ORRICK
OFFSHORE WIND ENERGY UPDATE AND OUTLOOK

January 2020

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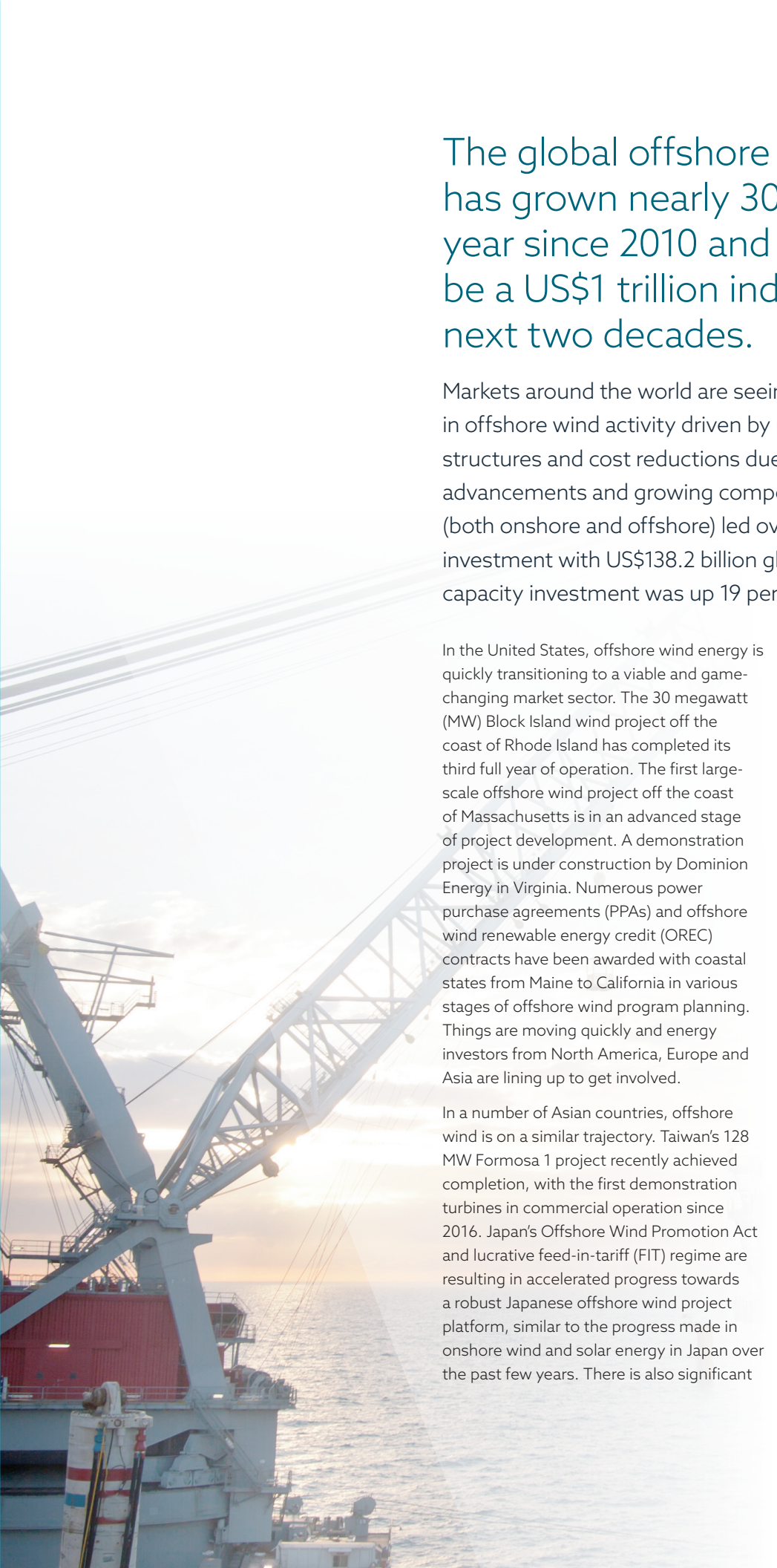


The global offshore wind market has grown nearly 30 percent per year since 2010 and is projected to be a US$1 trillion industry over the next two decades.

Markets around the world are seeing significant increases in offshore wind activity driven by more evolved regulatory structures and cost reductions due to technological advancements and growing competition. In 2019, wind (both onshore and offshore) led overall renewable energy investment with US$138.2 billion globally and offshore wind capacity investment was up 19 percent compared to 2018.

