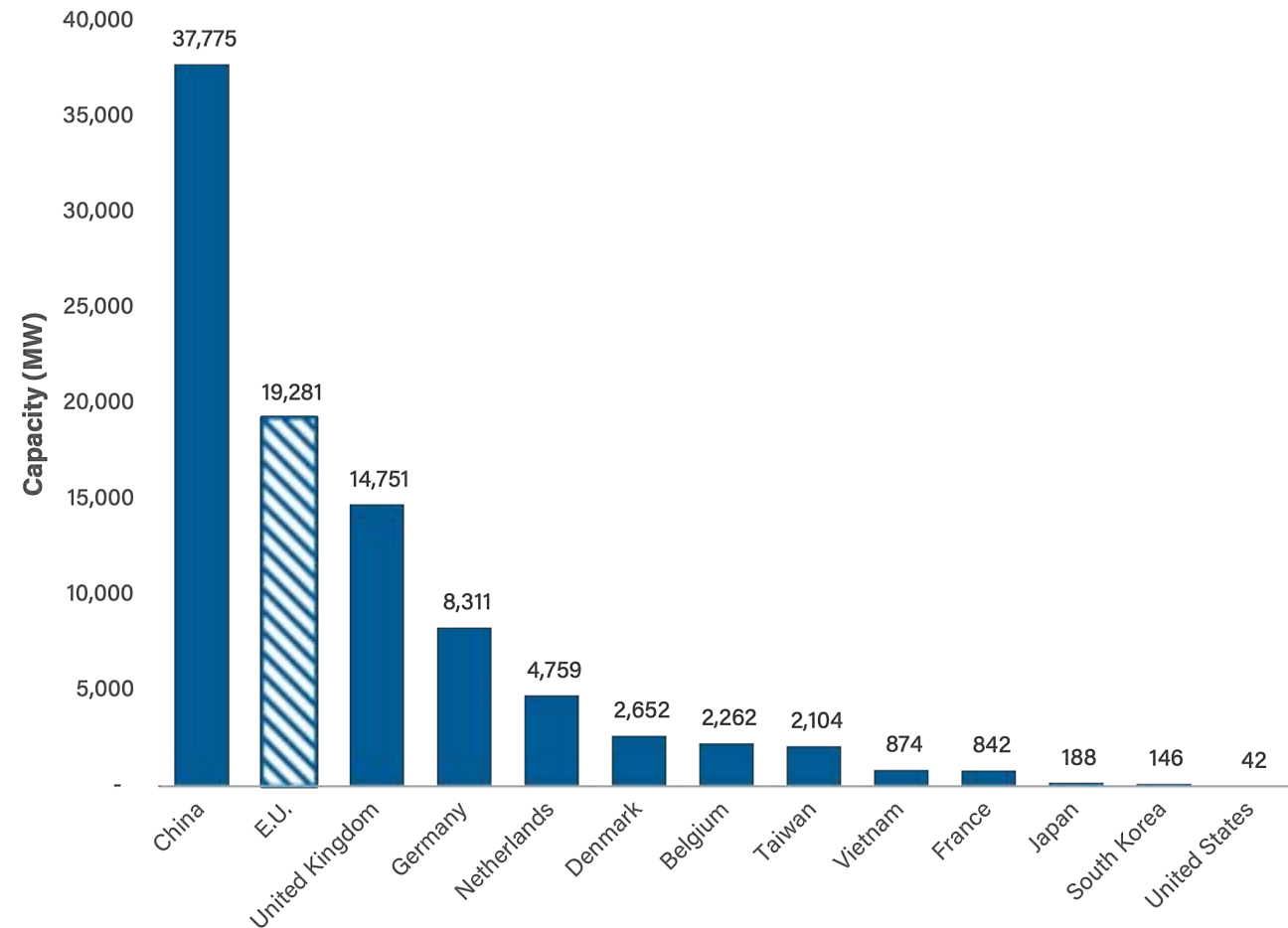
At the end of 2023, there were two offshore wind projects online in the United States – Ørsted’s 30 MW Block Island Wind Farm off Rhode Island and Dominion Energy’s 12 MW Coastal Virginia Offshore Wind Pilot Project.

In March of 2024, South Fork Wind Farm came online in the United States, with 132 MW of capacity.

China leads the world with over 37 GW of cumulative offshore wind capacity installed.

The United Kingdom and Germany follow, with 14,751 MW and 8,311 MW, respectively. The Netherlands, Denmark, Belgium, and Taiwan are the only other countries with at least 1 GW of offshore wind capacity installed.

U.S. and Global Installed Offshore Wind Capacity, 2023



Source: GWEC Global Wind Report 2024

Offshore Wind in Development

The U.S. has over 12 GW of offshore wind capacity in Advanced Development or Under Construction.

There are currently three projects under construction in federal waters – Avangrid and Vineyard Offshore’s (Copenhagen Infrastructure Partners) 806 MW Vineyard Wind 1, Ørsted and Eversource’s 704 MW Revolution Wind, and Dominion Energy’s 2,587 MW Coastal Virginia Offshore Wind.

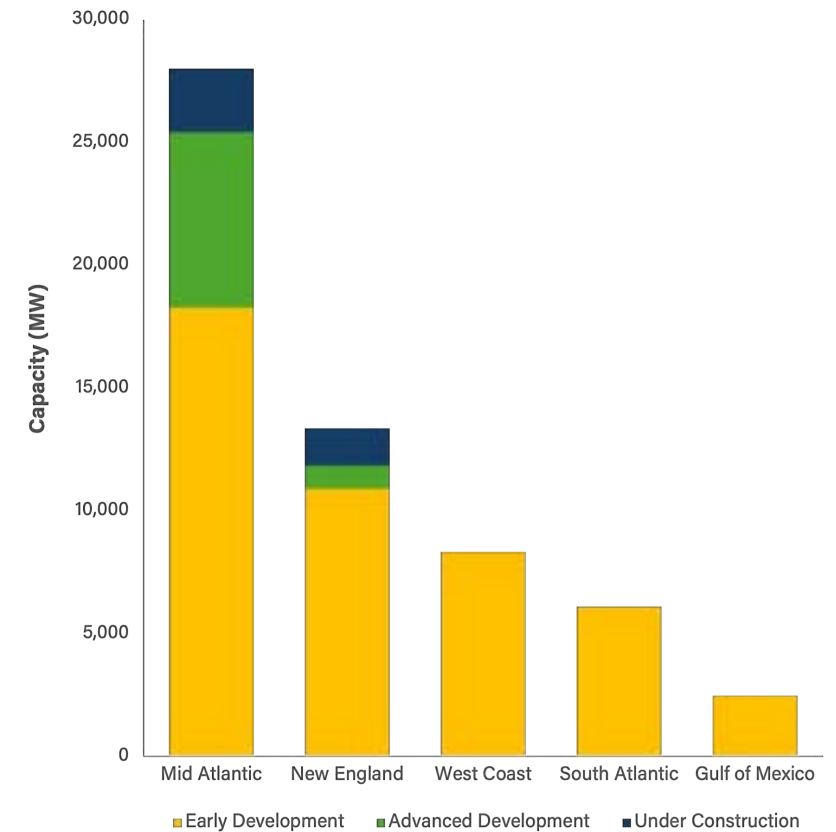
Projects in early development have been awarded a lease by BOEM but have yet to secure offtake via a PPA, Offshore Wind Renewable Energy Certificate (OREC) contract, or other offtake mechanism. Projects in advanced development have been awarded a lease and secured offtake or have a firm equipment order in place. ACP considers projects under construction when offshore construction such as cable laying, pile driving, or other offshore work has commenced.

There are 33 federal leases in development and four state leases in development. Within these leases, there are three projects under construction, eight projects in advanced development, and 32 projects in early development. Note that some leases host multiple projects.

Early development projects make up the majority of capacity under development, representing 46,092 MW. There are 8,076.5 MW of projects in advanced development, and 4,097 MW under construction. In total, there are 58,265.5 MW of offshore wind capacity under development in the U.S.

Eighty-two percent of the capacity under development, from 36 projects, is on the East Coast, two of which are located in the Carolina Long Bay. An additional 14% is spread across six projects on the West Coast, along California’s coast. Four percent comes from the Gulf of Mexico.

U.S. Offshore Wind Capacity in Development, by Region



Recent Market Activity

Construction milestones reached

Revolution Wind put its first steel in the water in May 2024, installing the project's first turbine foundation. Deliveries of turbine components to New London, Connecticut's State Pier port have begun in preparation for assembly.

Coastal Virginia Offshore Wind began installing monopiles in May 2024, with in-water installations set to continue through the fall and then resume in 2025 to allow for seasonal whale migration.

Vineyard Wind 1 saw its first five turbines brought into operation in December 2023. The project put first power into the grid starting in January 2024. By May 2024, developers had commissioned additional turbines, bringing the total number of operational turbines to nine.

States set out to procure 8-12 GW in H2 2024

New Jersey opened its fourth solicitation for up to 4 GW of capacity in April 2024, just months after its third solicitation for more than 3.7 GW of capacity was approved by the state's Board of Public Utilities. The third solicitation awarded OREC contracts to Leading Light Wind and Attentive Energy Two.

New York's fifth solicitation is expected to be released in the Summer of 2024 and set to accept bids for 800-1,400 MW of offshore wind. New York also plans to conduct a parallel request for proposals for offshore wind supply chain projects.

Massachusetts, Rhode Island, and Connecticut coordinated a joint solicitation for offshore wind, with developers encouraged to submit multi-state bids. Winning bids are expected to be announced in Fall 2024. The solicitation's procurement goals include 3,600 MW of offshore wind capacity for Massachusetts, 1,200 MW for Rhode Island, and 2,000 MW for Connecticut.

Contract renegotiation/cancellation outcomes

After being denied a contract renegotiation for higher prices, **Empire Wind 1** and **Sunrise Wind** successfully rebid into New York State's accelerated fourth offshore wind solicitation. The new contracts were finalized in May 2024.

New York cancelled the offtake awards for the three projects selected in its third solicitation (**Attentive Energy One, Community Offshore Wind, and Excelsior Wind**) in April 2024 after GE Vernova cancelled plans to manufacture a 17-18 MW offshore wind turbine in New York. Developers for the three affected projects have each said the projects will be rebid.

In May 2024, Ørsted settled with New Jersey over the cancellation of **Ocean Wind 1** and **Ocean Wind 2**, agreeing to pay \$125 million. To remain on track to meet its offshore wind deployment goals, New Jersey also accelerated the timeline of its fifth offshore solicitation to now occur in 2025, up from 2026.

Record-setting year for proposed lease sales

BOEM announced plans to hold four lease auctions in the second half of 2024, which would be the most offshore wind lease auctions held in a single year. The four proposed lease sales would feature **two leases off the coast of Oregon, two leases in the Central Atlantic, four leases in the Gulf of Mexico, and eight leases in the Gulf of Maine.**

Top Project Developers

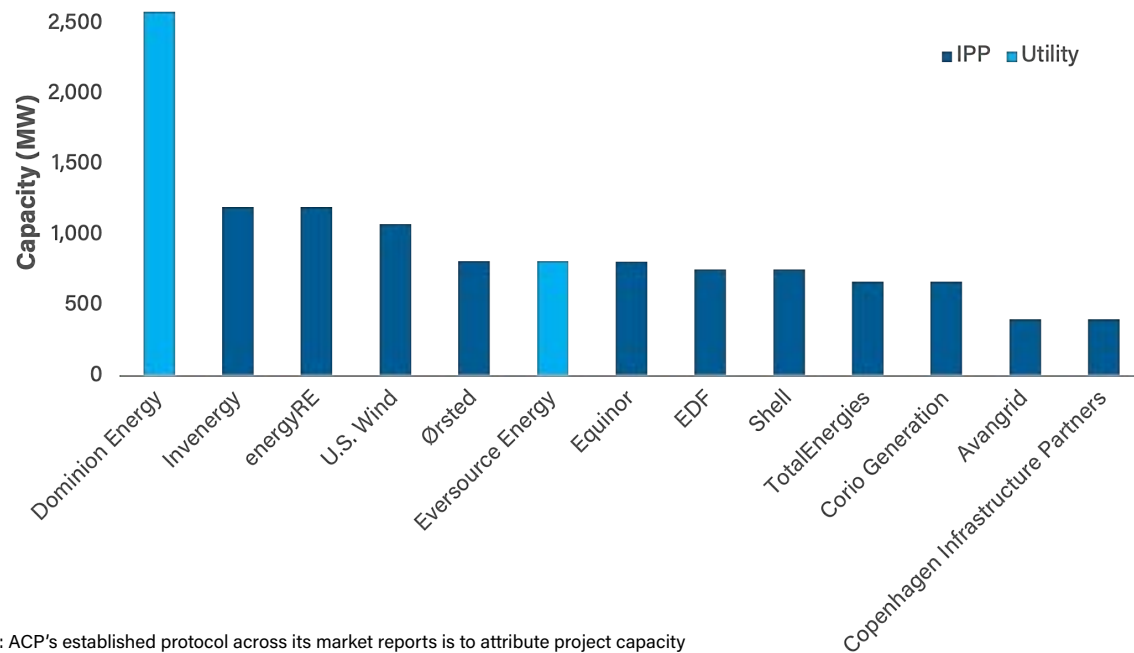
Independent Power Producers (IPPs) are responsible for owning and developing most of the offshore wind capacity currently in the pipeline or in early development. Dominion Energy is the largest owner and developer of pipeline offshore wind capacity. Meanwhile, Ørsted is the largest owner and developer of projects that are currently in early development.

In terms of operational offshore wind power, Ørsted is once again the leader, having developed the Block Island Wind Farm and jointly developed South Fork Wind, the first large-scale offshore wind project in the U.S., with Eversource Energy.

Overall, the rankings of top developers include many global clean energy developers such as Avangrid, Invenergy, and RWE, pioneers of offshore wind energy like Ørsted, as well as companies that have been active in other areas of offshore energy production, such as Shell, bp, and Equinor.

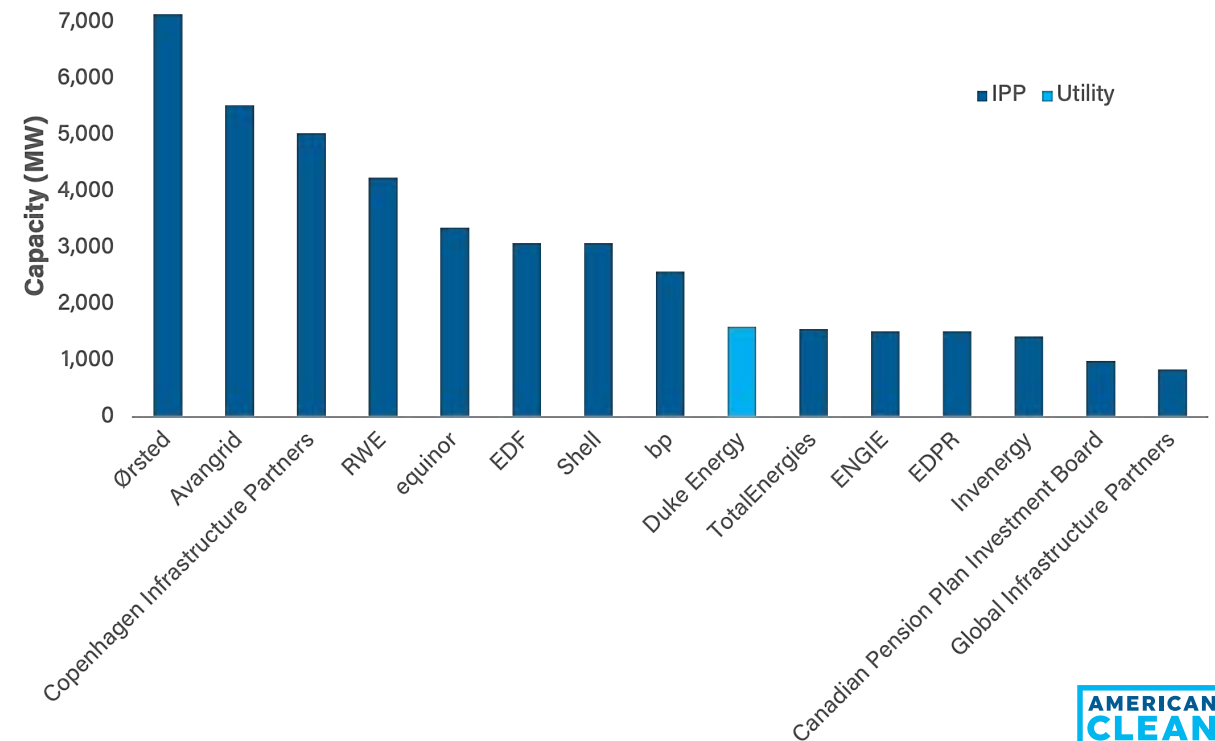
Several developers have formed joint-ventures to build projects. EDPR and ENGIE formed Ocean Winds, which is developing the SouthCoast Wind, Bluepoint Wind, and Golden State Wind projects. EDF and Shell formed Atlantic Shores to build several projects in the Mid-Atlantic. In addition, RWE and National Grid formed Community Offshore Wind in New York. Meanwhile TotalEnergies and Corio Generation, as well as Avangrid and Vineyard Offshore (Copenhagen Infrastructure Partners) have partnered up to develop several projects. Joint-venture partners do not always have 50-50 ownership stakes in projects.

Top Developers of Projects Under Construction or in Advanced Development



Note: ACP's established protocol across its market reports is to attribute project capacity to parent companies when comparing developer portfolio sizes.

Top Developers of Early Development Projects



Top Offshore Wind Purchasers

Of the 174 MW of operational offshore wind capacity, just 12 MW is owned by a utility directly. The remaining 162 MW of online capacity is contracted to utilities under PPAs.

The landscape for projects under development is diverse. Of the projects currently contracted to an off-taker, 66% of capacity is procured by the state agencies of New Jersey, New York, and Maryland under OREC contracts, which are awarded to project developers through a competitive solicitation process. Meanwhile, 12% of pipeline capacity is contracted to utilities selected by relevant state agencies in New England.

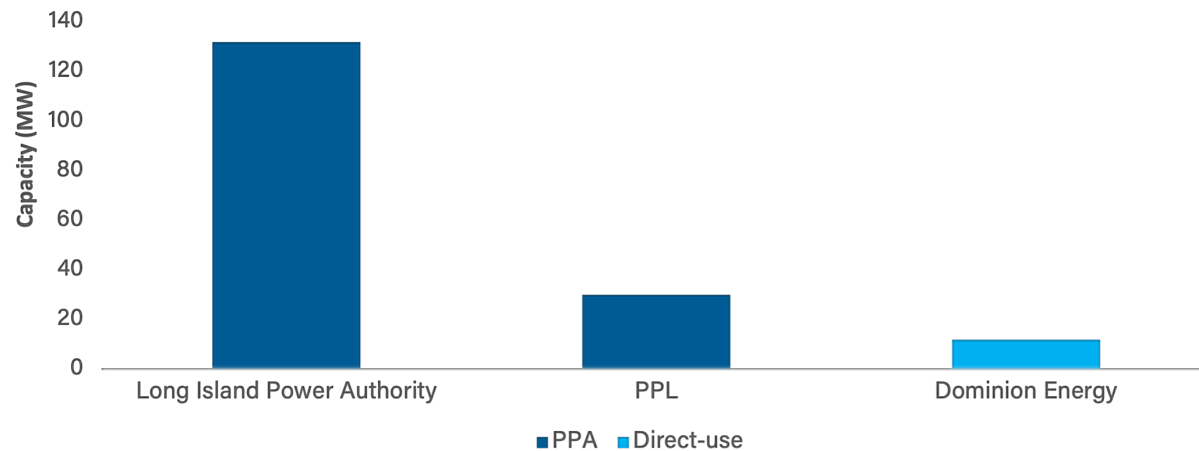
The New Jersey Board of Public Utilities currently has over 5.2 GW of OREC contracts awarded to three projects, making it the largest single off-taker of offshore wind projects in the pipeline.

With the 2.6 GW Coastal Virginia Offshore Wind project under construction, Dominion Energy is the second largest off-taker of pipeline offshore wind capacity and the only investor-owned utility to own and develop its own offshore wind project.

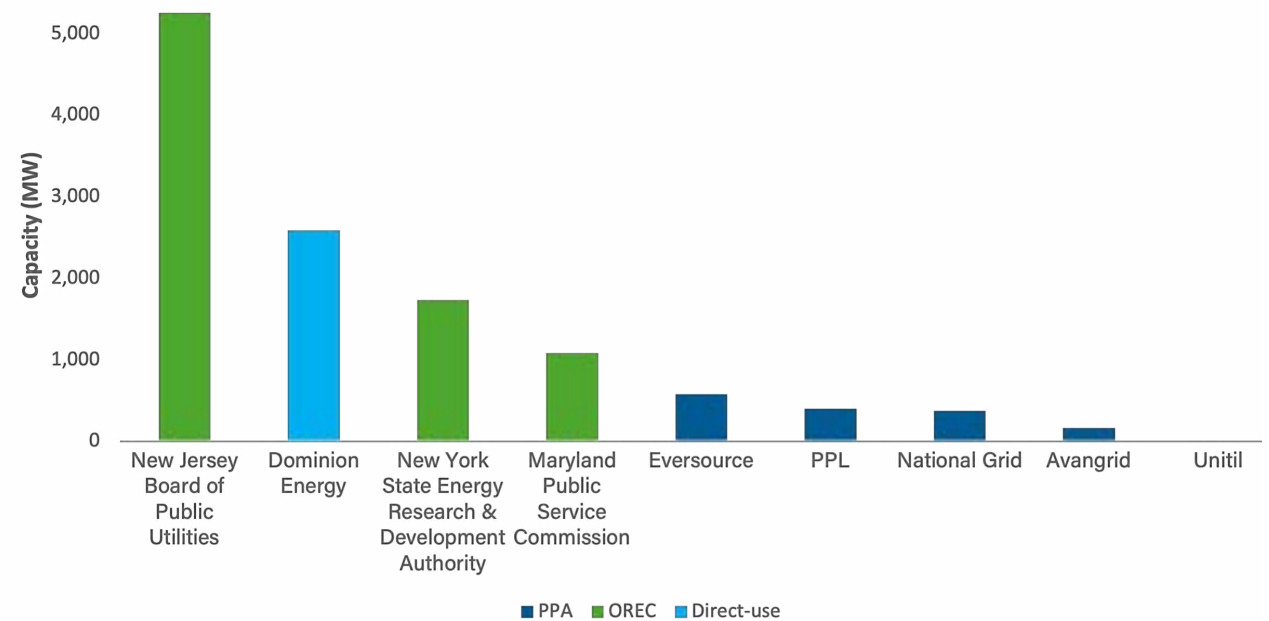
Following the cancellation of three provisional contracts totaling 4 GW earlier in 2024, the amount of offshore wind power contracted by the New York State Energy Research & Development Authority has fallen to 1.7 GW, making it the third largest offshore wind buyer.

Five investor-owned utilities have executed PPAs to purchase power from the Vineyard Wind I and Revolution Wind projects, both of which are under construction and will serve the utilities' customers in Massachusetts, Connecticut, and Rhode Island.