In the United States, offshore wind energy is quickly transitioning to a viable and game-changing market sector. The 30 megawatt (MW) Block Island wind project off the coast of Rhode Island has completed its third full year of operation. The first large-scale offshore wind project off the coast of Massachusetts is in an advanced stage of project development. A demonstration project is under construction by Dominion Energy in Virginia. Numerous power purchase agreements (PPAs) and offshore wind renewable energy credit (OREC) contracts have been awarded with coastal states from Maine to California in various stages of offshore wind program planning. Things are moving quickly and energy investors from North America, Europe and Asia are lining up to get involved.

In a number of Asian countries, offshore wind is on a similar trajectory. Taiwan's 128 MW Formosa 1 project recently achieved completion, with the first demonstration turbines in commercial operation since 2016. Japan's Offshore Wind Promotion Act and lucrative feed-in-tariff (FIT) regime are resulting in accelerated progress towards a robust Japanese offshore wind project platform, similar to the progress made in onshore wind and solar energy in Japan over the past few years. There is also significant progress in China with well over a gigawatt (GW) of installed offshore wind capacity and many more projects planned or under construction. Half of all global offshore wind installed in 2018 was located in China, which is currently projected to be the market leader for installed offshore wind capacity by 2021.

While these markets, and others, are seeing exciting growth in this space, countries around the world continue to chase the mature offshore wind energy platform in Europe. Europe now has a total installed offshore wind capacity of approximately 20 GW, with more than 4,500 offshore turbines in 11 countries. Offshore project installation and investment continues at an impressive rate, with nearly a gigawatt of installed offshore wind capacity in the UK in 2019 and more than 5 GW of new project contracts in the pipeline at record low prices. Countries such as Denmark, Belgium, Germany and France are also advancing their offshore wind programs.

A significant, steady buildout of offshore wind energy in the decade starting in 2020 is all but certain across Europe, Asia and the U.S., as well as in other regions that are just beginning to plan how and when to capitalize on the immense potential of offshore wind energy.

Continuing Decline in Offshore Wind Energy Prices

One of the reasons for the increasing global buildout of offshore wind is the decreasing price curves that we have seen in Europe and are now seeing in United States power purchase transactions. The trend is similar to that of U.S. onshore wind and utility-scale solar over the last 10 years.

The rapid decline in prices around the world for the power from new offshore wind projects is driven by a number of factors, including market competition, increasing supply chain efficiency, technology advances, and improving forecasts of performance based on operational history. In the coming years, these factors are projected to continue driving prices downward. Although various numbers and projections are available, nobody debates the declines are already striking. The U.S. Department of Energy (DOE) released a report in 2018 that found power prices in European offshore wind auctions and PPAs dropped from approximately US$200/MWh for projects commencing operation between 2017 and 2019 to approximately US$75/MWh for projects expected to begin operation between 2024 and 2025.

Bloomberg New Energy Finance reported a second-half 2019 global benchmark price of just US$78/MWh, a 32 percent drop from the previous year. In June 2019, the planned 600 MW Dunkerque project off the coast of France announced a strike price of just €44/MWh. And the United Kingdom's contracts for difference auction scheme accepted bids from three offshore wind projects at approximately US$50/MWh in 2019.

Prices in the U.S. are not far behind. The National Renewable Energy Laboratory (NREL) analyzed the planned 800 MW Vineyard Wind project off the coast of Massachusetts, ran a bottom-up cost estimate, and found the price premium for the U.S. market as compared to the more established European markets might be less significant than had been widely expected or might otherwise be presumed. The year 1 price under the Vineyard Wind PPA signed in July of 2018 is US$74, escalating to US$118 in year 20 for the first 400 MW, and US$65 in year 1 for the second 400 MW. This price does not factor in the project's revenue from tax benefits and revenue from capacity sales outside of the PPAs.