Largest Purchasers of Operational Offshore Wind Capacity



Largest Purchasers of Pipeline Offshore Wind Capacity



Post Data Cutoff Update: On July 2 2024, Delaware Governor John Carney signed into law the Delaware Energy Solutions Act of 2024, establishing a target to deploy up to 1,200 MW of offshore wind power by 2035

Progress Toward State Targets

Across eleven states, there is a total goal of 83.9 GW of offshore wind capacity. ACP includes both planning goals and procurement mandates in this tally.

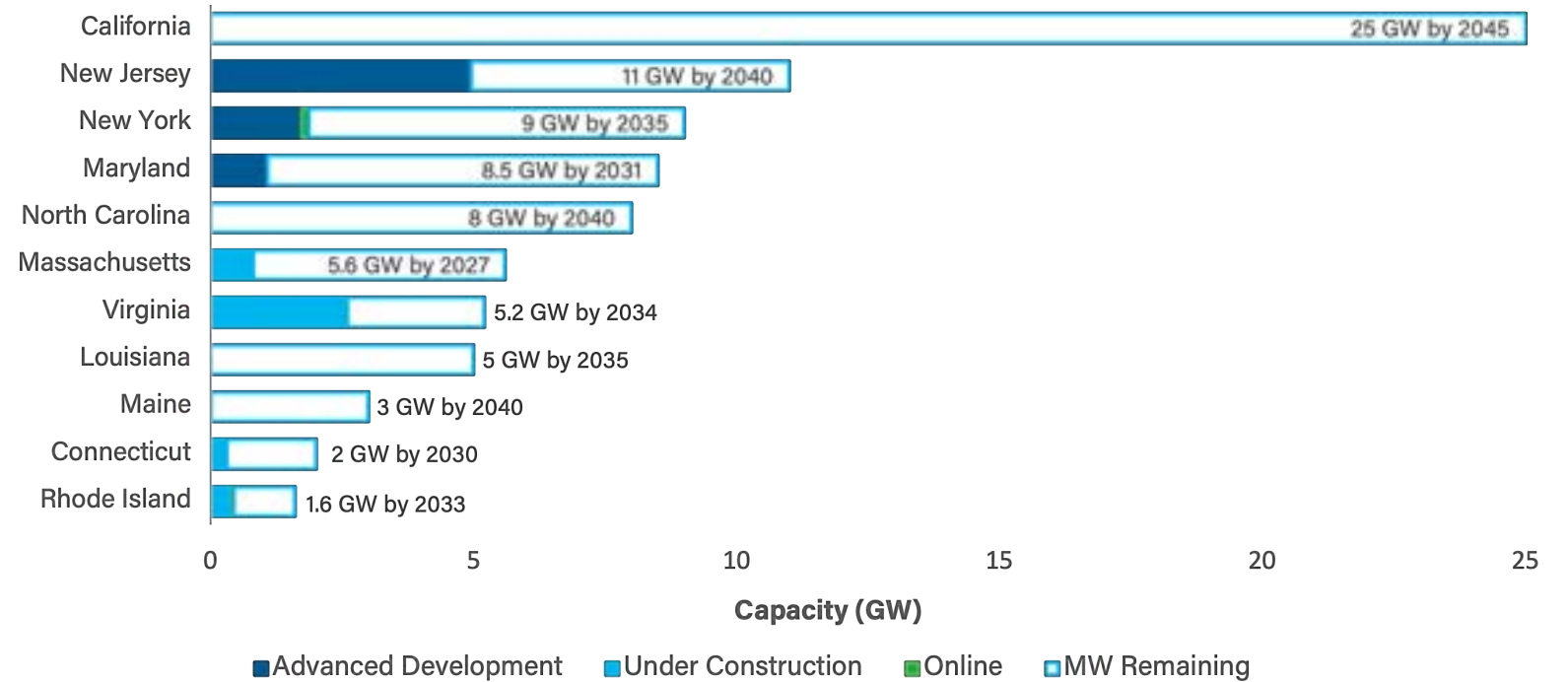
California leads with the highest offshore wind target of 25 GW by 2045. There are 5 federal lease areas and 1 state lease in early development within California's waters that have the potential to give California over 8.3 GW of capacity.

New Jersey has made the most progress towards its targeted offshore wind procurement with over 5.2 GW of capacity in advanced development, which makes up almost 50% of its 2040 goal.

New York also has a high goal of 9 GW by 2035. Despite setbacks over the past year, in May 2024, New York finalized two offtake agreements with Empire Wind 1 and Sunrise Wind for 1.7 GW of offshore wind capacity.

In October 2023, the New England states of Massachusetts, Rhode Island, and Connecticut signed a memorandum of understanding (MOU) to seek multi-state procurement of offshore wind projects. The MOU allows for flexibility and expanded benefits as the states finalize offtake agreements.

State Offshore Wind Targets



Turbine Supplier Market

Three Original Equipment Manufacturers (OEMs) dominate the offshore wind turbine market.

At the end of June 2024, six projects in the pipeline, totaling 7,341 MW, have announced a turbine supplier. Overall, Siemens Gamesa Renewable Energy (SGRE) leads the three major turbine suppliers, with a 57% market share. Vestas and GE Vernova follow with 32% and 11% respectively.

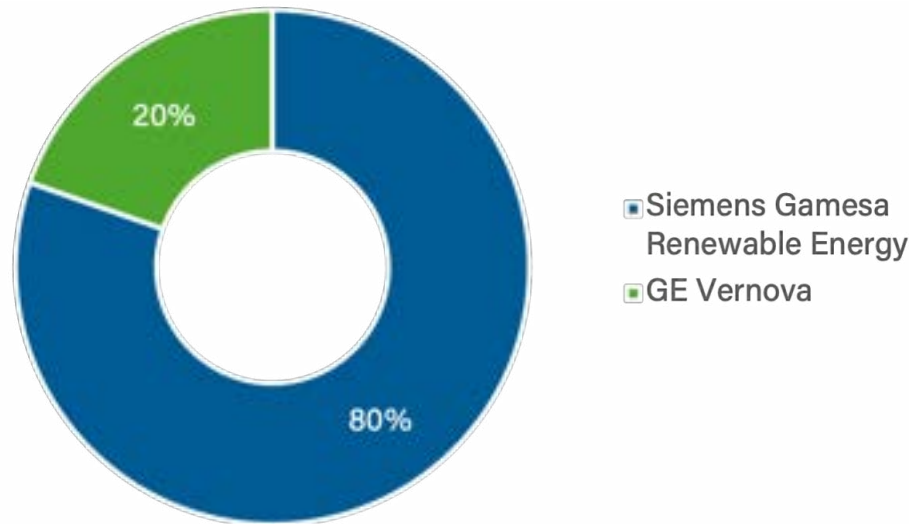
Dominion Energy’s Coastal Virginia Offshore Wind project, the largest offshore wind project currently under construction has selected SGRE’s SG 14-222 turbine (rated at 14 MW). Meanwhile, The 704 MW Revolution Wind project and the 924 MW Sunrise Wind project have both chosen to deploy SGRE’s SG 11-200 turbine (rated at 11 MW).

Vestas has been contracted to supply its V236-15 turbine (rated at 15 MW) to the 1,510 MW Atlantic Shores South Project 1 and the 810 MW Empire Wind 1 projects, both in advanced development.

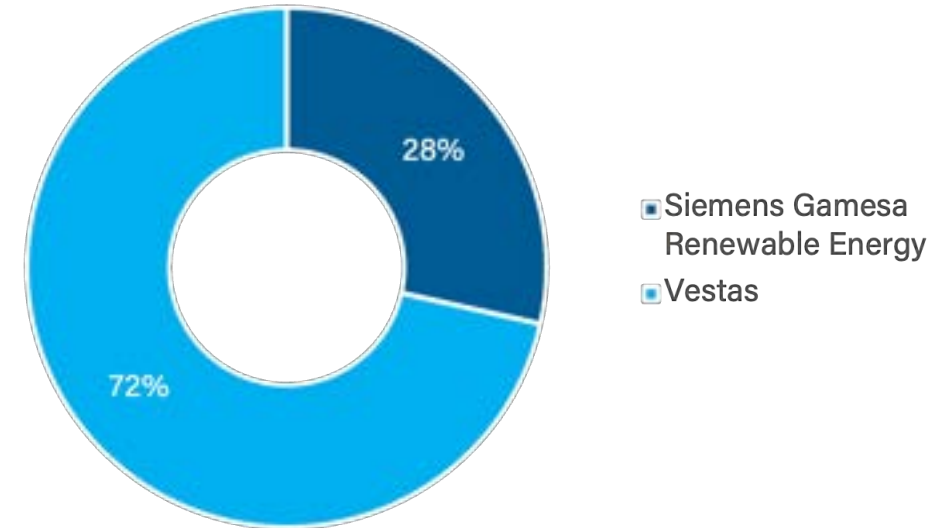
Finally, GE Vernova will deliver the Haliade-X 13 MW turbine to the 806 MW Vineyard Wind project currently under construction.

The offshore wind turbine market has shown signs of backing away from the “turbine arms race” where manufacturers feel pressure to consistently expand turbine sizes over time. GE Vernova announced that it would withdraw from plans to manufacture the Haliade-X 18 MW turbines, leading to the cancellations of conditional contracts with the Attentive Energy One, Community Offshore Wind, and Excelsior Wind projects in New York. GE Vernova has indicated that it would instead focus on the Haliade-X turbine model rated at 15.5/16.5 MW.

Turbine OEM Market Share for Projects Under Construction



Turbine OEM Market Share for Projects in Advanced Development



M&A Activity for Offshore Wind Pipeline

Investor-Owned Utilities exit offshore wind business

Eversource Energy announced in May 2023 that it would exit the offshore wind market. The utility finalized the sale of its 50% ownership interest in Lease Area OCS-A 0500 to Ørsted in September 2023. Ørsted will also secure full ownership of partnerships with four ports in Rhode Island and Connecticut as well as an operations and maintenance hub in New York.

Eversource announced in February 2024 that it would sell its 50% ownership interests in the South Fork Wind and Revolution Wind projects to Global Infrastructure Partners. Once the transactions close, GIP and Ørsted will become 50-50 owners of the projects.

Following PSEG's January 2023 announcement that it would divest from the Ocean Wind project, Ørsted completed its acquisition of PSEG's 25% share of the project in June 2023.

M&A activity ramps up in 2024

Equinor and bp, which were jointly developing the Beacon Wind 1, Beacon Wind 2, Empire Wind 1, and Empire Wind 2 projects, announced in January 2024 that the two companies would swap assets. As of April 2024, Equinor has become the sole owner of the Empire Wind 1 and Empire Wind 2 projects while bp became the sole owner of the Beacon Wind 1 and Beacon Wind 2 projects.

Shell has sold its 50% equity share in the SouthCoast Wind Project to Ocean Winds, a joint venture between EDP Renewables and ENGIE. Through their joint venture, EDP Renewables and ENGIE are the sole owners of the SouthCoast Wind Project as of March 2024.

Stonepeak announced that it will acquire a 50% ownership interest in the Coastal Virginia Offshore Wind project from Dominion Energy. The transaction is ongoing and is expected to close by the end of 2024.

Offshore Wind Leases and Projects

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Photo Credit: South Fork Wind

Leases in Development

There are 33 federal lease areas and four state lease areas in active development. Three federal lease areas host projects in operation.

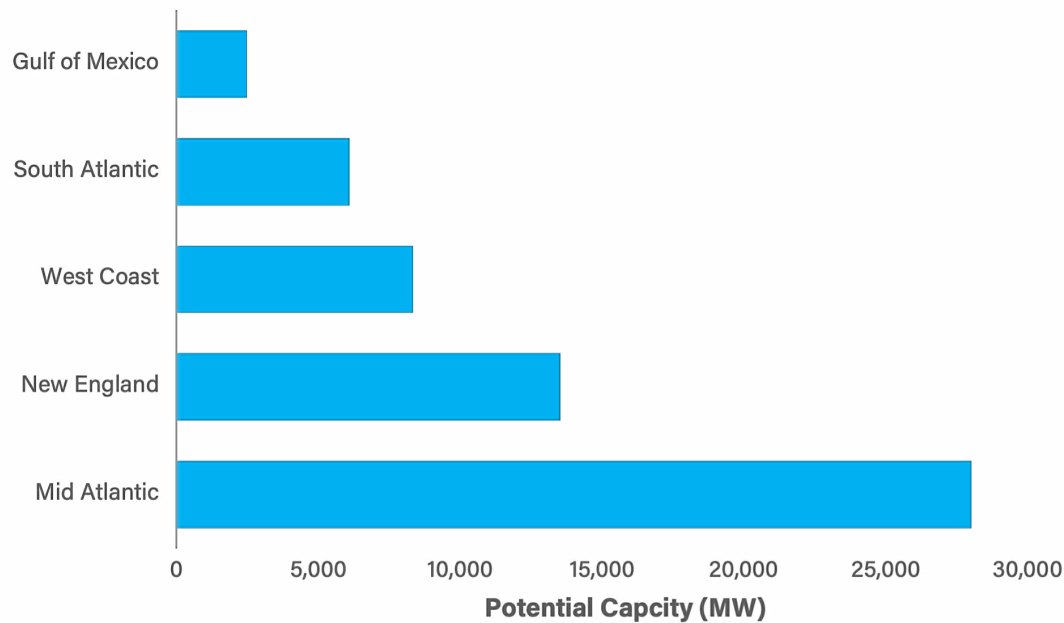
Within these leases, there are three projects under construction, eight projects in advanced development, and 32 projects in early development. Because some developers choose to host multiple projects within one lease area, there are more projects in development than leases.

BOEM has held 12 competitive auctions for seabed leases since 2013. Over time, with greater demand for offshore wind projects, the price per acre of a lease has increased.

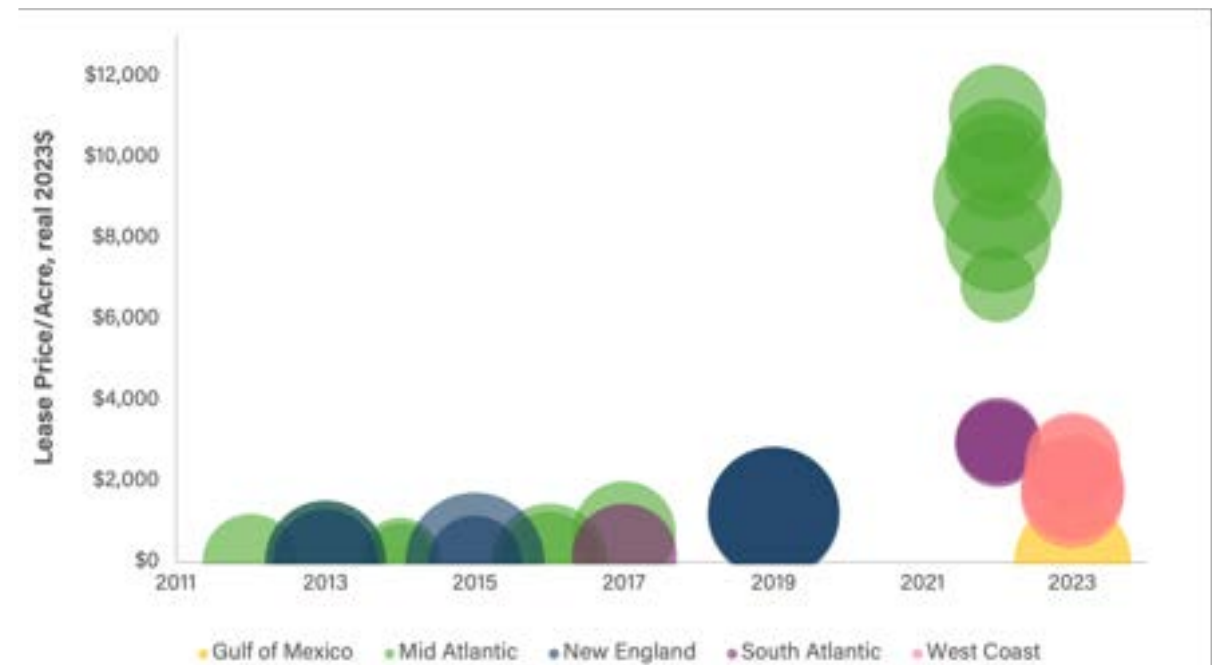
Lease prices in the Mid Atlantic region are significantly higher than leases in other regions with an average price per acre around \$4,300 in real 2023\$. The South Atlantic region and West Coast follow with an average price per acre around \$2,000, in real 2023\$.

New England leases average much lower around \$500 per acre, in real 2023\$. However, there have been no competitive lease auctions for New England since 2019.

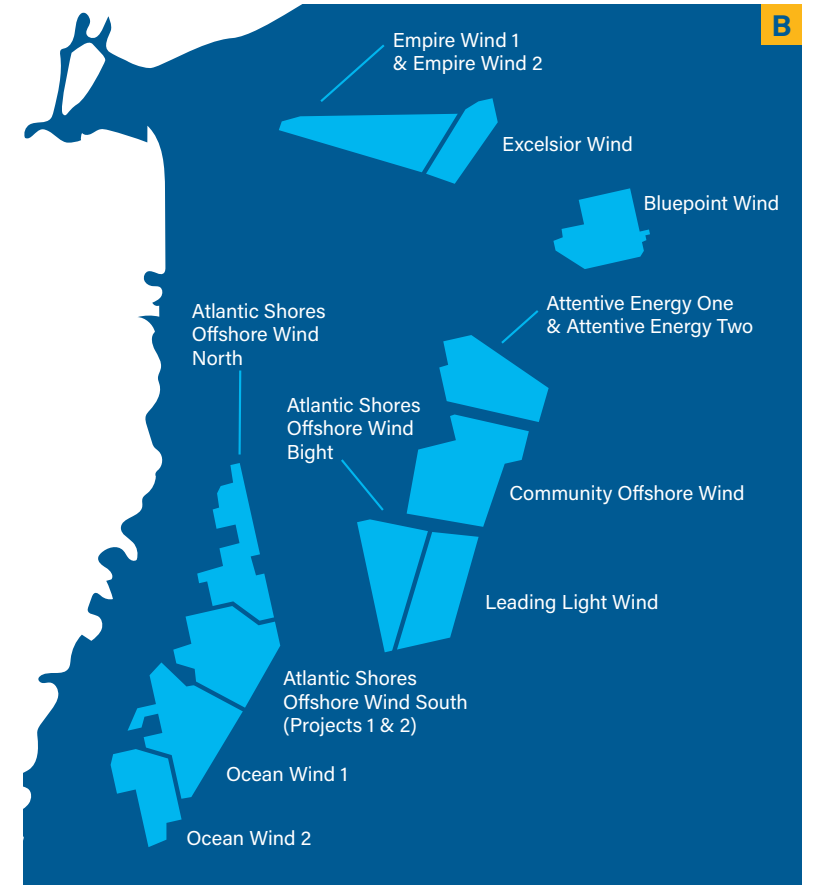
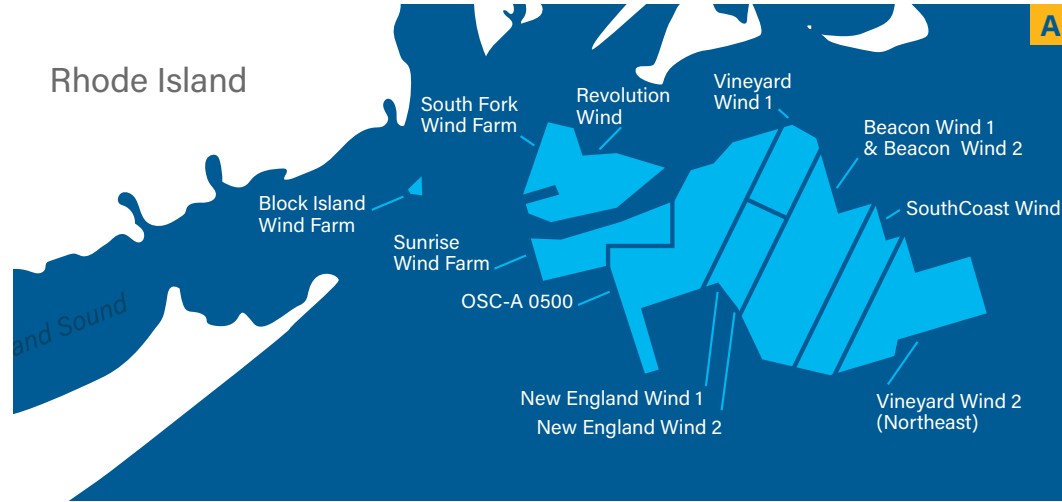
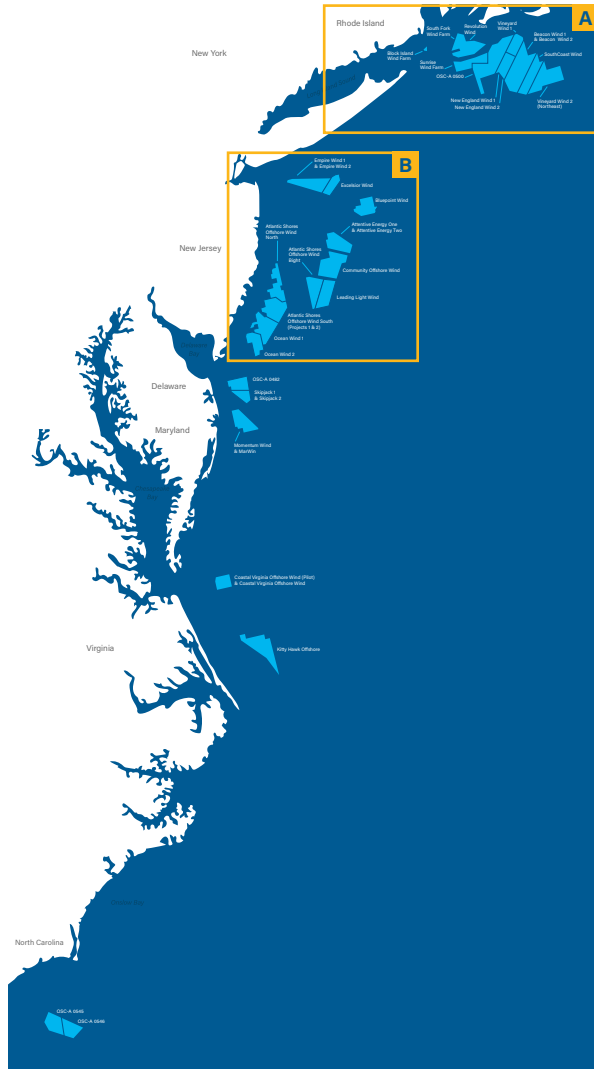
Potential Capacity of Lease Area in Development by Region