By way of contrast, the initial price under Deepwater's Block Island Power Purchase Agreement was US$244. The pricing of the Maryland OREC program for US Wind's Maryland project and Deepwater's Skip Jack project is US$132/MWh. And the price on the Long Island Power Authority's PPA for the South Fork project is reported at US$160/MWh for the first 90 MW and US$86/MWh for the additional 40 MW. The New Jersey OREC price for Orsted's Ocean Wind project is US$98.10 (year 1). And in New York's recent OREC awards, NYSERDA announced average all-in development costs of US$83.86 and expected average OREC costs of US$25.14/MWh for the Empire Wind and Sunrise Wind projects (note that the projects retain energy sales revenue). Pricing on the recently awarded Revolution Wind PPAs for power supply to Connecticut and Rhode Island was $94 and $98.43, respectively, and the recently awarded Mayflower Wind PPA for power to Massachusetts utilities is forecasted to be below the original price cap of $84.23.

When comparing prices, it is important to consider such factors as the allocation of energy and capacity revenue, tax benefits (ITC/PTC and local credits), price escalation factors, and whether the cost of transmission is included.

Structure of Energy Purchase Transactions (PPAs and OREC Transactions)

Two different transaction structures have been utilized for the purchase and sale of offshore wind energy and related products in the United States. Starting with the early PPAs for the Bluewater Wind project in Delaware and the Cape Wind project in Massachusetts, the majority of offshore wind energy transactions have been agreed upon using traditional bilateral PPAs with the state utilities. These PPAs have been similar to utility PPAs for U.S. onshore wind and solar, but with customized and highly negotiated transaction terms related to offshore wind and project-specific considerations, including for pricing, project timeline, transmission, permitting and variations in project size and technology. Utility PPAs have been used for the recent offshore power purchase transactions in Massachusetts, Connecticut, Rhode Island and for the South Fork project in New York.

The second transaction structure is for the purchase and sale of ORECs, representing the environmental attributes associated with one megawatt-hour of electricity generated from offshore wind resources and consumed by retail customers. The OREC transaction structure has been utilized for the recent procurements of offshore wind energy in Maryland, New Jersey and New York.

According to the Department of Energy, offshore wind has the potential to generate more than 2,000 GW of capacity per year. That's almost double the nation's current electricity use. Even if only one percent of that potential is captured, it would mean that offshore wind could power nearly 6.5 million U.S. homes within the next decade.

- MARYLAND

  Maryland passed the Maryland Offshore Wind Energy Act in 2013, amending the state's renewable portfolio standard to include Maryland ORECs. In 2017, the Maryland Public Service Commission (MDPSC) awarded the state's first OREC agreements to the 120 MW Skipjack and 248 MW US Wind projects. Then in 2019, Maryland increased the requirement for energy obtained from offshore wind by 2030 by an additional minimum of 1.2 GW. The 2017 awards set forth OREC prices and maximum OREC quantities for the two winning bidders. The Maryland OREC program requires "retail electricity suppliers" (as defined by state law) to purchase ORECs from the project owners in accordance with guidance set out by the MDPSC. To be eligible for OREC payments, the project owners must sell all energy, capacity and ancillary services associated with the OREC into the regional PJM Interconnection-operated markets and then distribute the resulting proceeds to the electricity suppliers purchasing the associated ORECs from an escrow account. The MDPSC set an initial price schedule equivalent to US$131.93/MWh for US Wind and the Skipjack projects.

- NEW JERSEY

  The New Jersey Board of Public Utilities (NJBPU) has implemented an OREC program and funding mechanism similar to Maryland's program to support New Jersey's offshore wind goals of 3.5 GW of offshore capacity by 2030. In 2019, New Jersey selected the 1.1 GW Ocean Wind project being developed by Ørsted with support from PSEG, marking the largest single procurement of offshore wind in the U.S. to date. The NJBPU requires New Jersey's electricity supply companies to purchase ORECs from the selected project according to a set percentage of kWh of energy sold in the state. The program's "OREC administrator" facilitates the OREC payments to the project and transfer of ORECs to the electricity suppliers required to purchase the ORECs, as well as the transfer of revenues from the projects' sale of energy and products into PJM back to the ratepayers.

- NEW YORK

  New York set a goal for offshore wind energy of 9 GW by 2035, with the procurement led by the New York State Energy Research and Development Authority (NYSERDA). NYSERDA's OREC program has NYSERDA procuring ORECs from the project owners on behalf of load serving entities, which in turn are required to purchase ORECs from NYSERDA. Project owners retain all energy and capacity revenues generated, while the ORECs act as an additional support mechanism. In 2019, New York's first solicitation of proposals for offshore wind power, two projects were selected: the 816 MW Empire Wind (Equinor) and the 880 MW Sunrise Wind projects (JV of Ørsted A/S and Eversource Energy). The projects have an expected average OREC cost of US$25.14/MWh and an average all-in development cost of US$83.36/MWh. NYSERDA's procurement methods operate separately from that of public power authorities, including the Long Island Power Authority and its 20-year PPA with the South Fork Wind project. With New York law mandating 9 GW of offshore wind by 2035, further NYSERDA procurements are likely.