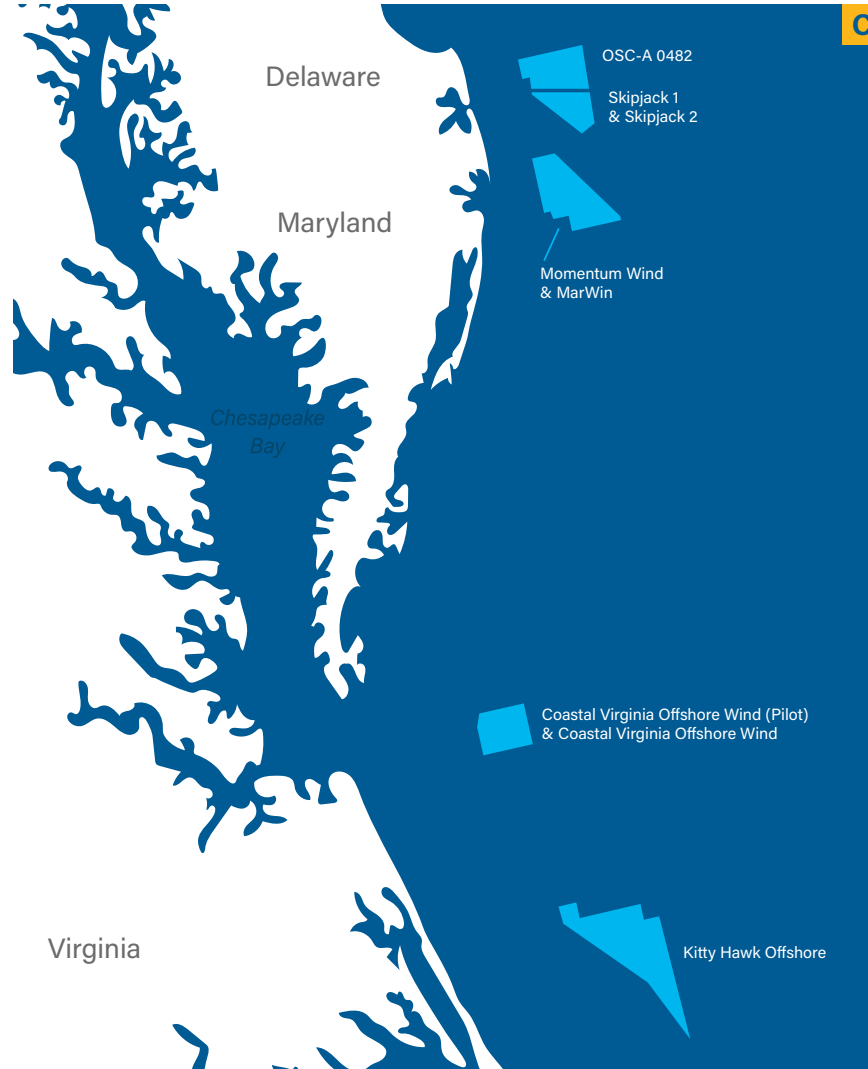
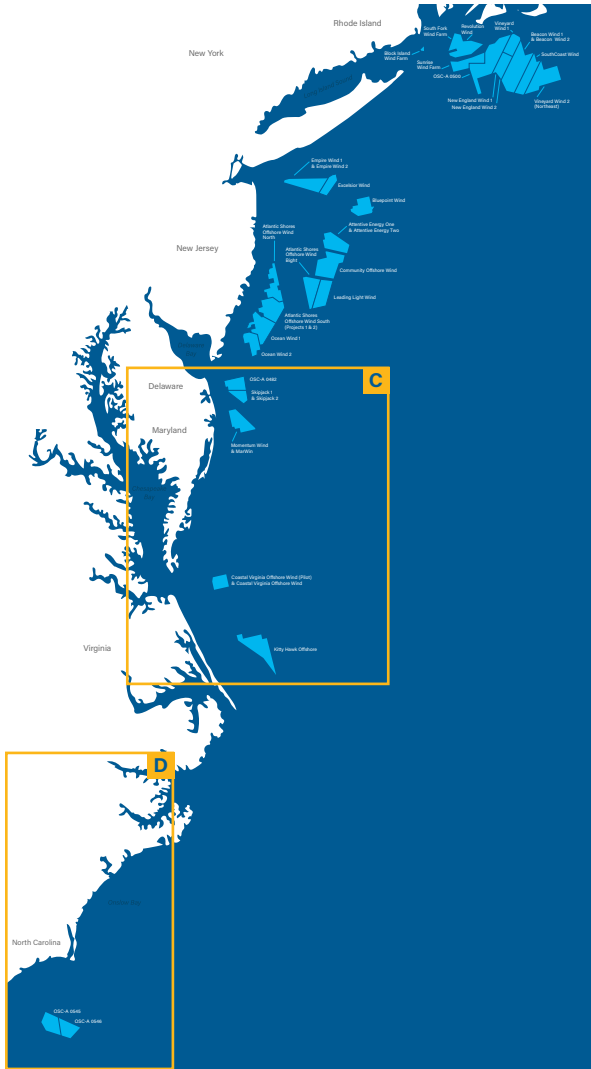
Lease Price per Acre, real 2023\$, Over Time



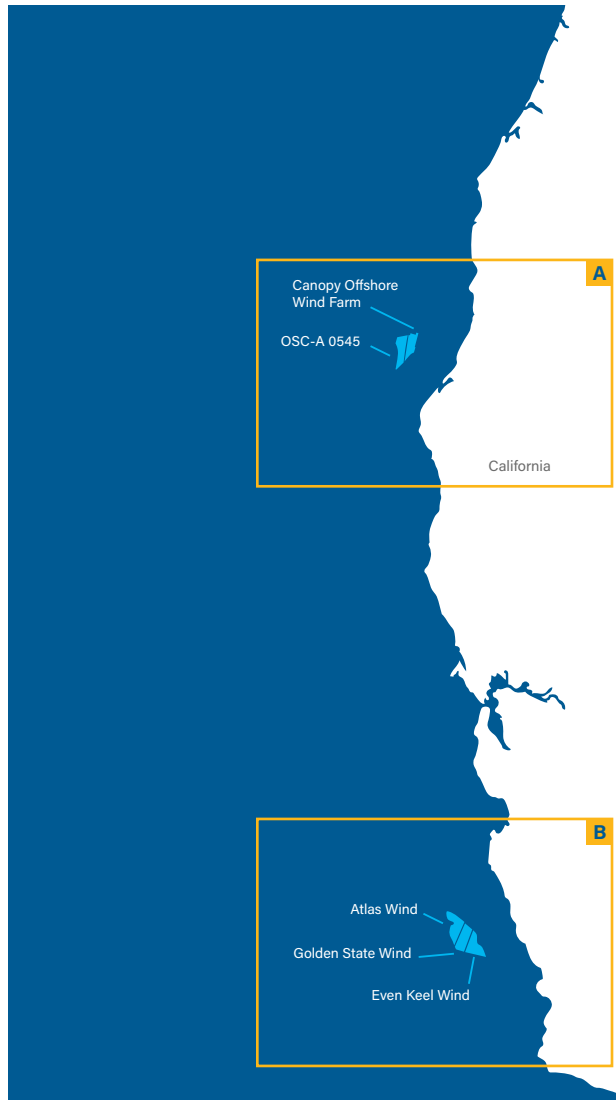
East Coast Project & Lease Map



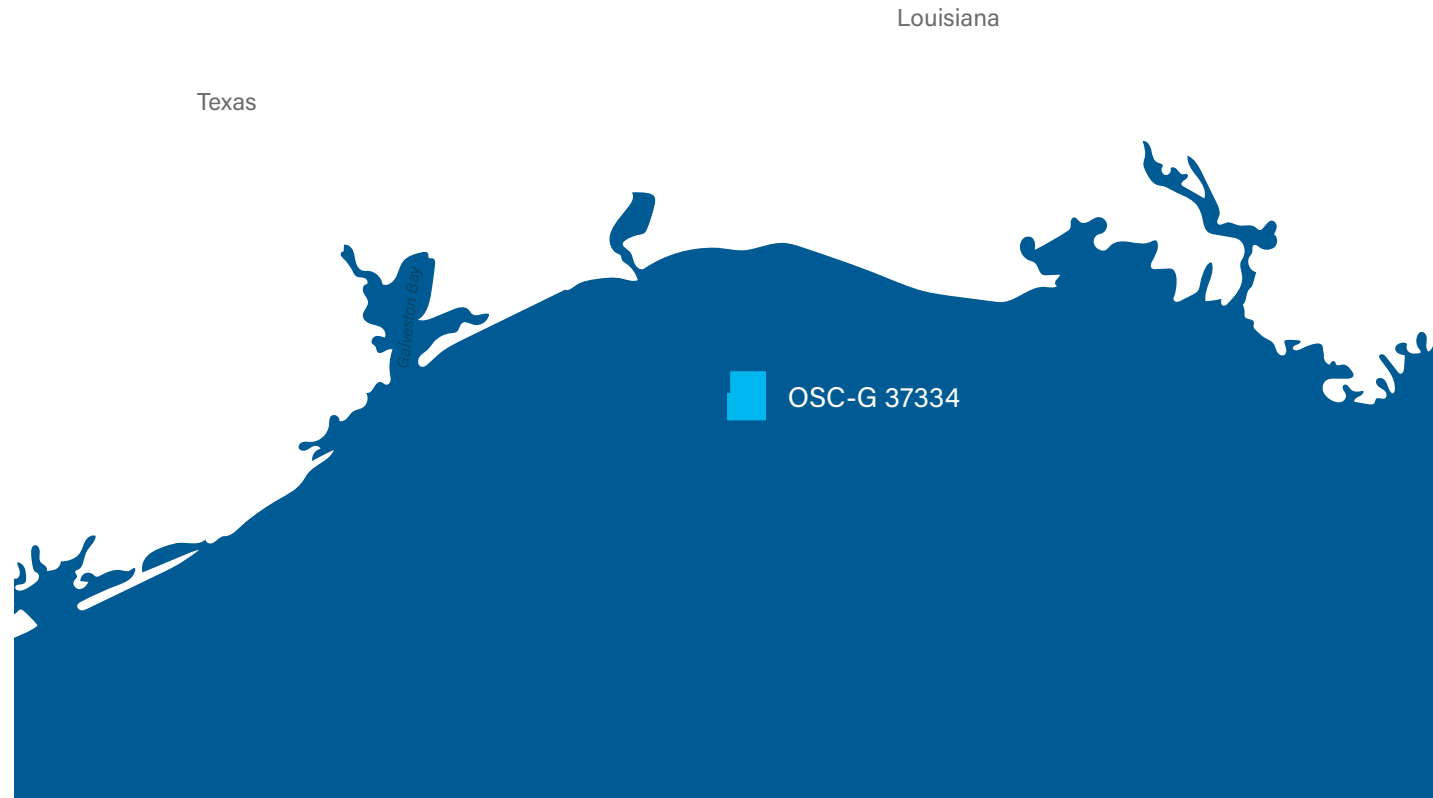
East Coast Project & Lease Map (continued)



West Coast Project & Lease Map



Gulf Coast Project & Lease Map



Leases in Development

Label	Lease Number	Project Name	State of Interconnection	Expected Capacity (MW)	Lease Owner(s)	Lease Price per Acre, Real 2023\$
1	OCS-A 0482	TBD	unknown	1,249	Ørsted, PSEG	\$0.33
2	OCS-A 0483	Coastal Virginia Offshore Wind	Active - System Impact Study	2,587	Dominion Energy	\$18.30
3	OCS-A 0486	Revolution Wind	Active - IA executed	704	Ørsted, Eversource	\$19.22
4	OCS-A 0487	Sunrise Wind	Active - IA executed	924	Ørsted, Eversource	\$19.22
5 6	OCS-A 0490	Marwin	Active - IA executed	270	U.S. Wind	\$148.81
		Momentum Wind	unknown	808.5		\$131.20
7	OCS-A 0497	Coastal Virginia Offshore Wind Pilot ¹	Operational	12	Virginia Department of Energy	N/A
8	OCS-A 0498	TBD (Ocean Wind 1)	Active, IA executed	1,470	Ørsted	\$6.83
9 10	OCS-A 0499	Atlantic Shores South Project 1	Active, IA executed	1,510	Atlantic Shores (EDF, Shell)	\$683
		Atlantic Shores South Project 2	unknown	1,290		
11	OCS-A 0500	TBD	unknown	2,579	Ørsted	\$2.44
12	OCS-A 0501	Vineyard Wind 1	Active, IA executed	806	Avangrid, Vineyard Offshore (Copenhagen Infrastructure Partners)	\$1.13
13	OCS-A 0506	Block Island Wind Farm ¹	Operational	30	PPL ²	N/A
14	OCS-A 0508	Kitty Hawk Offshore	Active - System Impact Study	3,500	Avangrid	\$148.23

¹ Coastal Virginia Offshore Wind Pilot has a federal research lease, and Block Island Wind Farm is a Right of Way grant.

² PPL, through Narragansett Electric Company, owns the federal BOEM Lease for the offshore transmission cable. The project, Block Island Wind Farm, is owned by Ørsted and located in state waters.

Leases in Development *(continued)*

Label	Lease Number	Project Name	State of Interconnection	Expected Capacity (MW)	Lease Owner(s)	Lease Price per Acre, Real 2023\$
15 16	OCS-A 0512	Empire Wind 1	Active - IA executed	810	Equinor	\$730.13
		Empire Wind 2	Active - IA executed	1260		
17	OCS-A 0517	South Fork Wind Farm	Active - IA executed	132	Ørsted, Eversource	\$19.22*
18 19	OCS-A 0519	Skipjack Wind 1	unknown	120	Ørsted	\$0.33*
		Skipjack Wind 2	unknown	846		
20 21	OCS-A 0520	Beacon Wind 1	unknown	1,230	bp	\$1,231.43
		Beacon Wind 2	unknown	1,360		
22	OCS-A 0521	SouthCoast Wiind (Mayflower)	unknown	1,204	Ocean Winds (EDP, ENGIE)	\$1,245.86
23	OCS-A 0522	Vineyard Wind 2 (Northeast)	Active - System Impact Study	2,500	Vineyard Offshore (Copenhagen Infrastructure Partners)	\$1,199.86
24	OCS-A 0532	TBD (Ocean Wind 2)	unknown	1,514	Ørsted	\$6.83*
25	OCS-A 0534	New England Wind 1 (Park City)	Active - IA executed	804	Avangrid	\$1.13*
26	OCS-A 0561 (0534)	New England Wind 2 (Commonwealth)	unknown	1232	Avangrid	\$1.13*
27	OCS-A 0537	Bluepoint Wind	Active	1,700	Ocean Winds (EDP, ENGIE), Global Infrastructure Partners	\$11,085.88
28 29	OCS-A 0538	Attentive Energy One	Active	1,404	TotalEnergies, Rise Light & Power, Corio Generation	\$9,770.64
		Attentive Energy Two	Active	1,342	TotalEnergies, Corio Generation	

* These leases were not won through competitive bids, and the pricing is not competitive. They are segregated portions of leases won in previous bids.

Leases in Development *(continued)*

Label	Lease Number	Project Name	State of Interconnection	Expected Capacity (MW)	Lease Owner(s)	Lease Price per Acre, Real 2023\$
30	OCS-A 0539	Community Offshore Wind	Active - Feasibility Study	1,314	Community Offshore Wind (RWE, National Grid)	\$9,050.96
31	OCS-A 0541	Atlantic Shores Bight	Active	2,400	Atlantic Shores (EDF, Shell)	\$10,188.04
32	OCS-A 0542	Leading Light Wind	unknown	2,400	Invenergy, energyRE	\$7,960.73
33	OCS-A 0544	Excelsior Wind (Vineyard Mid-Atlantic)	Active	1,314	Vineyard Offshore (Copenhagen Infrastructure Partners)	\$6,860.56
34	OCS-A 0545	TBD	unknown	1,000	TotalEnergies	\$3,018.58
35	OCS-A 0546	TBD	unknown	1,600	Duke Energy	\$2,912.75
36	OCS-A 0549	Atlantic Shores North	Active - System Impact Study	2,400	Atlantic Shores (EDF, Shell)	\$6.83*
37	OCS-G 37334	TBD	unknown	2,000	RWE	\$54.65
38	OCS-P 0561	Canopy Offshore Wind Farm	unknown	1,600	RWE	\$2,489.82
39	OCS-P 0562	TBD	unknown	1,229	Vineyard Offshore (Copenhagen Infrastructure Partners)	\$2,517.71
40	OCS-P 0563	Atlas Wind	unknown	2,000	Equinor	\$1,623.74
41	OCS-P 0564	Golden State Wind	unknown	2,000	Ocean Winds (EDP, ENGIE)	\$1,868.98
42	OCS-P 0565	Even Keel Wind	unknown	1,433	Invenergy	\$1,806.81
43	OCS-P 0553 ³	Maine Research Array	unknown	144	State of Maine	N/A

* These leases were not won through competitive bids, and the pricing is not competitive. They are segregated portions of leases won in previous bids.

3: Research lease offered by BOEM on 24 May 2024, pending approval by State of Maine.

Federal Leasing Process

BOEM has held 12 offshore wind lease auctions in total over a ten-year span (2013-2023), with an additional 12 lease auctions planned for the following five years: 2024-2028. The Federal leasing process typically begins when BOEM determines interest either from a state, through a Governor's request that BOEM establish an Intergovernmental Renewable Energy Task Force, or a developer submits an unsolicited lease request. Below is a general description of the process BOEM undergoes when deciding to hold a lease auction and is not necessarily reflective of the exact process in each region.

After at least one Task Force meeting, during which public input is allowed, BOEM requests public comment by issuing a Call for Information and Nominations (Call) within areas under consideration for offshore wind leasing. Before the Call, BOEM may publish a Request for Interest (RFI), which is also aimed to source public feedback. This comment period seeks information from the public on site conditions, resources, and multiple uses near or within the areas where offshore wind could be developed, as well as commercial interest in development within those areas.

After incorporating public feedback from the Call, BOEM publishes the area identification in draft form for comment. Then BOEM identifies the Final Wind Energy Areas (WEAs), or the parts of the Outer Continental Shelf that appear most suitable for commercial wind energy activities in consideration of environmental and user conflicts. The WEAs are generally smaller than the Call Areas because they incorporate feedback from other ocean users such as the fishing and commercial shipping industries, state and federal agencies, and other interested parties. BOEM may or may not issue "draft" WEAs to solicit additional public comment.

Next, BOEM publishes a Proposed Sale Notice (PSN) that provides information about proposed lease areas, lease provisions and conditions, auction details, and other information. Areas identified in the PSN stage may be a subset, or reduced versions, of the final WEAs. Public comment is also accepted at this stage.

Finally, BOEM publishes a Final Sale Notice (FSN) which finalizes the lease areas to be auctioned, incorporates feedback from stakeholders regarding the PSN, setting the date and providing the final details for a lease auction.

Proposed and Past BOEM Lease Auctions, 2022-2028

Region	RFI/Call	WEA	PSN	FSN	Auction	Auction Included in BOEM's 5-Year Leasing Plan
New York Bight	●	●	●	●	●	
Carolina Long Bay	●	●	●	●	●	
Northern and Central California	●	●	●	●	●	
Gulf of Mexico 1	●	●	●	●	●	
Gulf of Mexico 2	●	●	●			●
Central Atlantic 1	●	●	●			●
Oregon	●	●	●			●
Gulf of Maine 1	●	●	●			●
Gulf of Mexico 3						●
Central Atlantic 2						●
Gulf of Mexico 4						●
New York Bight 2						●
California 2						●
Territory 1						●
Gulf of Maine 2						●
Hawaii						●

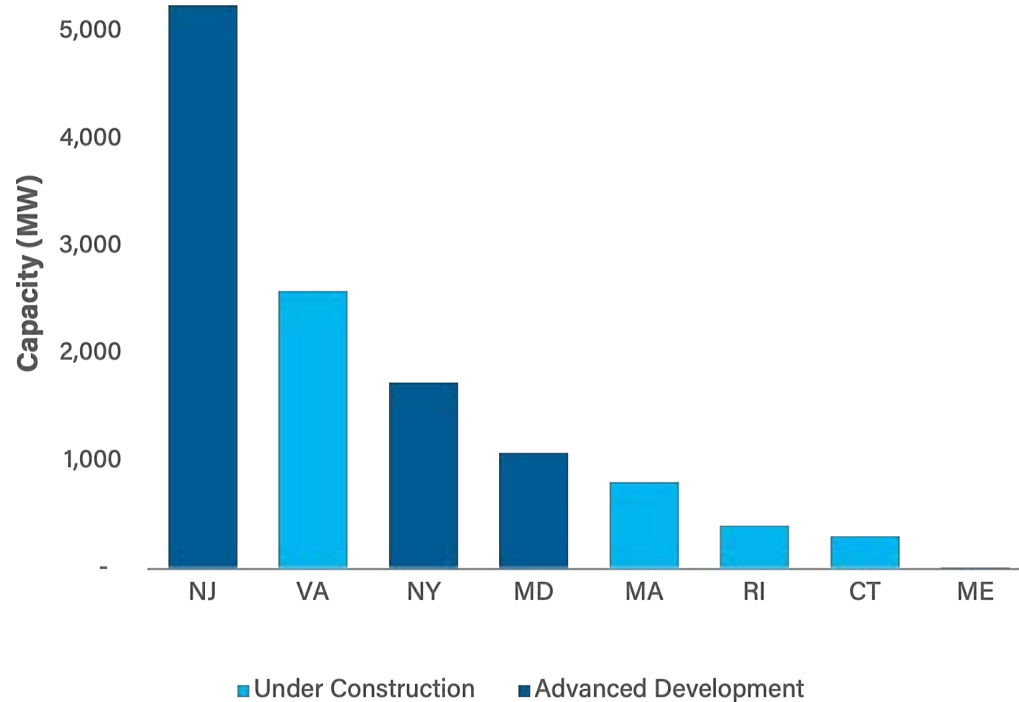
Offshore Wind Pipeline by State

Projects that have reached the advanced development phase have secured offtake, identifying the state where the electricity generated by the offshore wind project is to be provided. Although projects in early development may be targeting specific state procurements, we cannot say with certainty where these projects will ultimately provide electricity.

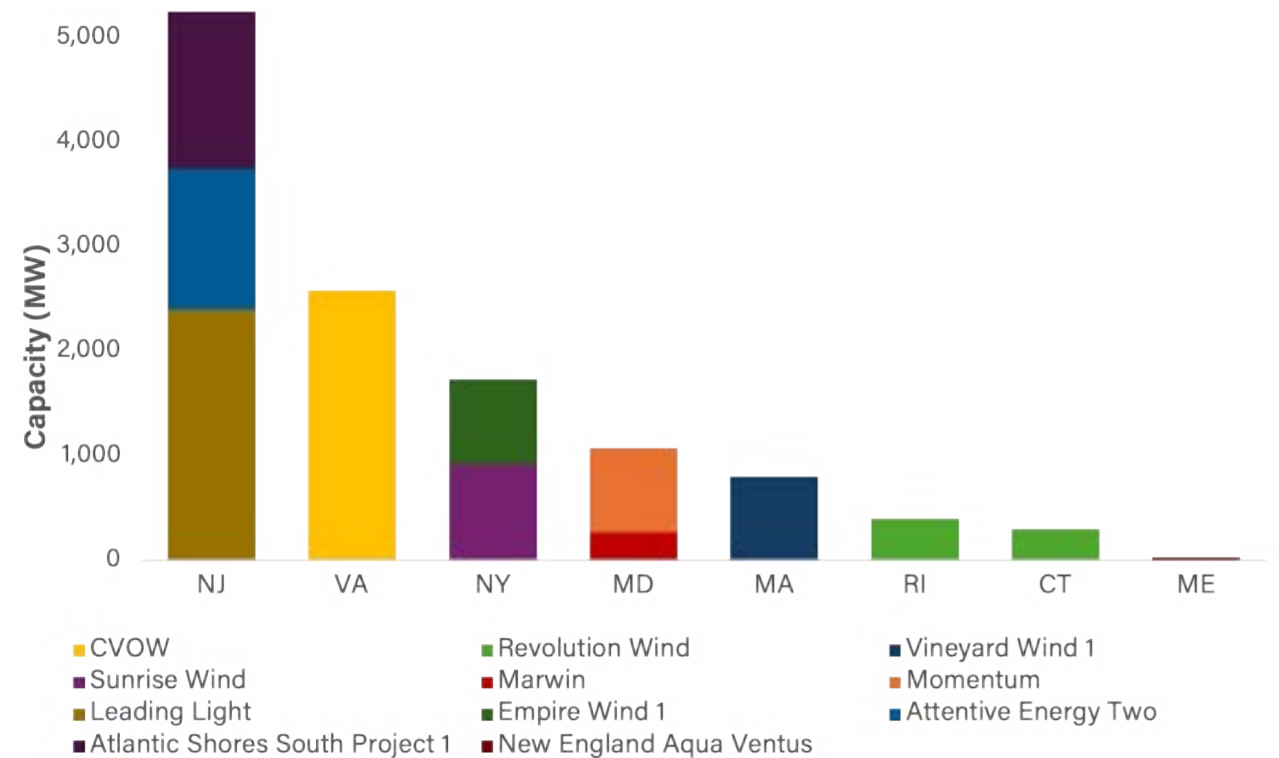
New Jersey leads all states with a total of 5,252 MW of offshore capacity in the pipeline, made up of three projects in advanced development (Atlantic Shores South Project 1, Attentive Energy Two, and Leading Light Wind).