Both PPAs and OREC transaction structures are expected to be utilized in upcoming procurements of U.S. offshore wind.

Financing Outlook For U.S. Offshore Wind

If permitting and supply chain hurdles can be met, the financing market for U.S. renewable energy projects appears to be robust and ready to embrace many of the offshore wind projects mentioned in this update. More than 50 financing entities have expressed interest in financing U.S. offshore wind. This includes between 20 and 30 European lenders that have experience with offshore wind and that will likely be a driving force for offshore wind in the United States. For onshore wind projects in the U.S., both debt and tax equity have traditionally been available for projects with strong economic fundamentals in place. It can be expected that many of these U.S. onshore wind financing providers will also participate in upcoming offshore wind project financings. Moreover, many of the planned U.S. offshore wind projects feature large project sizes, strong project sponsors backing the projects, and better offtake contracts than many of the onshore projects in the current market. Accordingly, many lenders and tax equity investors are anxious to fund these projects.

On the debt side, offshore wind projects are likely to benefit from the low debt rates that exist in the current market. Premiums for offshore back-leverage are expected to be about 25 basis points higher than for onshore wind, which has rates as low as 75 basis points above LIBOR. European lenders will need to be educated on tax equity financings and the intercreditor arrangements between tax equity and debt. Many lenders also perceive offshore wind to have heightened construction risk, which the industry believes will be manageable over time as the market is educated. At an 80 percent investment tax credit (ITC) or production tax credit (PTC) level, a typical capital stack for projects is expected to be approximately 50 percent debt, 30 percent tax equity and 20 percent sponsor equity. The share of debt and sponsor equity will rise as the tax credits phase out.

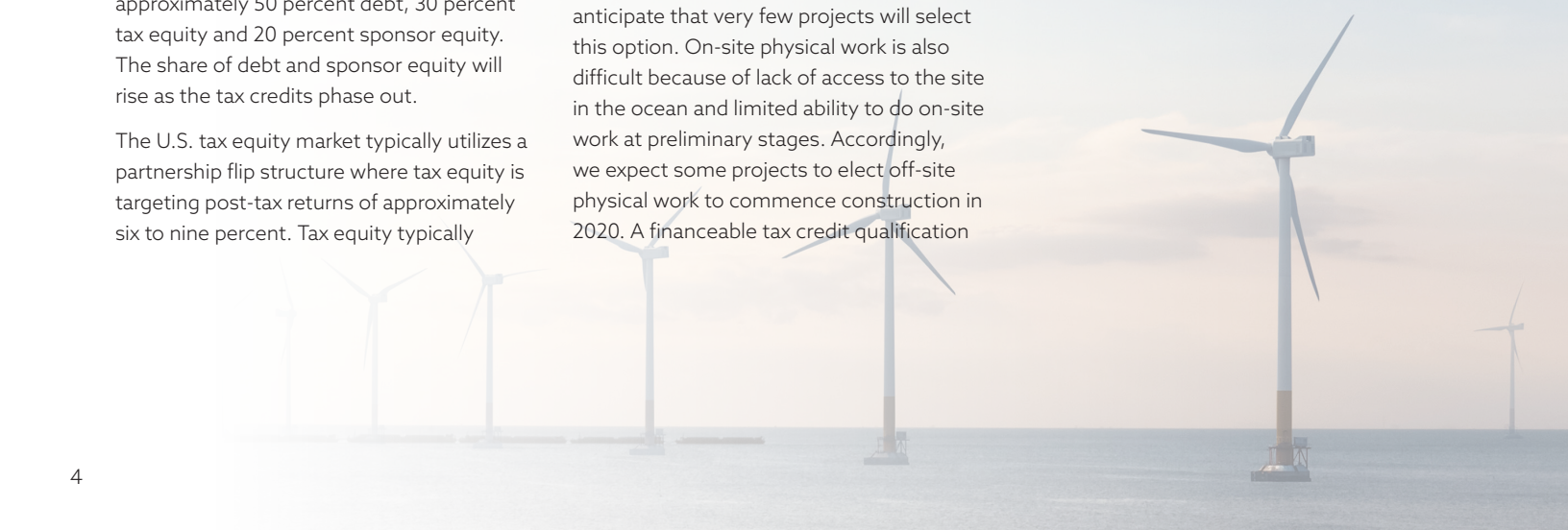
The U.S. tax equity market typically utilizes a partnership flip structure where tax equity is targeting post-tax returns of approximately six to nine percent. Tax equity typically prefers not to commit more than 12 months before the commercial operation date of a project, which is a challenge for offshore wind. Tax equity will likely accommodate earlier commitments for offshore wind in the range of 18 to 24 months before the commercial operation date. At least one offshore wind project obtained construction financing prior to having a tax equity commitment (i.e. no committed take-out). Also, based on public information, the Vineyard Wind project off the coast of Massachusetts, has been very well received in the tax equity and debt markets. The project went to market more than 24 months before its commercial operation date (COD) and received offers for more than two times the tax equity capital it was seeking.