Virginia follows with 2,587 MW of capacity in the pipeline, all of which is from the Coastal Virginia Offshore Wind project.

U.S. Offshore Wind Pipeline Status by State



U.S. Offshore Wind Pipeline Projects by State

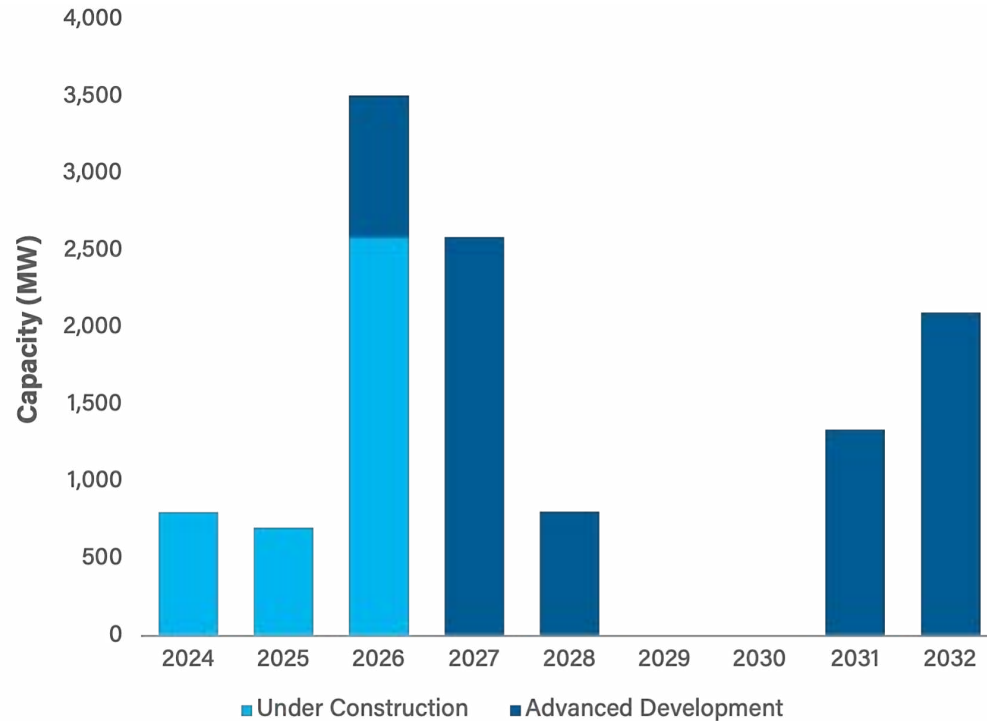


Offshore Wind Pipeline by State

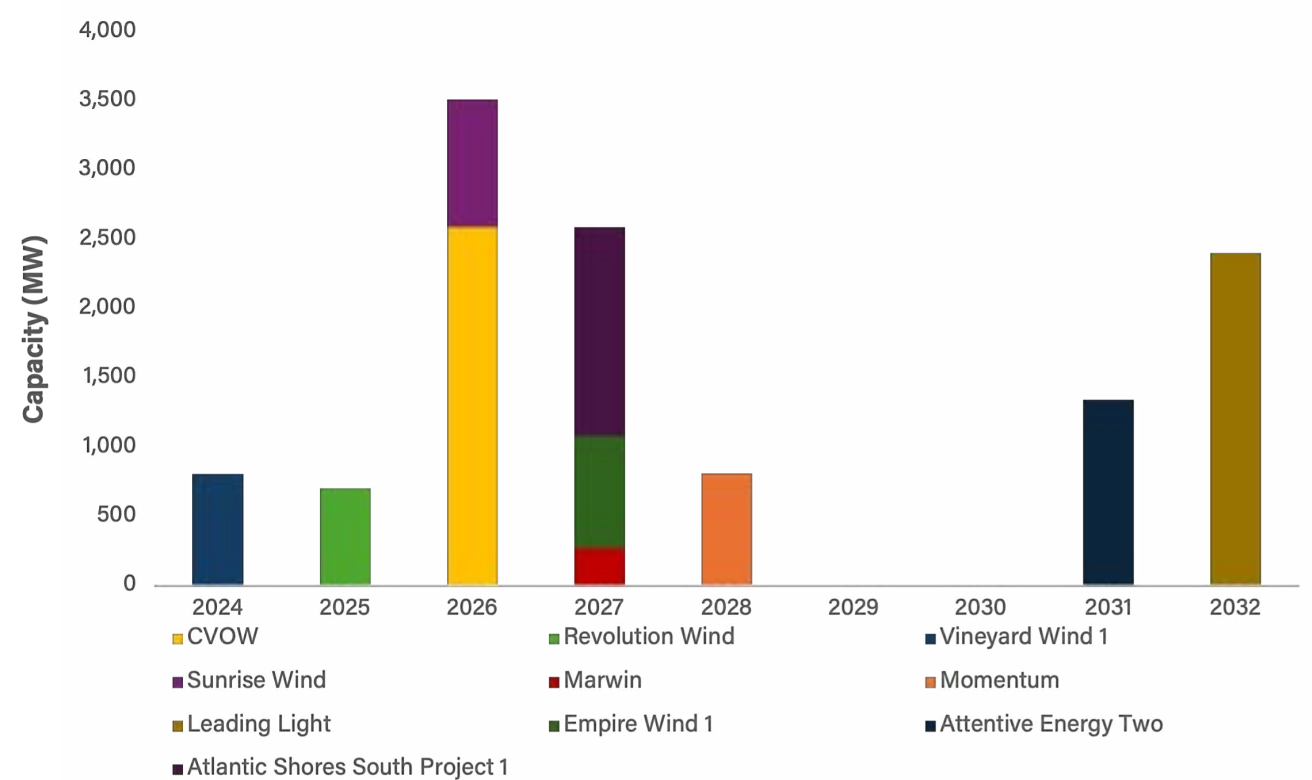
For projects currently under construction or in advanced development, capacity installations are expected to reach their peak in 2026, with 3,511 MW planned to come online in that year, as of June 2024. The year 2027 represents a close second with 2,590 MW of planned installations.

Expected capacity installations fall after 2027, as many projects are still in early development and have not secured offtake. As states release additional offshore wind solicitations (the main procurement method to date) and award offtake contracts to bidders, it stands to reason that additional capacity with commercial operations dates in 2030 and beyond will be added to the pipeline.

U.S. Offshore Wind Pipeline Status by Expected Commercial Operations Date



U.S. Offshore Wind Pipeline by Expected Commercial Operations Date



Projects in Development (Table)

For offshore wind development, leases and projects are not the same. One lease area can host more than one project.

Lease ownership is publicly available information. However, developers may choose how much or little to share of their project development plans. As such, if a developer does not have an offtake agreement or has not yet begun the permitting process, the project plans for that lease area may not be known.

Energy prices are a key component to offtake agreements, as they mark the amount an offtaker will pay a developer per MWh of energy for the duration of the contract. However, with offshore wind projects, offtake agreements also typically include additional commitments from developers, such as donations to local organizations, supply agreements with local vendors, or investments to develop the region's offshore wind supply chain. As such, offtake agreements cannot be measured solely by the energy price offered.

Lease ownership refers to the seabed lease awarded to developers by BOEM through a federal auction process.

Project refers to one offshore wind facility located in a lease area. Some lease areas host multiple projects. Offtake agreements are organized at the project level.

Label	Project Name	Expected Capacity (MW)	State	Developer(s)	Status	Offtake	Expected Construction Start	Expected COD	Year 1 Energy Price, Real 2023\$ (\$/MWh)
1	TBD	1,249	TBD	Ørsted, PSEG	Early Development	TBD	TBD	TBD	N/A
2	Coastal Virginia Offshore Wind	2,587	VA	Dominion Energy	Under Construction	Direct use	2024	2026	N/A
3	Revolution Wind	704	CT, RI	Ørsted, Eversource	Under Construction	PPAs (PPL, Eversource, Avangrid)	2024	2025	\$120.35, \$118.94, \$117.65
4	Sunrise Wind	924	NY	Ørsted, Eversource	Advanced Development	NY OREC	2024	2026	\$143.73
5	Marwin	270	MD	U.S. Wind	Advanced Development	MD OREC	TBD	2027	\$161.31
6	Momentum Wind	808.5	MD	U.S. Wind	Advanced Development	MD OREC	TBD	2028	\$60.10
7	Coastal Virginia Offshore Wind Pilot	12	VA	Dominion Energy	Online	Direct use	2019	2020	N/A
8	TBD (Ocean Wind 1)	1,470	TBD	Ørsted	Early Development	TBD	TBD	TBD	N/A
9	Atlantic Shores South Project 1	1,510	NJ	Atlantic Shores (EDF, Shell)	Advanced Development	NJ OREC	2024	2027	\$96.10
10	Atlantic Shores South Project 2	1,290	TBD	Atlantic Shores (EDF, Shell)	Early Development	TBD	TBD	TBD	N/A

Projects in Development (Table cont.)

Label	Project Name	Capacity (MW)	State	Developer(s)	Status	Offtake	Expected Construction Start	Expected COD	Year 1 Energy Price, Real 2023\$ (\$/MWh)
11	TBD	2,579	TBD	Ørsted	Early Development	TBD	TBD	TBD	N/A
12	Vineyard Wind 1	806	MA	Avangrid, Vineyard Offshore (Copenhagen Infrastructure Partners)	Under Construction	PPAs (Eversource, National Grid, Unitil)	2022	2024	\$82.10
13	Block Island Wind Farm	30	RI	Ørsted	Online	PPA (PPL)	2015	2016	\$332.86
14	Kitty Hawk Offshore	3,500	TBD	Avangrid	Early Development	TBD	TBD	TBD	N/A
15	Empire Wind 1	810	NY	Equinor	Advanced Development	NY OREC	TBD	2027	\$152.59
16	Empire Wind 2	1260	TBD	Equinor	Early Development	TBD	TBD	2028	N/A
17	South Fork Wind Farm	132	NY	Ørsted, Eversource	Online	PPA (Long Island Power Authority)	2023	2024	\$196.04
18	Skipjack Wind 1	120	TBD	Ørsted	Early Development	TBD	TBD	2030	N/A
19	Skipjack Wind 2	846	TBD	Ørsted	Early Development	TBD	TBD	TBD	N/A
20	Beacon Wind 1	1,230	TBD	bp	Early Development	TBD	TBD	2028	N/A
21	Beacon Wind 2	1,360	TBD	bp	Early Development	TBD	TBD	TBD	N/A
22	SouthCoast Wind (Mayflower)	1,204	TBD	Ocean Winds (EDP, ENGIE)	Early Development	TBD	TBD	TBD	N/A

Projects in Development (Table cont.)

Label	Project Name	Capacity (MW)	State	Developer(s)	Status	Offtake	Expected Construction Start	Expected COD	Year 1 Energy Price, Real 2023\$ (\$/MWh)
23	Vineyard Wind 2 (Northeast)	2,500	TBD	Vineyard Offshore (Copenhagen Infrastructure Partners)	Early Development	TBD	2026	2031	N/A
24	TBD (Ocean Wind 2)	1,514	TBD	Ørsted	Early Development	TBD	TBD	TBD	N/A
25	New England Wind 1 (Park City)	804	TBD	Avangrid	Early Development	TBD	TBD	2027	N/A
26	New England Wind 2 (Commonwealth)	1,232	TBD	Avangrid	Early Development	TBD	TBD	2028	N/A
27	Bluepoint Wind	1,700	TBD	Ocean Winds (EDP, ENGIE), Global Infrastructure Partners	Early Development	TBD	TBD	TBD	N/A
28	Attentive Energy One	1,404	TBD	TotalEnergies, Rise Light & Power, Corio Generation	Early Development	TBD	TBD	2030	N/A
29	Attentive Energy Two	1,342	NJ	TotalEnergies, Corio Generation	Advanced Development	NJ OREC	TBD	2031	\$128.96
30	Community Offshore Wind	1,314	TBD	Community Offshore Wind (RWE, National Grid)	Early Development	TBD	TBD	2030	N/A
31	Atlantic Shores Bight	2,400	TBD	Atlantic Shores (EDF, Shell)	Early Development	TBD	TBD	TBD	N/A
32	Leading Light Wind	2,400	NJ	Invenergy, energyRE	Advanced Development	NJ OREC	TBD	2032	\$110.75
33	Excelsior Wind (Vineyard Mid-Atlantic)	1,314	TBD	Vineyard Offshore (Copenhagen Infrastructure Partners)	Early Development	TBD	TBD	2030	N/A

Projects in Development (Table cont.)

Label	Project Name	Capacity (MW)	State	Developer(s)	Status	Offtake	Expected Construction Start	Expected COD	Year 1 Energy Price, Real 2023\$ (\$/MWh)
34	TBD	1,000	TBD	TotalEnergies	Early Development	TBD	TBD	TBD	N/A
35	TBD	1,600	TBD	Duke Energy	Early Development	TBD	TBD	TBD	N/A
36	Atlantic Shores North	2,400	TBD	Atlantic Shores (EDF, Shell)	Early Development	TBD	TBD	TBD	N/A
37	TBD	2,000	TBD	RWE	Early Development	TBD	TBD	TBD	N/A
38	Canopy Offshore Wind Farm	1,600	CA	RWE	Early Development	TBD	TBD	TBD	N/A
39	TBD	1,229	CA	Vineyard Offshore (Copenhagen Infrastructure Partners)	Early Development	TBD	TBD	TBD	N/A
40	Atlas Wind	2,000	CA	Equinor	Early Development	TBD	TBD	TBD	N/A
41	Golden State Wind	2,000	CA	Ocean Winds (EDP, ENGIE), Canadian Pension Plan Investment Board	Early Development	TBD	TBD	TBD	N/A
42	Even Keel Wind	1,433	CA	Invenergy	Early Development	TBD	TBD	TBD	N/A
43	Maine Research Array	144	ME	TBD	TBD*	TBD	TBD	TBD	N/A

* Research lease offered by BOEM on 24 May 2024, pending approval by State of Maine.

State Waters Projects

In addition to offshore wind projects on federal BOEM leases, individual states can lease state waters for projects. Projects in state waters are subject to state permitting processes, not federal.

State projects are typically smaller-scale than projects in federal waters. They also are often demonstration or pilot projects for new offshore wind technologies.

New England Aqua Ventus will demonstrate VoltturnUS technologies by mounting one turbine to VoltturnUS's floating semisubmersible concrete hulls.

CADEMO is a pilot project for two different floating wind base technologies. The project will have four floating wind turbines and is expected to begin operations in 2028.

Project Name	Capacity (MW)	State	Developer(s)	Status	Offtake	Expected Construction Start	Expected COD
CADEMO	60	CA	Floventis (Cierco, SBM Offshore)	Early Development	TBD	TBD	2028
Cajun Wind	480	LA	Steelhead American (Vestas)	Early Development	TBD	TBD	TBD
Diamond Offshore Wind	TBD	LA	Diamond Offshore Wind (Mitsubishi Americas)	Early Development	TBD	TBD	TBD
New England Aqua Ventus I	12	ME	Diamond Offshore Wind (Mitsubishi Americas)	Advanced Development	PPA (Avangrid)	TBD	TBD

Spotlight on Projects

3



Photo Credit: Dominion Energy

South Fork Wind

OPERATIONAL

The South Fork Wind project was the first large-scale offshore wind project to begin commercial operations in the United States.

The project began construction in March 2023 and delivered first power in December 2023. In March 2024, the South Fork project became fully operational and started supplying power to the Long Island Power Authority under a 20-year PPA. The project has the capacity to power 70,000 homes.

The South Fork Wind project is jointly-owned and developed by Ørsted and Eversource Energy. Global Infrastructure Partners announced in February 2024 that it would acquire Eversource's 50% ownership interest in the project.

The project is located about 35 miles away Montauk Point, New York.

The project consists of 12 SG 11-200 turbines (rated at 11 MW) supplied by Siemens Gamesa Renewable Energy and all 36 turbine blades of the project were assembled at the New London State Pier in Connecticut. The project will be serviced by the ECO Edison, the first U.S.-built Service Operation Vessel (SOV). The project's Operations and Maintenance hub is located in East Setauket, New York. The hub will serve as the O&M facility for several of Ørsted's offshore wind projects in the Northeast.



Photo credit: South Fork Wind

Vineyard Wind 1

UNDER CONSTRUCTION

Located 15 miles off the southern coast of Massachusetts, the Vineyard Wind 1 project, which began offshore construction in late 2022, was the first large-scale offshore wind project to break ground.

The project will have a capacity of 806 MW and consist of 62 GE Vernova Haliade-X turbines (rated at 13 MW), enough to power 400,000 homes in Massachusetts. The turbines for the Vineyard Wind 1 project are assembled at the New Bedford Marine Commerce Terminal in Massachusetts. Construction on the project has created 937 union jobs as of December 2023, almost doubling the developers' commitment to create 500 union jobs.

The project is owned jointly by Avangrid and Copenhagen Infrastructure Partners and is developed by Avangrid and Vineyard Offshore. The Vineyard Wind 1 project achieved first power in January 2024, when developers commissioned the first turbine. By May, developers had commissioned another eight turbines, bringing the total number of operational turbines to nine. The project is slated to become fully operational by the end of 2024, delivering power to National Grid, Unitil, and Eversource Energy.

The Tisbury Marine Terminal in Martha's Vineyard will serve as the operations & maintenance hub for the project. The terminal will have the capacity to support three crew-transfer-vessels, creating almost 100 jobs in the area.

In March 2024, Vineyard Offshore announced a historic agreement with the Mashpee Wampanoag Tribe, establishing the Wampanoag Tribe Offshore Wind Community Fund that would support scholarships, wastewater projects, language reclamation, and workforce training benefits for the tribe. The agreement also marks a partnership between the two parties that would allow the Tribe to engage with future offshore wind projects developed by Vineyard offshore.



Revolution Wind

UNDER CONSTRUCTION

Revolution Wind, a 704 MW project located south of the Connecticut and Rhode Island coasts, is under construction and expected to be online by 2025.

The project is a joint venture between Ørsted and Eversource. However, in February 2024, Eversource announced plans to sell its 50% share of the project to Global Infrastructure Partners.

Onshore construction for Revolution Wind began in August 2023 after final approval from the U.S. Department of the Interior. Offshore construction began in May 2024, and Ørsted and Eversource announced the first 'steel in water' milestone as turbine foundations began installation.

Revolution Wind will supply power to both Connecticut and Rhode Island through three PPAs. 400 MW of capacity will go to Rhode Island through Narragansett Electric Company (a subsidiary of PPL) and 304 MW of capacity will go to Connecticut through The Connecticut Light and Power Company (a subsidiary of Eversource Energy) and The United Illuminating Company (a subsidiary of Avangrid).

The project will host up to 100 turbines and has a turbine supply agreement with Siemens Gamesa for its SG 11-200 model (rated at 11 MW).

When operational, Revolution Wind is expected to generate enough energy to power over 350,000 Connecticut and Rhode Island homes.



Photo credit: Boskalis

Coastal Virginia Offshore Wind

UNDER CONSTRUCTION

The 2,587 MW Coastal Virginia Offshore Wind (CVOW) started construction in May of 2024, making it the largest offshore wind project under construction or operational in the U.S.

The project is expected to start delivering power to the grid in late 2026.

The construction and operations of CVOW was approved in October 2023 by the U.S. Department of the Interior, and CVOW's COP was approved by BOEM in January 2024. Offshore construction began in May 2024 with the installation of the first monopile foundation approximately 29 miles off the Virginia Beach coast.

Monopile installations will continue until the fall of 2024, then resume in May 2025. The pause allows for the endangered North Atlantic right whale to move freely for their migration past the project area.

CVOW's construction includes support from Charybdis, the first U.S. built offshore wind turbine installation vessel. Charybdis was launched for sea trials in April 2024.

Dominion Energy is currently the sole owner of CVOW and will supply power to the Virginia electricity grid directly through its subsidiary, Virginia Electric and Power Company. Stonepeak is set to acquire 50% ownership of CVOW, making the project a joint venture. The transaction is expected to close by the end of 2024.

The project has a turbine supply agreement with Siemens Gamesa for its SG 14-222 model (rated at 14 MW) and will host 176 turbines.

When operational, CVOW is expected to produce enough clean energy to power up to 660,000 homes.



Photo credit: Dominion Energy

Offshore Wind Power Contracts



4

State Solicitations

To date, state-issued Request for Proposals (RFPs), or solicitations, have been the main procurement method for projects that are not directly owned by a utility.

Rhode Island's 2022 offshore wind solicitation had only one project application. The state did not move forward with the bid, and instead issued another RFP in 2023.

New Jersey's third solicitation required bids to be submitted by August 2023 and announced the two awarded projects in January 2024. Leading Light Wind and Attentive Energy Two had energy strike prices of \$112.50 and \$131.00, respectively. Both offtake agreements held additional provisions for economic impacts in the region. The projects are committed to use New Jersey ports and supply chains for many development and operations activities. Together, both projects have committed more than \$500 million in economic investment to further the offshore wind industry in New Jersey.

New York's third solicitation provisionally awarded three projects (Attentive Energy One, Community Offshore Wind, and Excelsior Wind) in fall of 2023. However, the offtake awards were rescinded for all three projects in April 2024 after GE Vernova announced the cancellation of its plans to build a 17-18 MW offshore wind turbine. The projects have all stated intention to rebid in future solicitations.

Bids were submitted by November 2023 for New York's fourth solicitation, and the two awarded projects were announced in February 2024. Empire Wind 1 and Sunrise Wind had energy strike prices of \$155.00 and \$146.00, respectively. New York State also required specific economic benefits from the projects, including confidential investments for labor, conservation, supply chain, and community organizations in the state.

Project Awards in Last 12 Months

	Projects Awarded	Capacity (MW)	Year 1 Price, nominal (\$/MWh)
New York's fourth OREC solicitation	Empire Wind 1	810	\$155.00
	Sunrise Wind	924	\$146.00
New Jersey's third OREC solicitation	Leading Light Wind	2,400	\$112.50
	Attentive Energy Two	1,342	\$131.00

Contract Pricing Over Time

The cost of offshore wind procurement in the United States dropped steadily from 2010 until 2021, then rose again after 2022.

In late 2023 through 2024, developers chose to withdraw or cancel their offtake agreements due to financial concerns. Project developers have faced financial difficulties due to inflation, supply-chain constraints, interest rate increases and other macroeconomic factors. To cover project costs, the previously awarded energy prices were not high enough.

The average price, in real 2023\$, for ongoing offtake agreements is 125.95 \$/MWh, excluding Block Island Wind Farm. The four offtake contracts finalized in 2024 have an average price, in real 2023\$, of 134.01 \$/MWh.

Additionally, over time, offtake agreements have grown to include more stipulations, such as commitments for donations to local organizations, supply agreements with local vendors, and investments to develop the region's offshore wind supply chain.

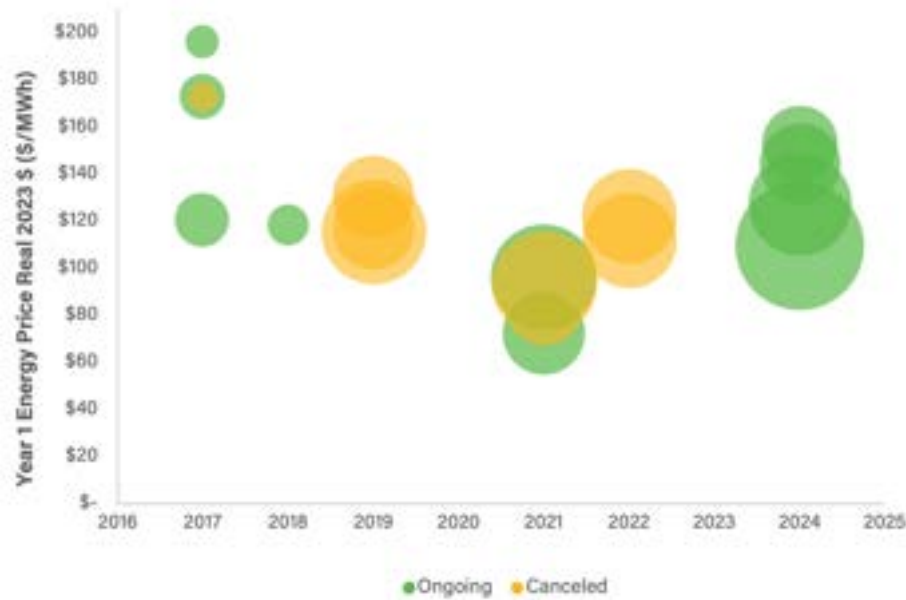
Offtake agreements awarded in 2024 had significantly more local economic commitments required of project developers than any offtake agreements before.

In addition to energy prices, New Jersey's offtake agreements for Leading Light Wind and Attentive Energy Two stipulated over \$550 million in investments from the developers for workforce development, regional supply chain development, conservation initiatives, education initiatives, and community engagement initiatives. The offtake agreements also mandate total job creation for both contracts to be over 27,000.

The recent New York offtake agreements, Empire Wind 1 and Sunrise Wind, have over \$50 million in known mandated investments, as well as additional confidential monetary commitments to regional initiatives.

Most offtake agreements require project developers to host project operations and maintenance (O&M) activity within the state or to use local ports for marshalling activities.

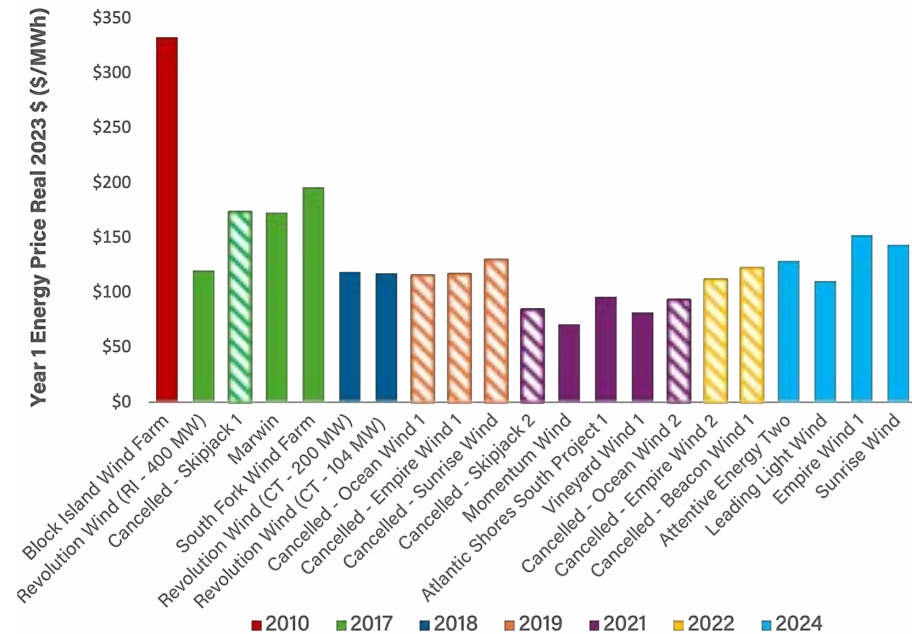
Offshore Wind Year 1 Energy Prices by Year with Project Capacity



* Does not include Block Island Wind Farm

**Energy strike prices are not the only metric for offtake agreements. Additional economic impacts or regional investments are often required of developers.

Offshore Wind Year 1 Energy Prices



Cancellations and Rebidding

Offshore wind in the U.S. has faced a few tumultuous years with increased supply chain costs and delayed development timelines.

In November 2023, Ørsted ceased development for its Ocean Wind 1 and Ocean Wind 2 projects and cancelled its New Jersey OREC agreements. The company cited supply chain disruptions and rising costs as reasons for the projects' cancellation. No further announcements have been made as to Ørsted's plans with the lease areas.

At the end of September 2023, Ocean Winds, EDP and ENGIE's joint venture, cancelled its Massachusetts PPAs for SouthCoast Wind, also due to financial concerns. The project has been rebid in the ongoing multi-state New England solicitation.

In October 2023, Avangrid withdrew Park City Wind (renamed New England Wind 1) and Commonwealth Wind (renamed New England Wind 2) from PPAs with Connecticut and Massachusetts utility companies. Also facing financial challenges with the projects, Avangrid attempted to renegotiate the PPAs and was denied. Both projects have been rebid for new offtake agreements in the ongoing multi-state New England solicitation. Award decisions are expected in August 2024.

In January 2024, Ørsted cancelled the offtake agreements with Maryland for its Skipjack 1 and 2 projects after suspending spending on these projects in November 2023. Ørsted stated the projects were no longer economically viable. The projects have yet to be rebid, though Ørsted plans to seek other offtake agreements. In April 2024, the Governor of Maryland signed a law allowing the state to re-allocate ORECs from the Skipjack 1 and 2 projects to U.S. Wind, the developer of Marwin and Momentum. U.S. Wind is expected to begin the acquisition process with the state over the summer of 2024.

Also in January 2024, bp and Equinor announced their termination of Beacon Wind 1's New York OREC agreement. The project, now wholly owned by bp, is still in development. Equinor also terminated its NY OREC agreement for Empire Wind 2. Before termination, both projects had unsuccessfully petitioned for higher contract prices.

Empire Wind 1 and Sunrise Wind, among others, petitioned the State of New York to raise their contract prices to accommodate for risings costs from inflation and delayed development. When denied, Empire Wind 1 and Sunrise Wind rebid into New York's expedited fourth offshore wind solicitation. The projects were selected in February 2024, and new contracts were finalized in May.

In April 2024, GE Vernova withdrew plans to manufacture a 17-18 MW offshore wind turbine. The turbine had a significant role for offtake agreements awarded through New York State's third offshore wind solicitation. Provisional contracts with Attentive Energy One, Community Offshore Wind, and Excelsior Wind were canceled due to the change.

Planned State Solicitations

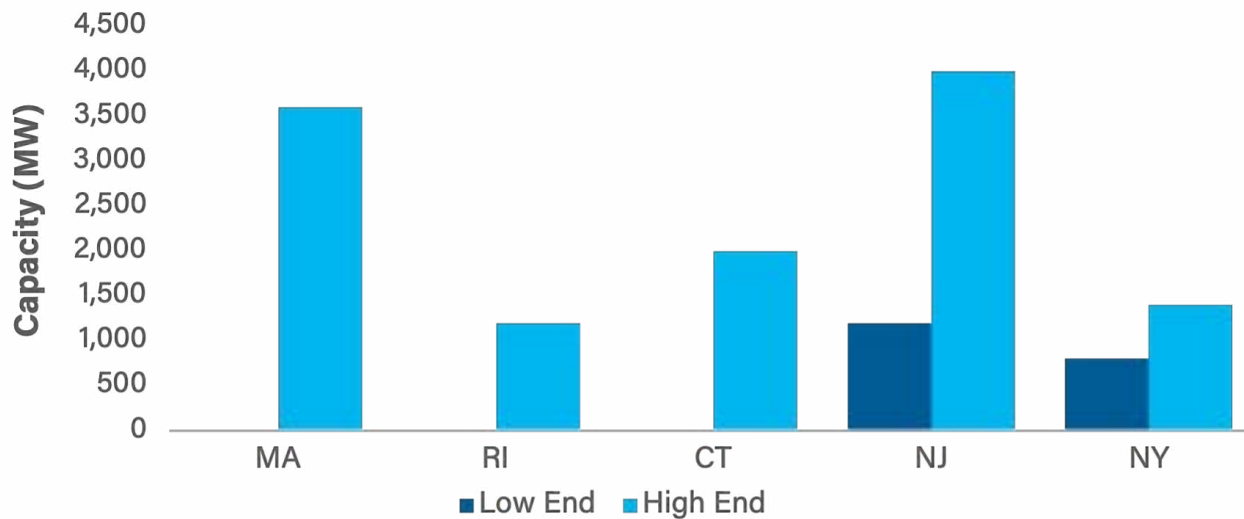
As of June 2024, there are five ongoing or upcoming state solicitations for 2024.

Massachusetts, Rhode Island, and Connecticut signed a Memorandum of Understanding (MoU) in October 2023 for coordination in offshore wind procurement. Developers are encouraged to submit multi-state offtake proposal for consideration. The states are expected to announce awarded projects in fall of 2024. Massachusetts plans to procure 3,600 MW of offshore wind capacity, Rhode Island plans for 1,200 MW, and Connecticut plans for 2,000 MW. Projects up for consideration include Avangrid's New England Wind 1 and New England Wind 2, Ørsted's Starboard Wind, Vineyard Offshore's Vineyard Wind 2, and Ocean Winds' SouthCoast Wind.

New Jersey's fourth offshore wind solicitation opened for bid applications in April 2024. The application window will end in July, with results expected to be shared by December. New Jersey plans to award 1,200 – 4,000 MW of offshore wind capacity in the solicitation.

New York State plans its fifth solicitation to start accepting bids in the summer of 2024. The state plans to accept 800 – 1,400 MW of offshore wind capacity. There will also be a parallel solicitation for offshore wind supply chain investments, to repurpose funds previously awarded to GE Vernova and LM Wind Power from its third offshore wind solicitation.

Planned Procurement Capacity by State



State	Start Bid Period	End Bid Period	Expected Award Date
MA	Aug-23	Mar-24	Aug-24
RI	Oct-23	Mar-24	Aug-24
CT	Oct-23	Mar-24	Aug-24
NJ	Apr-24	Jul-24	Dec-24
NY	Jun-24	Sep-24	Nov-24

Federal Activity

5



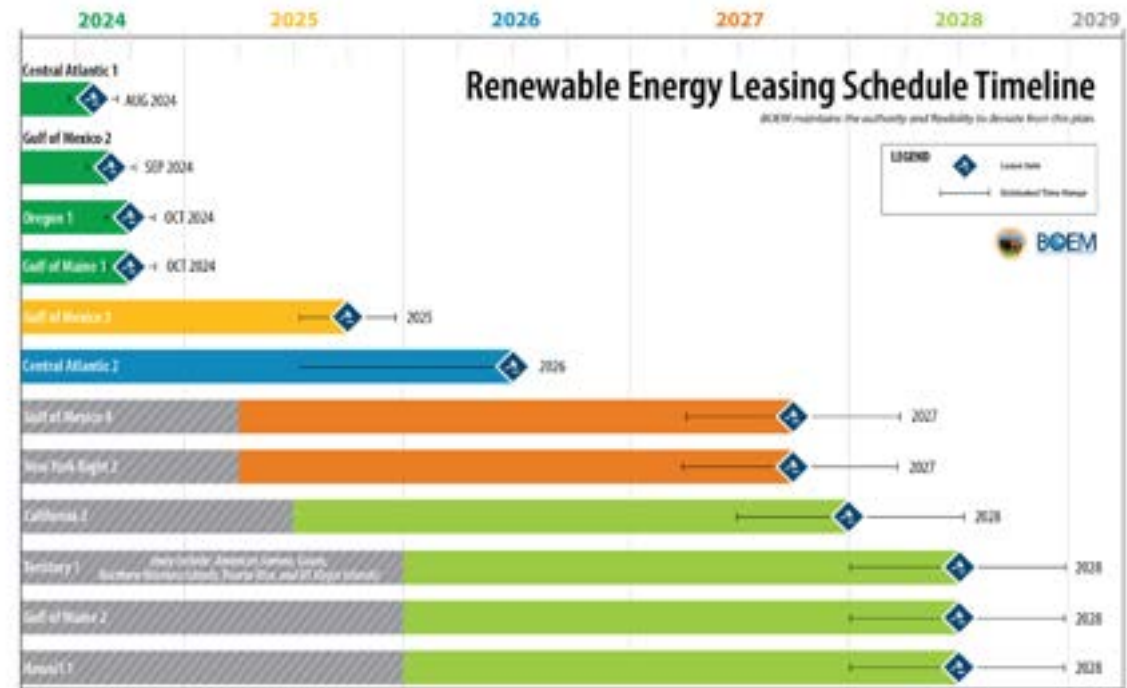
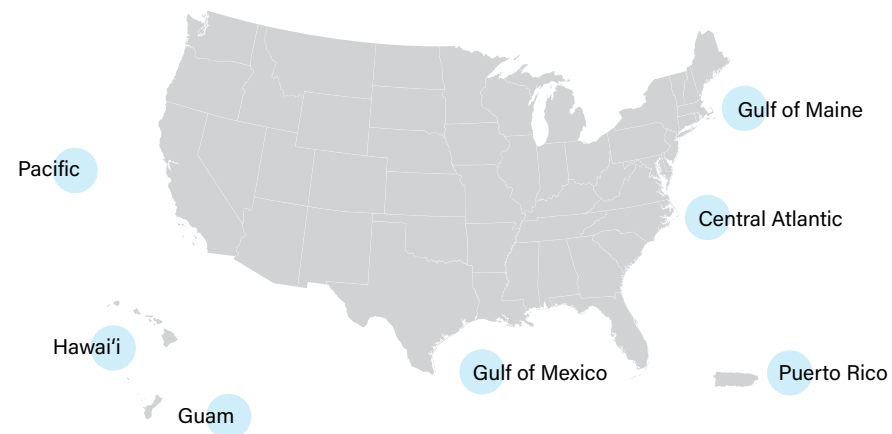
BOEM Lease Schedule (2024–2028)

On April 24, 2024, the Department of the Interior announced an updated offshore wind leasing schedule for the five-year period between 2024–2028

The *Renewable Energy Leasing Schedule* outlined BOEM's plans to hold 12 lease sales within the next five years. BOEM plans to hold four lease sales in 2024, with one lease sale each in 2025 and 2026, two in 2027, and four in 2028. The most imminent lease auctions will be for lease areas in the Central Atlantic, the Gulf of Mexico, the Gulf of Maine, and off the coast of Oregon.

The Department of the Interior's Leasing Schedule comes on the heels of a successful lease sale in the Gulf of Mexico in August 2023, and 2022 lease sales in the NY Bight, Carolina Long Bay and California.

As part of BOEM's *Renewable Energy Modernization Rule*, BOEM is required to publicly share a renewable energy leasing schedule every two years that will cover the following five years.



Planned 2024 Lease Sales



- 1 A-2
- 2 C-1

Central Atlantic 1

In April 2022, BOEM released a Call for Information and Nominations (Call) to determine commercial interest and feedback for possible offshore wind leasing activities in federal waters off the Central Atlantic states. The Call covered an initial area of 3.9 million acres.

In November 2022, BOEM announced eight draft Wind Energy Areas (WEA) off the coasts of North Carolina, Virginia, Maryland, and Delaware. The eight draft WEAs covered a combined 1.7 million acres.

In July 2023, BOEM put forth three final WEAs off the coast of Delaware, Maryland, and Virginia, with the selected areas featuring shallower depths.

In December 2023, BOEM issued a Proposed Sale Notice (PSN) for two leases covering a combined 277,948 acres: Lease Area A-2, off the coasts of Delaware and Maryland, and Lease Area C-1, offshore Virginia. Lease Area C-1 is located near the Coastal Virginia Offshore Wind project, while Lease Area A-2 is near the proposed Skipjack Offshore Energy project.

In January 2024, BOEM published a notice of availability for a Draft Environmental Assessment. A 30-day public comment period followed, ending Feb. 12, 2024.

In April 2024, BOEM released its updated five-year lease schedule for 2024-2028, with August 2024 identified as the timeline for the first Central Atlantic lease sale.

In June 2024, BOEM issued a Final Environmental Assessment for the three final WEAs issued in July 2023, determining that there would be no significant environmental impact due to the lease issuance. The third WEA, Area B-1, located off the coast of Maryland's Worcester County, is not included in the December 2023 PSN and could instead be included in a potential second lease sale in the Central Atlantic in 2026.

Planned 2024 Lease Sales



- 1 OCS-G37962
- 2 OCS-G37963
- 3 OCS-G37964
- 4 OCS-G37965

Gulf of Mexico 2

In October 2021, BOEM published a Call for Nominations and Information (Call) for a 30 million acre area in the Gulf of Mexico.

In July 2022, BOEM identified two draft Wind Energy Areas (WEA) in the Gulf of Mexico: one proposed WEA consisting of 546,645 acres off the coast of Galveston, TX and one covering 188,023 acres off the coast of Lake Charles, LA. The agency simultaneously put out a draft Environmental Assessment covering the initial call areas for public comment.

In October 2022, BOEM announced two final WEAs off the coast of Texas and Louisiana, which collectively covered 682,000 acres.

In February 2023, BOEM published a Proposed Sale Notice (PSN) for the first Gulf of Mexico auction. The final Environmental Assessment was published in May 2023, and the Final Sale Notice was published in July 2023. On August 29, 2023, the first Gulf of Mexico auction opened and resulted in lease area OCS-G 37334 being awarded to RWE.

In March 2024, BOEM issued a PSN for a second offshore wind energy auction in the Gulf of Mexico, consisting of four areas off the coast of Louisiana and Texas. The four areas combine to total 410,060 acres on the Outer Continental Shelf. The 60-day comment period ended May 20, 2024.

In April 2024, BOEM released its updated five-year lease schedule for 2024-2028, with September 2024 identified as the timeline for the second Gulf of Mexico lease sale.

Planned 2024 Lease Sales



- 1 OCS-P 0566 **Coos Bay Call Area**
- 2 OCS-P 0567 **Brookings Call Area**

Oregon 1

In April 2022, BOEM announced a Call for Nominations and Information (Call) for two areas that comprised 1,158,400 acres off the coast of central and southern Oregon. While offshore Oregon had previously been considered in 2013 as a potential location for a floating wind energy pilot project, the 2022 Call set a new milestone for progress toward establishing an offshore wind industry in the area.

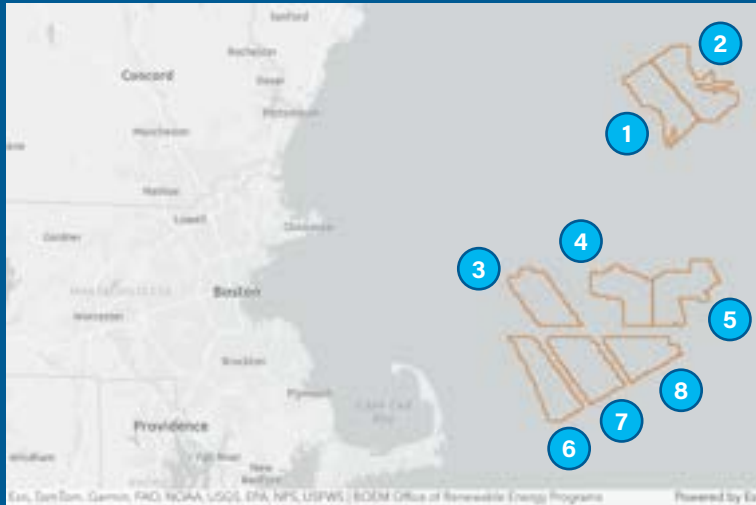
In August 2023, BOEM announced two draft Wind Energy Areas (WEA) off the coast of Oregon, covering 219,568 acres. The agency opened a 60-day comment period for public review on August 15, 2023, which was extended through October 31, 2023.

In February 2024, BOEM finalized two WEAs off the coast of Oregon, which cover 195,012 acres and could hold an estimated 2.4 GW of offshore wind potential. The agency also announced its intent to prepare an Environmental Assessment, with a public comment period that closed March 15, 2024, and attracted 127 comments.

In April 2024, BOEM announced a proposed offshore wind auction for two lease areas off the coast of Oregon totaling 194,995 acres. The agency also published a draft Environmental Assessment for public review, which had its 30-day comment period extended to June 14, 2024.

Also in April 2024, BOEM released its updated five-year lease schedule for 2024-2028, with October 2024 identified as the timeline for the first Oregon lease sale.

Planned 2024 Lease Sales



- | | |
|-------------|-------------|
| 1 OCS-A0562 | 5 OCS-A0566 |
| 2 OCS-A0563 | 6 OCS-A0567 |
| 3 OCS-A0564 | 7 OCS-A0568 |
| 4 OCS-A0565 | 8 OCS-A0569 |

Gulf of Maine 1

In August 2022, BOEM published an Request for Interest (RFI) to assess interest in potential offshore wind development in the Gulf of Maine, with an initial area of 13.7 million acres.

In April 2023, BOEM issued a Call for Nominations and Information (Call) for possible commercial offshore wind development for 9.8 million acres off the coast of Maine, New Hampshire, and Massachusetts. Public comments were accepted for 45 days.

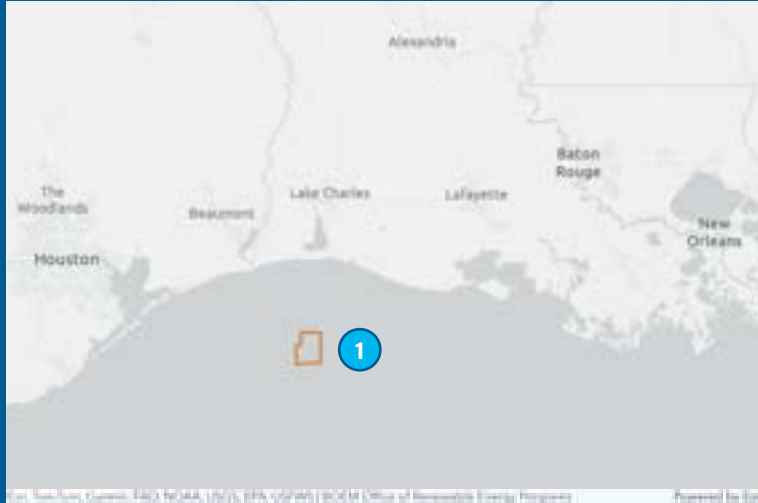
In October 2023, BOEM announced a draft Wind Energy Area (WEA) in the Gulf of Maine, which covered 3,519,067 acres. Public comments were accepted for 30 days, which resulted in more than 300 comments and involved over a dozen virtual and in-person meeting with stakeholders and the public.

In March 2024, BOEM finalized a WEA in the Gulf of Maine. The final WEA encompassed an area of around two million acres with a potential capacity of 32 GW. The agency also announced it would begin preparing an Environmental Assessment of potential impacts.

In April 2024, BOEM announced a proposed offshore wind auction for eight lease areas in the Gulf of Maine. The lease areas total nearly one million acres with a potential offshore wind capacity of 15 GW. The 60-day comment period will close July 1. During the same month, BOEM offered the State of Maine a lease area to develop a 144 MW floating offshore wind research project. As of June 30, 2024, the State of Maine had not accepted the lease offer.

In its updated five-year lease schedule for 2024-2028 released in April 2024, BOEM identified October 2024 as the timeline for the first Gulf of Maine lease sale.

2023 Lease Sale Results



1 OCS-G 37334

Gulf of Mexico 1

In its only lease sale of 2023 and the first-ever in the Gulf of Mexico, BOEM held an offshore wind auction for three lease areas offshore Louisiana and Texas on August 29, 2023. The auction drew two bids from two companies, with one lease awarded.

OCS-G 37334, a 102,480-acre lease, was awarded to RWE Offshore US Gulf, LLC for the winning bid of \$5.6 million. BOEM has estimated that the lease area has the potential to generate 1,244 MW and power around 435,000 homes.

Federal Permitting Tracking

After a lease is awarded, BOEM and the lessee become partners in the responsible development of offshore wind on the outer continental shelf.

This process begins with developers conducting site characterization surveys and conducting site assessment activities (e.g. installation of meteorological buoys). The information obtained is then used to inform the development of their Construction and Operations Plan (COP). After a COP is submitted, BOEM conducts a completeness and sufficiency review. Once the COP is deemed sufficient for purposes of conducting an environmental review, BOEM issues a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) which officially kicks off the COP environmental review process. BOEM will publish a draft of the EIS and seek public comments through public hearings and a public comment period. BOEM then incorporates public comments and finalizes the EIS through the publication of a Final EIS. The Record of Decision (ROD) documents BOEM’s decision of whether to approve or disapprove the COP.

Federal permitting starts after a developer has ownership of a lease and often runs concurrent with developers seeking offtake agreements.

Generally, onshore construction for projects may begin after the ROD has been issued, U.S. Army Corps of Engineers (USACE) permitting is finalized, and all relevant state and local permits have been issued. Offshore construction of projects may only begin after BOEM has approved the COP, and all federal permitting has been completed.

More information is available on the individual permits and the permitting process in the appendix.

Project Name	Site Characterization	SAP Approved	COP Submitted	NOI Published	Draft EIS Published	Final EIS Published	ROD Issued	COP Approval
TBD (OCS-A 0482)	●	●						
Coastal Virginia Offshore Wind	●	●	●	●	●	●	●	●
Revolution Wind	●	●	●	●	●	●	●	●
Sunrise Wind	●	●	●	●	●	●	●	●
Marwin Momentum Wind	●	●	●	●	●			

* Chart updated as of 2 July 2024

● * Approved to use existing data, instead of submitting their own SAP

The Renewable Energy Modernization Rule removed the SAP requirement. After July 15, 2024, projects will not need to submit a SAP.

Federal Permitting Tracking *(continued)*

Project Name	Site Characterization	SAP Approved	COP Submitted	NOI Published	Draft EIS Published	Final EIS Published	ROD Issued	COP Approval
TBD (Ocean Wind 1)	●	●	●	●	●	●	●	●
Atlantic Shores South Project 1 Atlantic South Project 2	●	●	●	●	●	●	●	
TBD (OCS-A 0500)	●							
Vineyard Wind 1	●	●	●	●	●	●	●	●
Kitty Hawk Offshore	●	●	●	●				
Empire Wind 1 Empire Wind 2	●	●	●	●	●	●	●	●
South Fork Wind Farm	●	●	●	●	●	●	●	●
Skipjack 1 Skipjack 2	●	●						
Beacon Wind 1 Beacon Wind 2	●	●	●	●	●			
SouthCoast Wind (Mayflower)	●	●	●	●	●			
Vineyard Wind 2 (Northeast)	●	●	●	●				
TBD (Ocean Wind 2)	●	●						
New England Wind 1 (Park City) New England Wind 2 (Commonwealth)	●	●	●	●	●	●	●	●
Bluepoint Wind	●	●*						

* Chart updated as of 2 July 2024

● * Approved to use existing data, instead of submitting their own SAP

The Renewable Energy Modernization Rule removed the SAP requirement. After July 15, 2024, projects will not need to submit a SAP.

Federal Permitting Tracking *(continued)*

Project Name	Site Characterization	SAP Approved	COP Submitted	NOI Published	Draft EIS Published	Final EIS Published	ROD Issued	COP Approval
Attentive Energy One Attentive Energy 2	●	●						
Community Offshore Wind	●							
Atlantic Shores Bight	●							
Leading Light Wind	●	●*						
Excelsior Wind (Vineyard Mid-Atlantic)	●	●						
TBD (OCS-A 0545)	●							
TBD (OCS-A 0546)	●							
Atlantic Shores North	●	●	●	●				
TBD (OCS-G 37334)	●							
Canopy Offshore Wind Farm	●							
TBD (OCS-P 0562)	●							
Atlas Wind	●							
Golden State Wind	●							
Even Keel Wind	●							

* Chart updated as of 2 July 2024

● * Approved to use existing data, instead of submitting their own SAP

The Renewable Energy Modernization Rule removed the SAP requirement. After July 15, 2024, projects will not need to submit a SAP.

State Activity

6



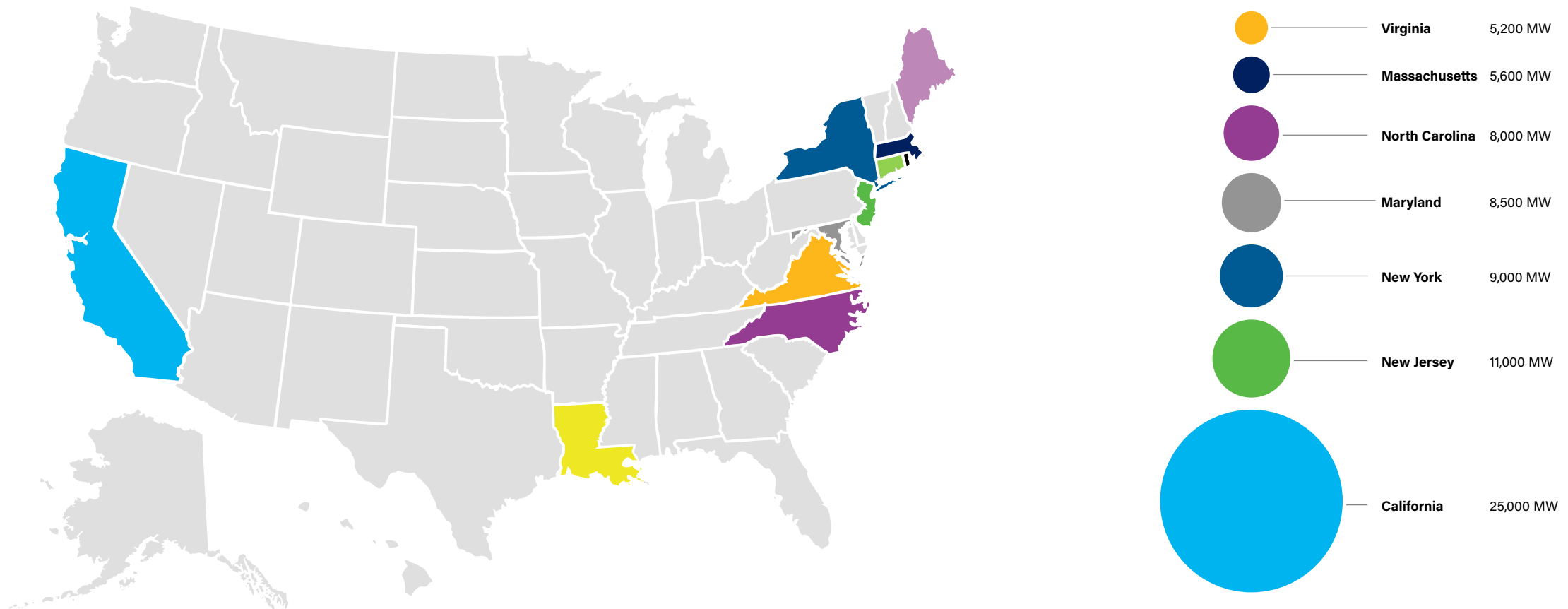
Photo credit: Ørsted

Post Data Cutoff Update: On July 2 2024, Delaware Governor John Carney signed into law the Delaware Energy Solutions Act of 2024, establishing a target to deploy up to 1,200 MW of offshore wind power by 2035

Offshore Wind State Targets

Action on the individual state level has been a powerful driver for U.S. offshore wind development, with ambitious procurement targets and net zero goals motivating states to open solicitations and invest in offshore wind supply chains and infrastructure.

Eleven states have set offshore wind deployment targets so far, for a total of 83,900 MW.



New Jersey

In 2022, New Jersey Governor Phil Murphy increased New Jersey's offshore wind target to 11,000 MW by 2040, almost 50% more than the 7,500 MW by 2035 target from 2019. The Garden State currently has three projects in advanced development with a combined capacity of 5,252 MW, around 45% of the state's target.

New Jersey holds OREC agreements with three projects:

- Atlantic Shores' (EDF, Shell) 1,510 MW Atlantic Shores South Project 1 in OCS-A 0499
- TotalEnergies and Corio Generation's 1,342 MW Attentive Energy Two in OCS-A 0538
- Invenergy and energyRE's 2,400 MW Leading Light Wind in OCS-A 0542

In January 2024, New Jersey concluded its 3rd offshore wind solicitation by awarding offtake agreements to two projects; Attentive Energy Two and Leading Light Wind.

New Jersey's 4th offshore wind solicitation ongoing as of June 2024. The state will be accepting bids from April to July 2024 and is expected to announce selected projects by December 2024. New Jersey plans to procure 1.2 – 4 GW of capacity in its 4th solicitation.

In May 2024, Governor Murphy announced an expedited 5th offshore wind solicitation. This moved the application start date for the 5th solicitation from Q3 2026 to Q2 2025.

Turbine assembly and marshalling for the state's offshore wind projects will take place at the New Jersey Wind Port.

New Jersey's goal to deploy 11,000 MW of offshore wind capacity could represent up to \$41 billion in capital investment, generating enough energy to power 5.3 million homes and cutting 25 million metric tons of CO2 from the state's power sector each year.

New York

In 2019, the Climate Leadership and Community Protection Act was approved in New York State and set an offshore wind target of 9,000 MW by 2035. Currently, New York State has 21% of its target, 1,866 MW, from two projects in advanced development and one project online.

New York currently hosts the largest offshore wind project in the U.S. to come online, South Fork Wind. With 132 MW of capacity, the joint project between Ørsted and Eversource was commissioned in March 2024.

The advanced development projects for New York that hold OREC agreements with the state are:

- Equinor's 810 MW Empire Wind 1 in OCS-A 0512
- Ørsted and Eversource's 924 MW Sunrise Wind in OCS-A0487

In February 2024, New York awarded three projects for its third offshore wind solicitation. In April 2024, the state had to withdraw the provisional agreements due to GE Vernova's cancellation of a 17-18 MW turbine project. In February 2024, New York's fourth solicitation awarded two projects, Empire Wind 1 and Sunrise Wind with offtake agreements, which were finalized in May 2024.

The state is currently planning its fifth offshore wind solicitation. The Request for Proposals (RFP) is set to begin in the summer of 2024, with selected projects expected to be announced in November 2024. The state also released its Master Plan 2.0 to study the potential of further offshore wind development in the state.

As part of the state's \$500 million investment commitment to establishing an offshore wind supply chain, NYSERDA is in process to award \$200 million for offshore wind supportive manufacturing and logistics and \$300 million to attract investments in major offshore wind supply chain component manufacturing and port upgrades. Awards are expected in 2024.

In June 2024, construction started on the South Brooklyn Marine Terminal (SBMT), which will be the nation's largest dedicated offshore wind port. SBMT is expected to create more than 1,000 union jobs for the construction phase, 200 assembly jobs, and 50 permanent positions.

New York's goal to deploy 9,000 MW of offshore wind capacity could represent up to \$34 billion in capital investment, generating enough energy to power 5 million homes and cutting 15 million metric tons of CO2 from the state's power sector.



Maryland

In April 2023, Maryland Governor Wes Moore signed the Promoting Offshore Wind Energy Resources (POWER) Act to establish the target of 8,500 MW by 2035. The state has two projects in advanced development with a total of 1,078.5 MW.

Maryland has two projects in advanced development. Both projects are located on the same lease area, OSC-A 0490, hold OREC agreements with the state of Maryland, and are being developed by U.S. Wind. The 270 MW Marwin project is expected to come online in 2027, and the 808.5 MW Momentum Wind is expected online by 2028.

In May 2024, Governor Wes Moore signed legislation that would award the ORECs returned to the state by Ørsted from its Skipjack 1 and 2 projects to U.S. Wind. Pending a required filing with the Public Service Commission, this process will permit U.S. Wind to expand their project capacity significantly. The legislation also established a separate PPA solicitation process scheduled to begin following the 2024 Central Atlantic lease auction.

In addition to a \$23 million federal workforce development award in 2022, Maryland will offer more than \$6 million in FY24 funding through its Maryland Offshore Wind Grant Program Portfolio, designed to help Maryland's emerging businesses and workforce get involved in the growing offshore wind industry.

In 2024, the U.S. Maritime Administration awarded \$47 Million to Baltimore County and Sparrows Point Steel to support plans to establish a major offshore wind logistics and manufacturing hub.

Maryland's goal to deploy 8,500 MW of offshore wind capacity could represent up to \$33 billion in capital investment, generating enough energy to power 2.9 million homes and cutting 21 million metric tons of CO2 from the state's power sector each year.



Massachusetts

Massachusetts set a target of receiving 5,600 MW of electricity from offshore wind by 2027. In addition, the *Massachusetts Clean Energy and Climate Plan* lays out the path to their 2050 goals. Offshore wind plays a critically important role in meeting those targets. Massachusetts anticipates bringing on about 10 GW of fixed bottom capacity by 2035 and 13 GW of floating offshore wind energy from the Gulf of Maine.

As of June 2024, the Bay State has one project under construction. Vineyard Wind 1, in OSC-A 501, has 806 MW of capacity and is being developed by Avangrid and Vineyard Offshore (Copenhagen Infrastructure Partners). The project has PPAs with Eversource, National Grid, and Unitil to supply electricity to Massachusetts.

In August 2023, Massachusetts launched an offshore wind solicitation for 3,600 MW of capacity. The state also signed a Memorandum of Understanding with Rhode Island and Connecticut in October 2023 to collaborate on offshore wind procurement. The three states have ongoing, concurrent request for proposals known as the New England solicitation. The application window closed in March 2024, and selected projects are expected to be awarded by August 2024.

In February 2024, the Department of Energy and the University of Massachusetts launched a Center of Excellence to Accelerate Domestic Offshore Wind Industry. With more than \$11 million in investment and 40 partners, this project is expected to focus on reliable and equitable offshore wind energy deployment.

Also in February 2024, Massachusetts Clean Energy Center (MassCEC), the City of Salem, and Crowley Wind Services announced a transfer of ownership and an agreement for site improvements and ongoing operations for the Salem Offshore Wind Terminal. Previously the site of a coal-fired energy plant, the terminal will become the second port built specifically for offshore wind in Massachusetts. The redevelopment project is expected to create more than 800 jobs.

Massachusetts' goal to deploy 5,600 MW of offshore wind capacity could represent up to \$22 billion in capital investment, generating enough energy to power 3.2 million homes and cutting 9 million metric tons of CO₂ from the state's power sector each year.

Virginia

In 2020, the Virginia State Legislature passed the Virginia Clean Economy Act, expanding the state's offshore wind target from 2,000 MW to 5,200 MW by 2034. Subsequent legislation, passed in 2023, codified the state's 5,200 MW target date of 2031. There have been no further state actions to move toward implementing the full 5,200 MW goal.

As of June 2024, Virginia has one project online and another project under construction.

- The 12 MW Coastal Virginia Offshore Wind (CVOW) Pilot was operational as of January 2021 in lease OCS-A 0497
- The 2,587 MW Coastal Virginia Offshore Wind (CVOW), in lease OCS-A 0483, began offshore construction in May 2024 and is expected online by 2026

Virginia's offshore wind projects are owned by Dominion Energy and will directly supply power generated from the projects to the grid.

In August 2022, the Virginia Port Authority hired Skanska for a redevelopment of the Portsmouth Marine Terminal for use as an offshore wind staging port. In November 2023, Skanska announced completion of the first of three wharfs for the redevelopment, keeping the company on-time for completion in 2025.

Virginia's goal to deploy 5,200 MW of offshore wind capacity could represent up to \$19 billion in capital investment, generating enough energy to power 1.6 million homes and cutting 14 million metric tons of CO₂ from the state's power sector each year.

Connecticut

In 2019, Connecticut's bipartisan Public Act 19-71 legislated Connecticut's Department of Energy and Environmental Protection (DEEP) to procure up to 2,000 MW of offshore wind energy. The Constitution State currently has one project under construction.

Connecticut will receive 304 MW of energy from Revolution Wind through PPAs between the project and The United Illuminating Company (Avangrid) and the Connecticut Light and Power Company (Eversource).

Revolution Wind, with a total capacity of 704 MW, is being developed by Ørsted and Eversource in lease area OCS-A 0486.

In October 2023, Connecticut launched an offshore wind solicitation for 2,000 MW of capacity. Also in October 2023, the state signed a Memorandum of Understanding with

Rhode Island and Massachusetts to collaborate on offshore wind procurement. The three states have ongoing, concurrent request for proposals known as the New England solicitation. The application window closed in March 2024, and selected projects are expected to be awarded by August 2024.

The New London State Pier, located in southeast Connecticut, served as the marshalling port for the South Fork Wind project and will support the construction of the Revolution Wind and Sunrise Wind projects.

Connecticut's goal to deploy 2,000 MW of offshore wind capacity could represent up to \$8 billion in capital investment, generating enough energy to power 900,000 homes and cutting 3 million metric tons of CO2 from the state's power sector each year.

Rhode Island

In 2022, Rhode Island Governor Dan McKee enacted legislation to require Rhode Island Energy, a subsidiary of PPL, to issue a competitive procurement of up to 1,000 MW offshore wind energy, in addition to the 400 MW of offshore wind capacity already contracted.

In October 2023, the state signed a Memorandum of Understanding with Connecticut and Massachusetts to collaborate on offshore wind procurement. The three states have ongoing, concurrent request for proposals known as the New England solicitation. The application window closed in March 2024, and selected projects are expected to be awarded by August 2024. As part of the solicitation, Rhode Island is seeking 1,200 MW of offshore wind power, raising the state's offshore wind deployment goal to 1,600 MW.

As of June 2024, the Ocean State has one operational project and one project under construction.

The 30 MW Block Island Wind Farm, located in lease area OCS-A 0506, came online in 2016 and supplies power to Rhode Island's grid through a PPA with PPL.

The 704 MW Revolution Wind is the sole project under construction for Rhode Island. Ørsted and Eversource are developing Revolution Wind in lease area OCS-A 0486, and Rhode Island Energy will procure 400 MW of offshore wind capacity under a PPA with the Narragansett Electric Company (PPL).

The Port of Providence serves as a construction hub for Ørsted's offshore wind projects in the Northeast.

Rhode Island's goal to deploy 1,600 MW of offshore wind capacity could represent up to \$6 billion in capital investment, generating enough energy to power 900,000 homes and cutting 3 million metric tons of CO2 from the state's power sector.

California

In 2024, the California Energy Commission published the final AB 525 Strategic Plan, outlining recommendations for implementing the state's goals to deploy 5,000 MW of offshore wind capacity by 2030 and 25,000 MW by 2045. The Golden State currently has no projects that are operational, under construction, or in advanced development and the State has yet to announce plans to put forth a solicitation for offshore wind energy.

There are five lease areas off the coast of California that are under active development:

- RWE is developing the 1,600 MW Canopy Offshore Wind Farm in OCS-P 0561.
- Vineyard Offshore (Copenhagen Infrastructure Partners) is developing lease area OCS-P 0562, which has the potential for 1,229 MW of offshore wind capacity.
- Equinor is developing the 2,000 MW Atlas Wind project in OCS-P 0563.
- Ocean Winds (EDP, ENGIE), Canadian Pension Plan Investment Board are developing the 2,000 MW Golden State Wind project in OCS-P 0564.
- Invenergy is developing the 1,433 MW Even Keel Wind project in OCS-P 0565.

Separately, Floventis, a joint venture between Cierco and SBM Offshore, is developing the 60 MW CADEMO floating project in California State waters. California Community Power and Floventis executed a Memorandum of Understanding in May 2024 for the potential procurement of offshore wind energy.

In February 2024, the The Humboldt Bay Harbor, Recreation and Conservation District received a \$426 million federal grant for the development and construction of the Humboldt Bay Offshore Wind Heavy Lift Marine Terminal that will support the development of offshore wind projects in California.

California's goal to deploy 25,000 MW of offshore wind capacity could represent up to \$116 billion in capital investment, generating enough energy to power 15.3 million homes and slashing 49 million metric tons of CO₂ from the state's power sector each year.



Oregon

Although the State of Oregon has not established an offshore wind deployment goal, the State Department of Energy published its Floating Offshore Wind Study in 2022, analyzing the costs and benefits of deploying 3,000 MW of offshore wind power by 2030.

The Beaver State currently has no projects that are operational, under construction, or in advanced development and has not announced plans to put forth a solicitation for offshore wind energy.

While there are no active lease areas off the coast of Oregon, BOEM announced plans to hold an offshore wind auction for two lease areas later in 2024. The lease areas will have a total potential offshore wind capacity of 2,400 MW.



Louisiana

In 2022, the State of Louisiana released the Louisiana Climate Action Plan, which outlined the state's goal to deploy 5,000 MW of offshore wind power by 2035.

The Pelican State currently has no projects that are operational, under construction, or in advanced development and has not announced plans to put forth a solicitation for offshore wind energy.

There is one federal lease area off the coast of Louisiana under active development:

- RWE is developing lease area OCS-G 37334, which has the potential for 2,000 MW of offshore wind capacity.

In December 2023, the State Department of Natural Resources approved two offshore wind projects in state waters:

- Diamond Offshore Wind (Mitsubishi Americas) is developing the Diamond Offshore Wind project on 6,152 acres.
- Vestas subsidiary Steelhead Development is developing the 480 MW Cajun Wind project on 59,653 acres.

Louisiana's goal to deploy 5,000 MW of offshore wind capacity could represent up to \$19 billion in capital investment, generating enough energy to power 1.3 million homes and reducing 12 million metric tons of CO₂ from the state's power sector per year.



Maine

In 2023, the State of Maine enacted L.D. 1895, titled “An Act Regarding the Procurement of Offshore Wind Energy Resources.” The law authorized the state to set a goal to deploy at least 3,000 MW of offshore wind power by 2040. The Pine Tree State currently has one project in advanced development and the State has opened a Request for Information to solicit feedback on future floating offshore wind procurements.

While there are no active federal lease areas off the coast of Maine, BOEM announced plans to hold an offshore wind auction for eight lease areas in the Gulf of Maine in late 2024. The lease areas will have a total potential offshore wind capacity of 15,000 MW.

Separately, after requesting a research lease in federal waters in 2021, the State was offered a site in May 2024 to deploy a floating offshore wind research array. The Maine Public Utilities Commission (PUC) is authorized to negotiate a contract with a project developer for up to 144 MW of offshore wind capacity using floating wind technology.

The only project currently in advanced development is the 12 MW New England Aqua Ventus I owned by Diamond Offshore Wind, a subsidiary of Mitsubishi Americas. In 2019, the Maine PUC approved a PPA between the project and Central Maine Power Company, a subsidiary of Avangrid.

In February 2024, Maine Governor Janet Mills announced the selection of Searsport, a purpose-built port facility for the floating offshore wind industry.

In 2024, Maine and Massachusetts made a joint proposal for \$200 million to the EPA’s Climate Pollution Reduction Grant program to support critical port infrastructure for floating offshore wind. Separately, Maine Department of Transportation submitted a \$450 million proposal building on the initial grant request to facilitate and accelerate Searsport development.

Maine’s goal to deploy 3,000 MW of offshore wind capacity could represent up to \$14 billion in capital investment, generating enough energy to power 1.7 million homes and reducing 5 million metric tons of CO₂ from the state’s power sector each year.

North Carolina

In 2021, North Carolina Governor Roy Cooper announced that the State would set a target to deploy 2,800 MW of offshore wind by 2030 and 8,000 MW of offshore wind power by 2040. The Tar Heel State currently has no projects that are operational, under construction, or in advanced development and the State has yet to announce plans to put forth a solicitation for offshore wind energy.

The North Carolina leases lack a clear path for near-term offtake. Without a signed offtake agreement, offshore wind development is difficult. In January 2024, Duke Energy announced in its Carolinas Resource Plan that it would add an estimated 2.4 GW of offshore wind for the mid-2030s to meet an anticipated spike in generation demand.

There are three lease areas off the coast of North Carolina that are under active development:

- Avangrid is developing the 3,500 MW Kitty Hawk Offshore Wind project in OCS-A 0508.
- TotalEnergies is developing lease area OCS-A 0545, which has the potential for 1,000 MW of offshore wind capacity.
- Duke Energy is developing lease area OCS-A 0546, which has the potential for 1,600 MW of offshore wind capacity.

North Carolina's goal to deploy 8,000 MW of offshore wind capacity could represent up to \$30 billion in capital investment, generating enough energy to power 2.5 million homes and cutting 19 million metric tons of CO₂ from the state's power sector every year.

Infrastructure



7

U.S. Offshore Wind Supply Chain Investments Near \$9.5 Billion

Based on public announcements, the U.S. offshore wind industry is expected to bring almost \$9.5 billion in capital investment, spurring over 3,500 permanent FTE jobs and nearly 8,800 construction jobs. The largest segment capital investment is directed to its primary manufacturing (\$3.7 billion), followed by ports (\$2.8 billion) and secondary manufacturing (\$2 billion) areas.

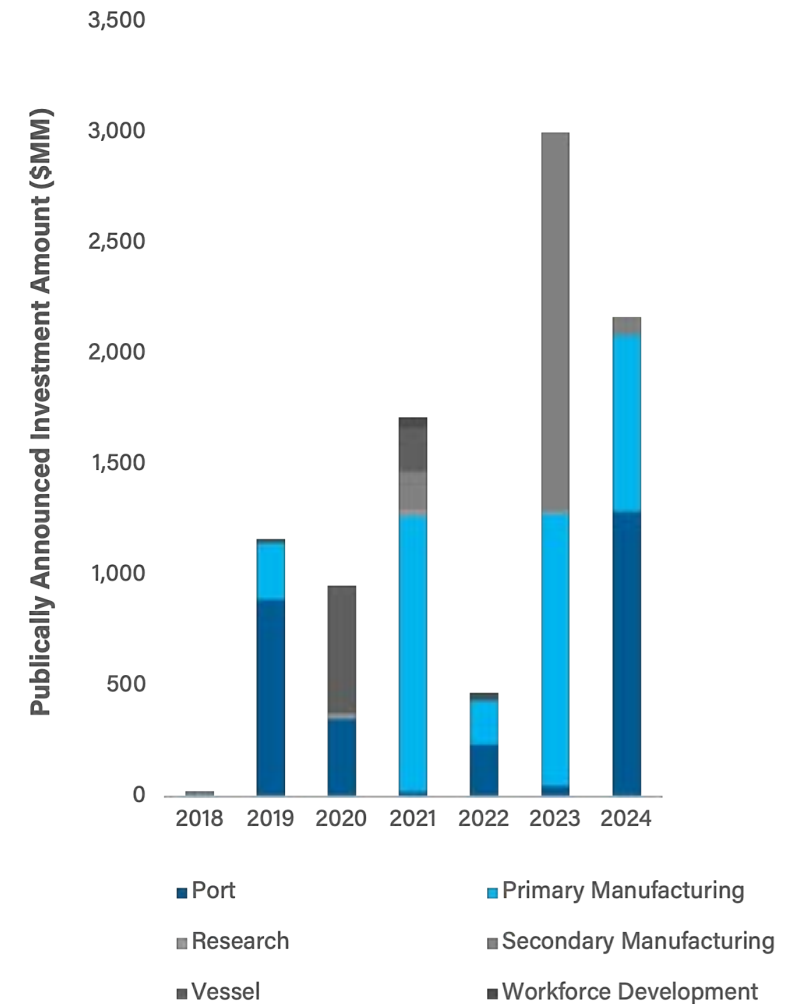
Bouncing back from a slowdown in announced investments in 2022, 2023 was a peak year for offshore wind with over \$3 billion committed to the industry. With about half of 2024 recorded, it remains to be seen whether investment volume will be on par with 2023 activity.

While investments to stand up production of major components like nacelle turbines, towers, and blades remain in flux, the offshore wind industry has made significant commitments to bolster ancillary links to the supply chain critical for project development like monopile foundations, cables, ports, and vessels. For example, in 2023, Nucor Steel brought online a new steel plate facility in Brandenburg, KY, and in 2024, Skanska will soon begin construction in transforming the South Brooklyn Marine Terminal into one of the nation's largest offshore wind ports.

With over \$4.7 billion (68%) of total investments still in announced status, only about 30% of investment sites have advanced to either breaking ground on construction or being brought online. As the industry goes through growing pains, there is some likelihood not all announced investments will reach fruition.

To view the full landscape of proposed investments in the U.S. offshore wind supply chain, visit ACP's [interactive map](#).

Publicly Announced Offshore Wind Supply Chain Investments (Q1 2018 - Q2 2024)



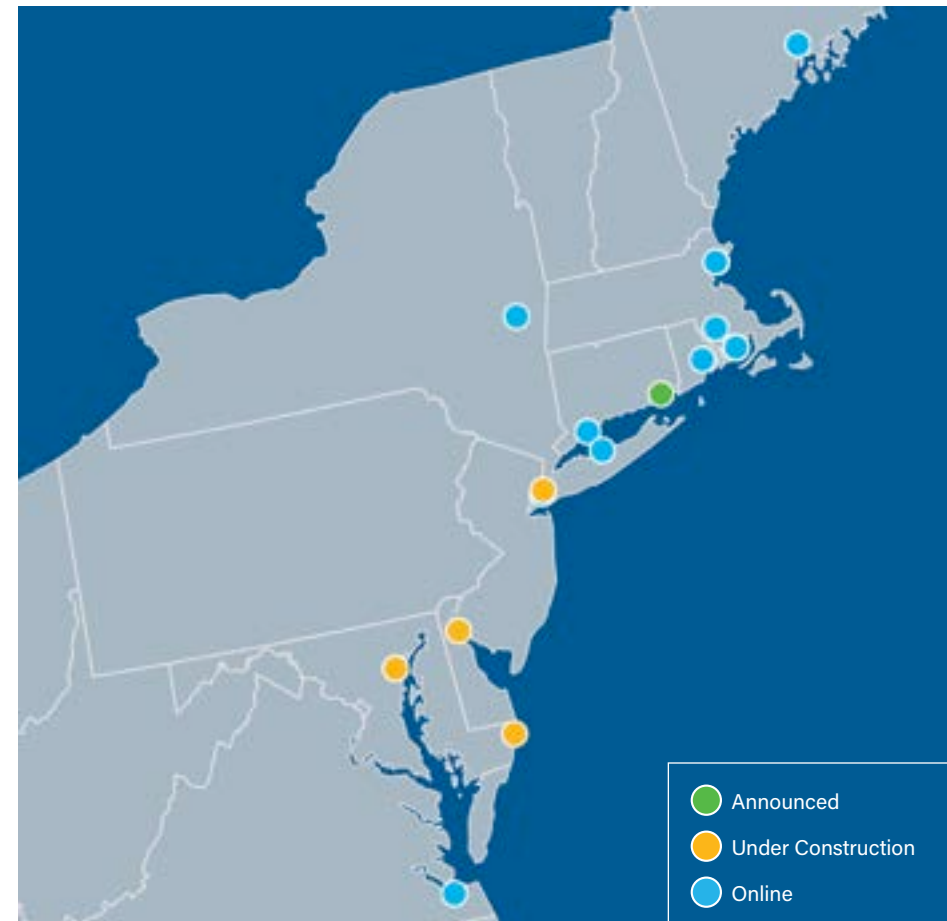
Domestic Offshore Wind to Revitalize Port Communities

To date, total U.S. port investments of over \$2.8 billion represent almost 30% of all offshore wind supply chain investments announced.

Since the start of 2024, notable port investment announcements include Skanska's award of a \$861 million contract to convert the South Brooklyn Maritime Terminal for offshore wind use, and Humboldt Bay Harbor's award of \$426.7 million from the Department of Transportation to construct offshore wind infrastructure.

Port investment conducive to offshore wind development may cover an array of activities like transport terminal construction, staging area buildouts, and general site reinforcement to accommodate heavy payloads.

East Coast Offshore Wind Ports



Not Pictured: Announced West Coast Ports, Port of Long Beach, and Humboldt Bay Harbor

Offshore Wind Jumpstarts U.S. Shipbuilding Industry

Since the 1980s, commercial shipbuilding in the U.S. has dwindled to only about five large oceangoing ships being built per year¹. However, with 45 U.S.-Flagged vessels proposed to serve the offshore wind industry, there is a generational opportunity to up lift domestic shipbuilding. In fact, more than half of the 45 vessels in scope are already either under construction (17) or in service (12) to the industry. There are 12 vessels currently on ordered status and four existing vessels being retrofitted.

Over 25 different types of vessels are expected to be used to construct, operate, and maintain an offshore wind project. Multiple vessels will be needed for each offshore wind project, but the exact number and types will be dependent on project size, distance from shore, environmental conditions, and other factors.

Crew Transfer Vessels (CTV) (28) and Service Operations Vessel (SOV) (7) are the most popular types of vessel being built as these crafts have long-term contracts and will be used during operations and maintenance to transport personnel.

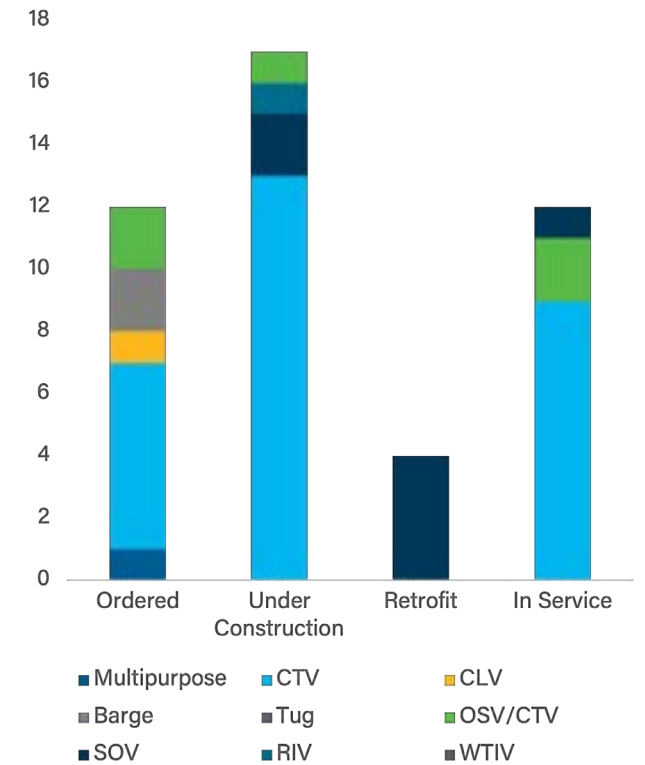
The industry greatly needs additional specialty vessels in the U.S. and global fleet, such as wind turbine installation vessels (WTIV) and heavy lift vessels for foundations (HLV). The Jones Act permits international vessels to do some of this construction work. A handful of specialty vessels have announced US construction including one WTIV, one CLV, and one Rock Installation vessel.

The christening of ECO Edison in May 2024 marks the completion of the first-ever U.S. built SOV vessel. Year-round, ECO Edison will act as homebase for up to 60 offshore wind turbine technicians.

With construction delayed on some of the announced vessels, and many of the ordered vessels under non-disclosed timelines, it is difficult to predict when exactly the remaining bulk of the vessel fleet will be brought online in the next few years.

For a full list of proposed U.S.-flagged vessels operating within the offshore wind industry, view ACP's resource [factsheet](#).

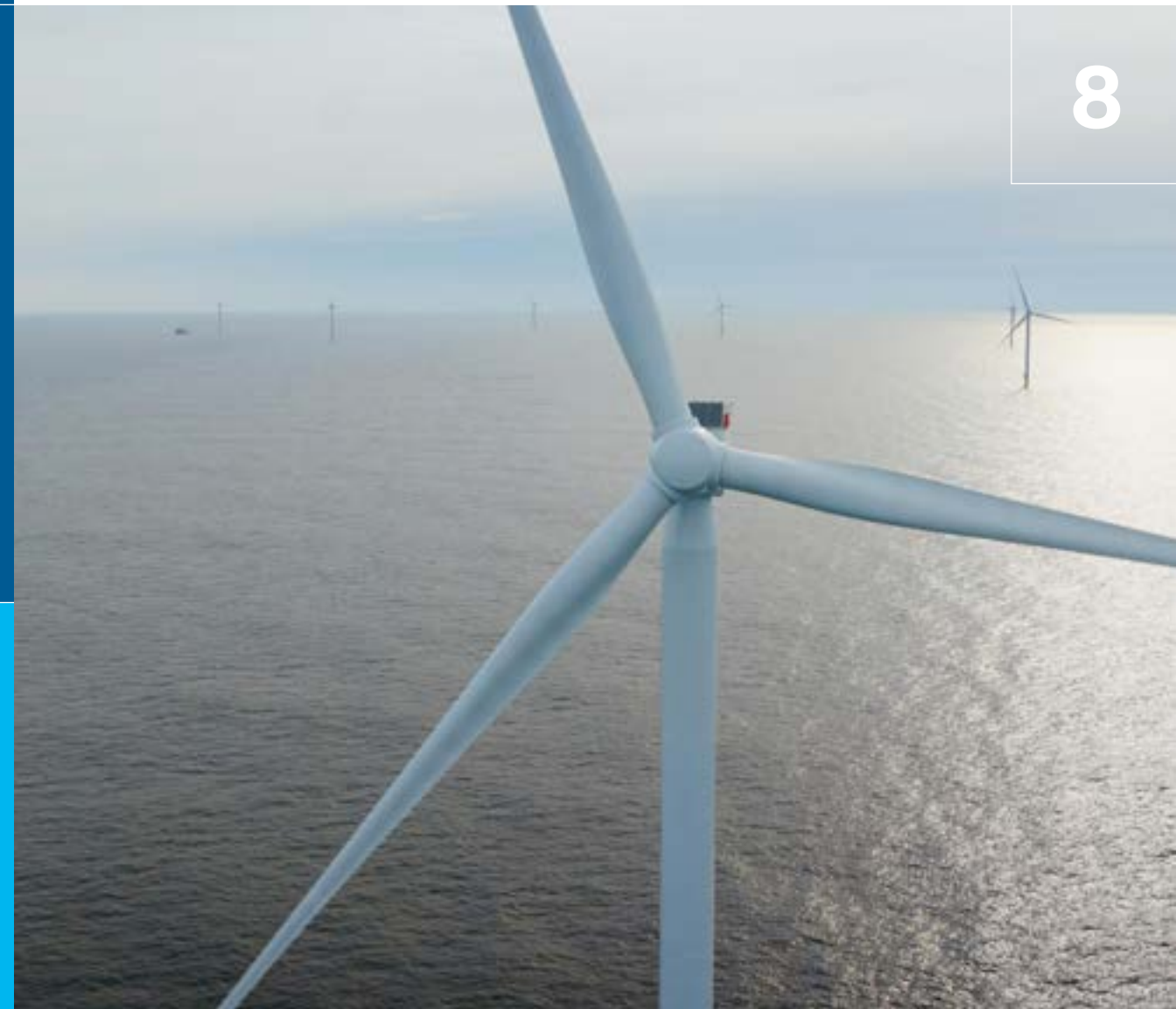
Count of Announced Offshore Wind Vessels by Status



¹ Source: Congressional Research Service, Nov 2023

Outlook

8



Outlook points to 14 GW by 2030, 30 GW by 2033, and 40 GW by 2035

Market observers are tightly aligned on 13-14 GW of offshore wind build this decade

Market consultants currently expect the offshore wind industry to deliver 14 GW by 2030, on average. These forecasts are largely based on a bottoms-up analysis of projects and their anticipated timelines.

As of June 2024, there were over 12 GW of projects with contracts in place, with most of these projects expected to be online by 2030.

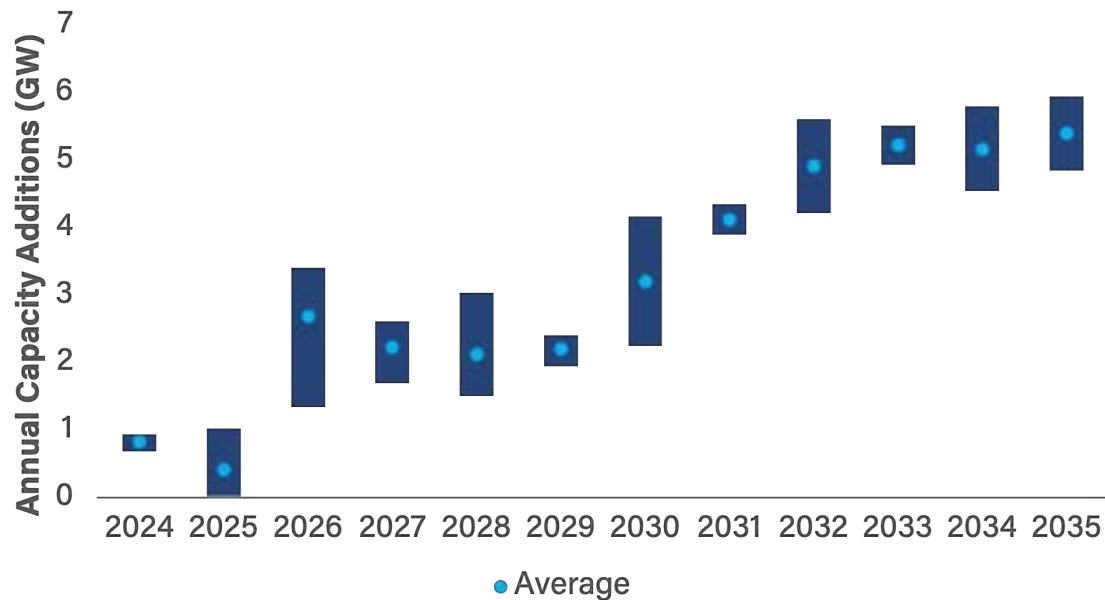
30 GW of offshore wind is now expected to be met by 2033, just a few years delayed from the original target.

Estimates of offshore wind build in the early part of the 2030s is based on known project timeframes, expectations for upcoming solicitation results, and state offshore wind target timelines.

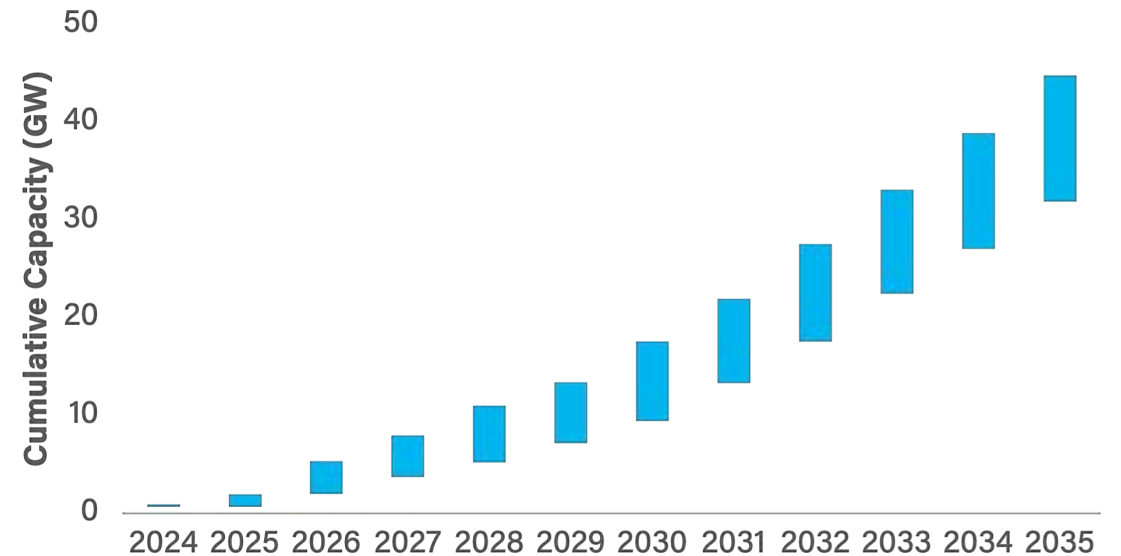
Throughout most of this five-year period, annual installation volumes are expected to range from 4 to 6 GW.

The average consultant forecast points to just shy of 40 GW built from 2024-2035.

Offshore Wind Market Outlook



Cumulative Offshore Wind Outlook



Industry on Pace to Invest \$65 Billion in Offshore Wind Projects by 2030

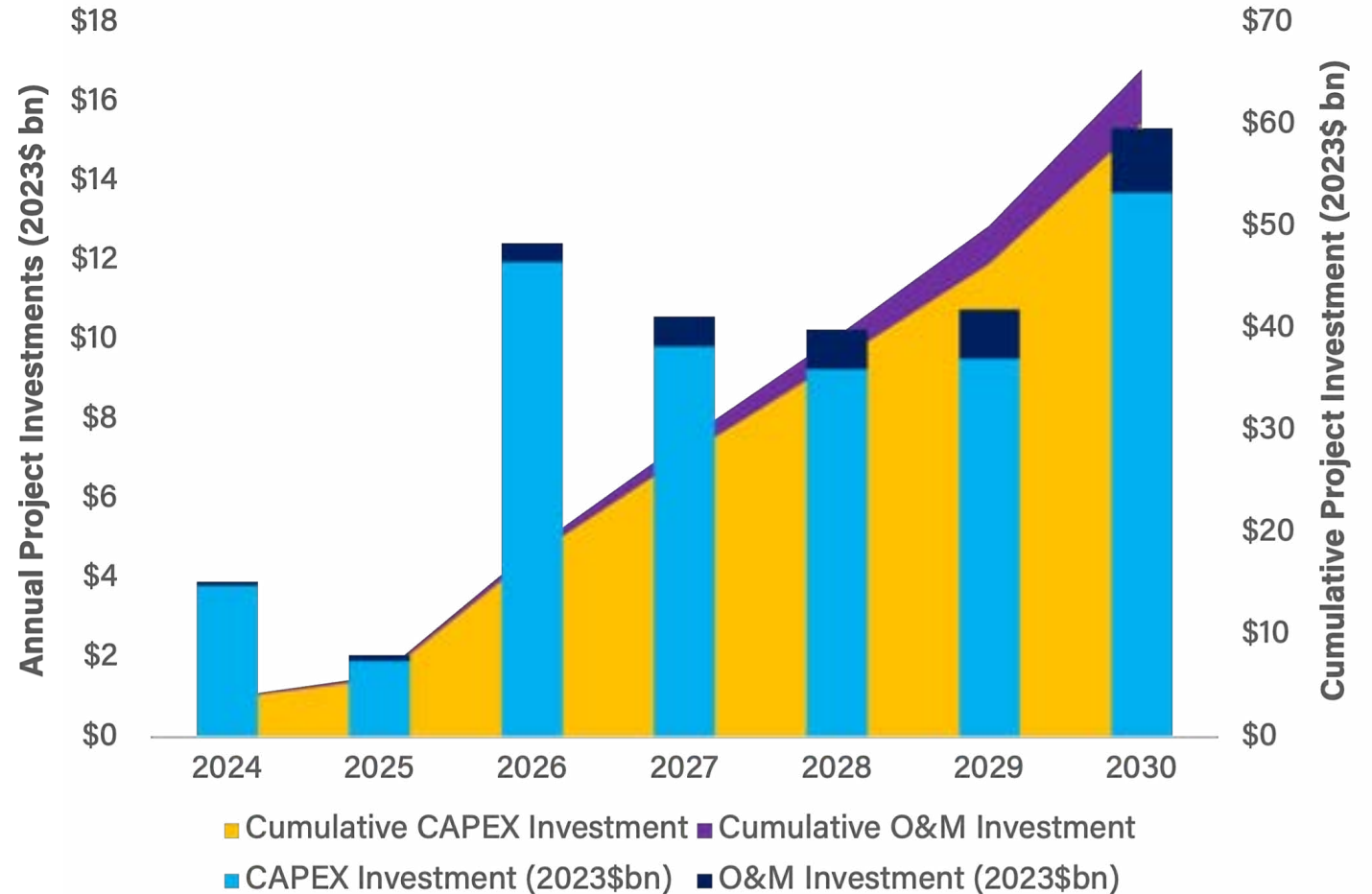
The offshore wind industry is investing across the value chain—in new manufacturing facilities, new vessels, port upgrades, workforce development program, and many other avenues. The biggest investments will be in the projects themselves.

Based on the average deployment outlook and expected capital costs for offshore wind projects built this decade, the industry is expected to invest an estimated \$60 billion in offshore wind projects.

In addition, as projects start operating, companies will continue to invest in the form of operations and maintenance (O&M) activities—hiring skilled technicians to keep projects in good working condition, buying needed services and equipment to maintain a consistent quality of operations, and, when needed, replacing parts. These O&M investments are expected to amount to an additional \$5 billion by 2030.

In total, the offshore wind industry is on pace to invest \$65 billion in projects by 2030. Annual investment amounts range from \$2 billion in 2025 to \$16 billion in 2030.

Offshore Wind Investment Outlook



Deployment Forecast Suggests 56,000 Offshore Wind Jobs by 2030*

At the end of 2022, the offshore wind market counted 1,056 jobs according to the US Department of Energy's Energy Employment Report. While relatively low compared to other energy industries, offshore wind jobs grew at the highest rate from 2021-2022 (20.3%).

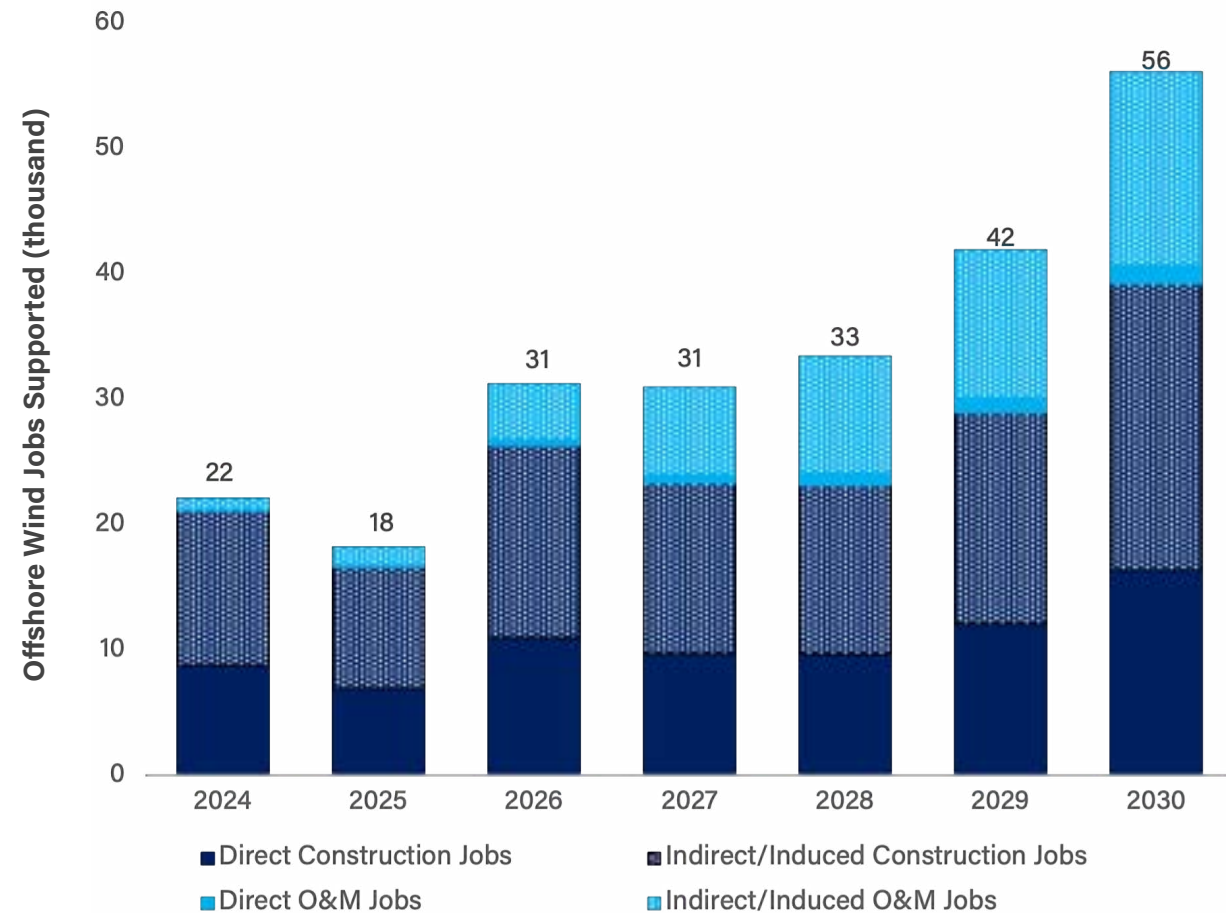
This rapid job creation is anticipated to continue as the industry expands. With three projects under construction, numerous development activities underway, and three projects in operation, the offshore wind industry is expected to support 22,000 jobs at the end of 2024.

As development activities continue to expand and additional projects start construction, job impacts will growth further. Based on the average deployment outlook, at the end of the decade, the industry is forecast to support 56,000 jobs in the U.S.

These impacts include direct, indirect, and induced jobs. The largest share of jobs result from construction activities, especially in early year. As the amount of operational offshore wind projects grow, employment effects for operations and maintenance activities grows significantly, making up 30% of jobs by 2030.

* Includes combination of reported job impacts from specific projects as detailed in Construction and Operation Plans (COP) and modeled jobs based on average impacts reported in COPs and similar published analyses.

Offshore Wind Industry Job Outlook



Jobs measured in Full-time Equivalents (FTE)

Appendix

9



Federal Permitting Process

After a lease is awarded, the Bureau of Ocean Energy Management (BOEM) and the lessee become partners in the responsible development of offshore wind on the outer continental shelf. This process begins with site characterization. During this phase, the lessee conducts geophysical, geotechnical, biological, and other surveys to better understand the awarded lease area.

Previously, the lessee submits a Site Assessment Plan (SAP). The SAP describes how the lessee will conduct resource assessment activities, such as the installation of meteorological towers or buoys. BOEM must approve the SAP before the lessee can begin to conduct activities or install equipment. The BOEM and Bureau of Safety and Environmental Enforcement (BSEE) *Renewable Energy Modernization Rule* removed the SAP requirement, and as such, after July 15, 2024, projects will not need to submit a SAP.

Using data collected from its site characterization and site assessment activities, the lessee prepares and submits a Construction and Operations Plan (COP) describing how they will construct and operate a commercial wind project on the lease. The COP includes a description of proposed construction activities, commercial operations, and conceptual decommissioning plans. BOEM must approve the COP before the lessee can install facilities.

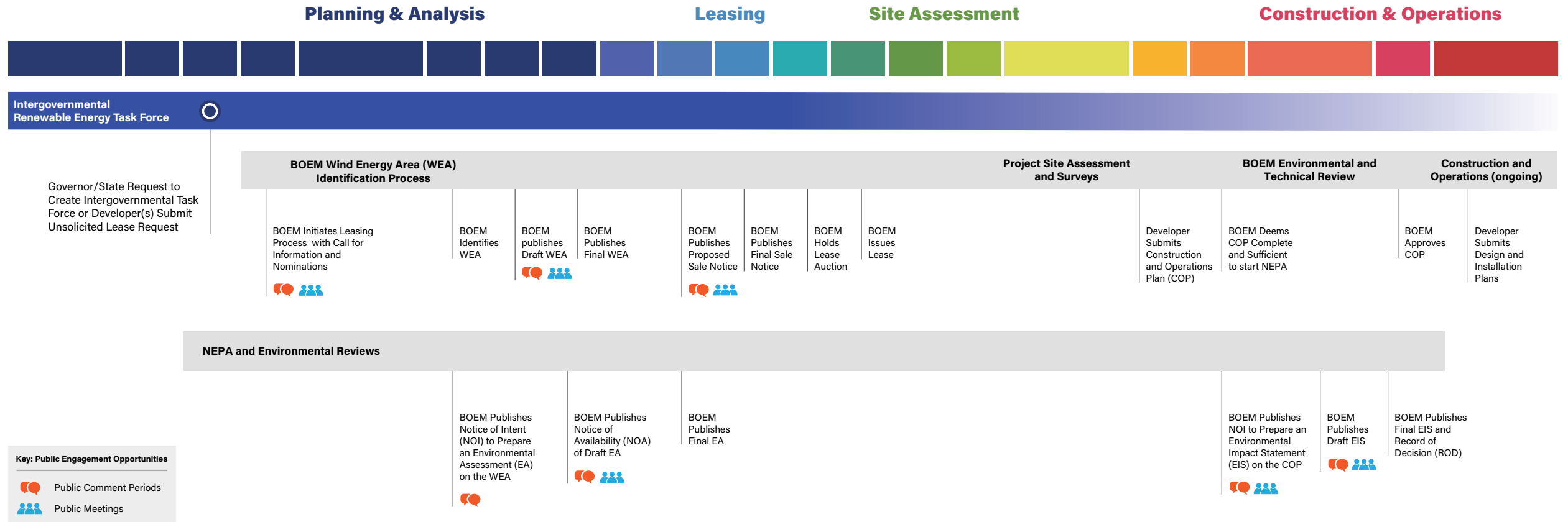
After a COP is submitted, BOEM conducts an environmental review of the COP under the National Environmental Policy Act (NEPA) (in cooperation with a host of federal and state agencies), as well as a technical review in collaboration with the BSEE and a review of the COP's compliance with the Outer Continental Shelf Lands Act (OCSLA). The first major step in this process is the publishing of a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS). The NOI begins the EIS scoping process for the proposed project and seeks public comment and input.

At this point, BOEM will hold a number of public scoping meetings and will incorporate public comments before publishing a draft EIS. BOEM will again seek public comment and hold public hearings, providing an opportunity for the public to participate in the process.

In parallel with the NEPA review process, BOEM also consults with other agencies under other statutes, including but not limited to the the Endangered Species Act and National Historic Preservation Act. In addition, several agencies are required to conduct their own independent permitting reviews, including under the Clean Air Act, the Clean Water Act, and the voluntary Marine Mammal Protection Act.

Finally, BOEM will release a final EIS, a Record of Decision (ROD), as well as an official approval for the COP. Lessees must then submit facilities design reports (FDRs) and fabrication and installation reports (FIRs) to BOEM, BSEE, and an independent third-party certified verification agent (CVA) for their review. Once all parties have non-objected to these reports, the project may proceed with construction.

Federal Permitting Process *(continued)*



Offtake Structures for Offshore Wind

States drive the offtake market for offshore wind. State agencies have primarily relied on two procurement mechanisms to date: Power Purchase Agreements (PPAs) and Offshore Wind Renewable Energy Certificate Agreements (ORECs)

Both procurement mechanisms utilize long-term contracts for offshore wind energy. Long term agreements either via PPA or OREC stabilize electricity prices at levels to cover the cost of building a project and include additional positive environmental attributes from building offshore wind.

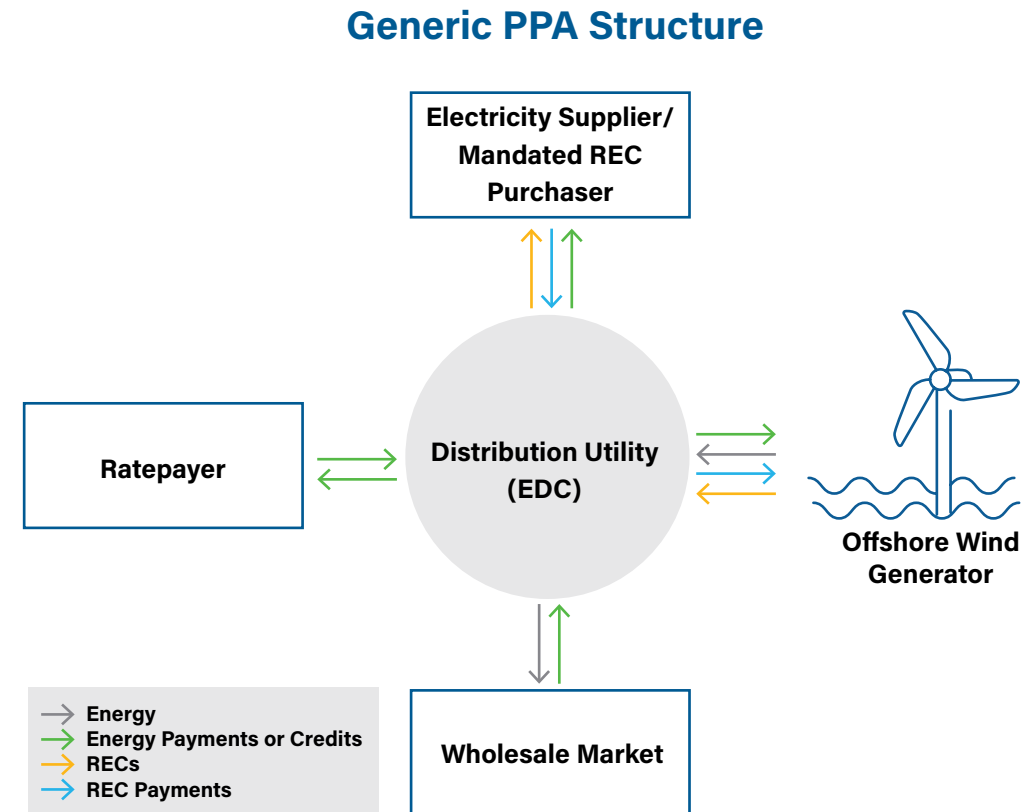
As high capital expenditure projects where most of the costs are front loaded, ORECs and PPAs for offshore wind provide guaranteed offtake and price stability which is necessary for projects to secure financing to build a project. PPAs and ORECs also lend themselves to lower cost financing options, which in turn can bring down the overall cost of a project.

Offshore Wind Offtake Structures: PPAs

Connecticut, Massachusetts, and Rhode Island have mandated utilities to enter PPAs with offshore wind generators for a specified nameplate capacity. A PPA is a long-term contractual agreement for the purchase of energy, capacity, energy services, and environmental attributes from an offshore wind generator to a purchaser of electricity. Under the PPA, the offshore wind generator receives a fixed-rate price for a fixed quantity mandated by a government entity. Generators are not exposed to commodity price risk because total remuneration is not exposed to changes in the electricity prices. This revenue certainty allows the developer to obtain lower-cost financing compared to a merchant structure.

Offshore wind generators sell energy, energy services, and RECs to the electric distribution utility, who in turn sells the energy to the wholesale market. In Rhode Island, the offshore wind generator sells energy directly into the wholesale market rather than to the distribution utility, but the structure is otherwise similar. The PPA does not cover capacity or ancillary services, but those services can be provided by the offshore wind generator directly into the wholesale market. Ratepayers pay for the costs of the offshore wind generation through charges on their distribution utility bill.

To the right, the flow chart describes a generic PPA structure.



Source: NREL
 Beiter, Philipp, Jenny Heeter, Paul Spitsen, David Riley. 2020. Comparing Offshore Wind Energy Procurement and Project Revenue Sources Across U.S. States.
 Golden, CO: National Renewable Energy Laboratory. NREL/TP-5000-76079.
<https://www.nrel.gov/docs/fy20osti/76079.pdf>

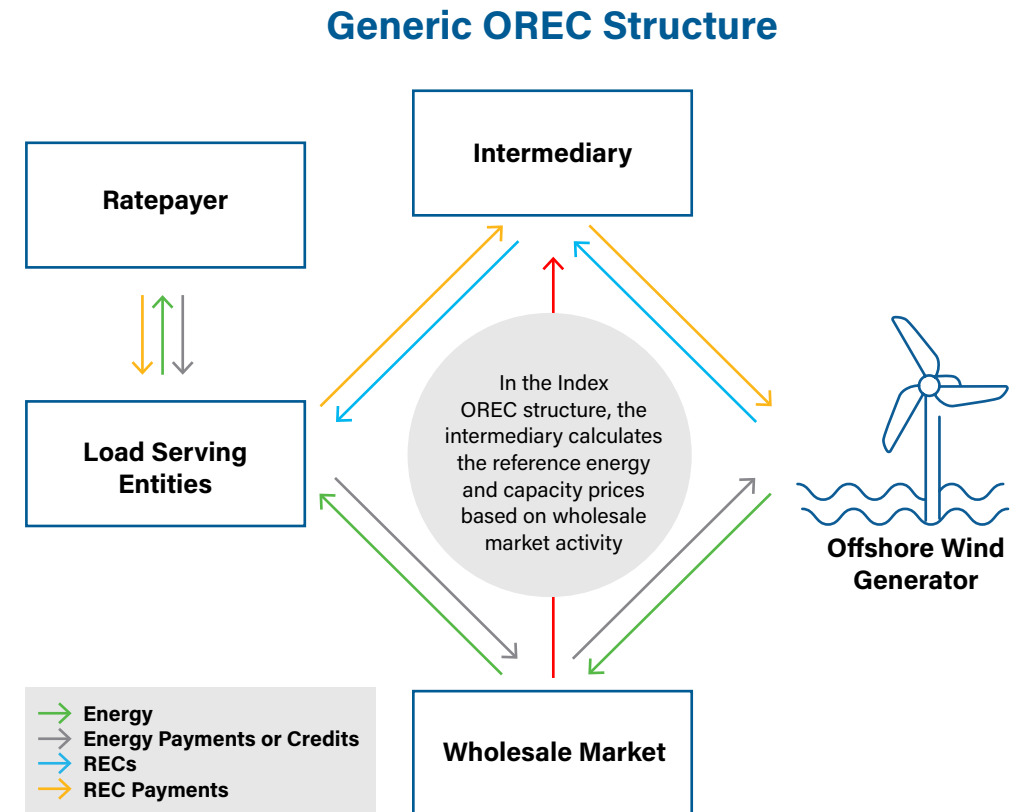
Offshore Wind Offtake Structures: ORECs

The second procurement instrument, competitive bidding for Offshore Wind Renewable Energy Certificates (ORECs), has been adopted in Maryland, New Jersey, and New York. ORECs represent the environmental attributes of one megawatt-hour (MWh) of electric generation from an offshore wind project. ORECs are used to comply with state offshore-wind specific Renewable Portfolio Standards (RPS) requirements. In a generic OREC structure, the offshore wind project sells energy into the wholesale market and sells the ORECs to an intermediary, which are then sold to the electricity suppliers to comply with RPS requirements. Ratepayers pay the OREC costs through charges on their utility bill.

In Maryland and New Jersey, a “fixed-price” OREC structure is used. The offshore wind generator sells electricity, capacity, and ancillary services into the wholesale market. The wholesale market revenue is then returned to the ratepayers via the distribution utility (New Jersey) or via an escrow account and ultimately to the distribution utility and ratepayers (Maryland). In Maryland, the electricity suppliers make mandated OREC purchases via the escrow account which pays the offshore wind generator the OREC price for each MWh. In New Jersey, the distribution utilities pay the offshore wind generator on a monthly basis and ORECs are then transferred to the electricity supplier. In both cases, the offshore wind generators receive a fixed price for the electricity they generate.

In New York, an index OREC structure is used. Under this approach, the generator sells into the wholesale market and may sell capacity into the forward capacity market. The New York State Energy Research and Development Authority (NYSERDA) then pays the generator a price that is equal to the difference between the agreed-upon strike price and a reference price equal to a simple average of the load-weighted hourly average prices across two zones of the New York Independent System Operator (NYISO). If the reference price exceeds the strike price, the generator does not retain the increased revenue from the higher reference price but is required to pay it back to the administrator.

To the right, the flow chart describes a generic OREC structure.



Source: NREL
 Beiter, Philipp, Jenny Heeter, Paul Spitsen, David Riley. 2020. Comparing Offshore Wind Energy Procurement and Project Revenue Sources Across U.S. States.
 Golden, CO: National Renewable Energy Laboratory. NREL/TP-5000-76079.
<https://www.nrel.gov/docs/fy20osti/76079.pdf>

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