Unfortunately, recent efforts to pass a federal tax credit specific to offshore wind were not successful. However, there was success in passing an extension of federal tax credits for all wind projects which have the potential to provide a very significant boost to the offshore wind market. The extension was for a 60 percent PTC or an 18 percent ITC for wind projects that commence construction in 2020. Generally, projects must reach COD by the end of 2024 to qualify for these credits. Fortunately, there are a number of offshore wind projects that are currently expected to reach COD on or before 2024, which should be in a position to capitalize on this extension. We believe some of these projects will take action this year to start construction for PTC/ITC purposes.

To qualify for the PTC or ITC, projects need to start construction by the end of 2020 by either incurring at least five percent of the qualified project costs (i.e., the five percent safe harbor) or by commencing physical work of a significant nature either on-site or off-site. The five percent safe harbor is very capital intensive given the size of offshore wind projects, and we anticipate that very few projects will select this option. On-site physical work is also difficult because of lack of access to the site in the ocean and limited ability to do on-site work at preliminary stages. Accordingly, we expect some projects to elect off-site physical work to commence construction in 2020. A financeable tax credit qualification strategy will be very important for offshore wind projects utilizing PTCs or the ITC, and projects should expect significant scrutiny of their qualification strategies given the cost of the offshore projects and the expectation that multiple tax equity and debt providers will participate in the financing of these projects and will separately diligence the tax credit qualification strategy. Additionally, offshore developers should be careful about basing their tax credit qualification strategy on physical work on equipment where the technology is quickly evolving. For example, starting work on offshore turbines is often a challenge if better turbines are expected to be available by the time the turbines will be erected. Despite these constraints, it can be expected that a number of upcoming U.S. offshore wind projects will be able to utilize the existing federal tax credits and obtain tax equity financing.

"A lot of creative solutions are being utilized in U.S. renewables financings, such as various flavors of bridge financing, vendor equipment financing, mezzanine financing, and creative tax equity and term debt structures. This creativity will be really helpful to sponsors seeking to mitigate the risks associated with the long development and construction cycles of offshore wind projects."

— Rael McNally, Director of Global Renewable Power at BlackRock Real Assets



United States Atlantic Seaboard

Offshore wind project development along the Atlantic seaboard continues to progress rapidly. Deepwater Wind's 30 MW/five turbine Block Island project completed its third year of commercial operation in December 2019, providing the sector with a much-needed tangible precedent for the enormous potential of U.S. offshore wind. Many more megawatts of offshore wind energy are in advanced stages of development.

The following section provides a high-level update on some of the most notable recent developments in the rapidly evolving offshore wind project landscape along the Atlantic Seaboard.

- MASSACHUSETTS

  In August 2016, Massachusetts passed a law requiring its utilities to procure 1,600 MW of offshore wind power by 2027. In 2018, the state passed new legislation that would double the offshore wind target to 3,200 MW by 2035. And in May 2018, Avangrid Renewables and Copenhagen Infrastructure Partners' 800 MW Vineyard Wind project was selected as the winner of the state's first major offshore wind solicitation, including PPAs with National Grid USA, Eversource Energy and Unitil Corp. in two 400 MW phases to be located south of Martha's Vineyard.

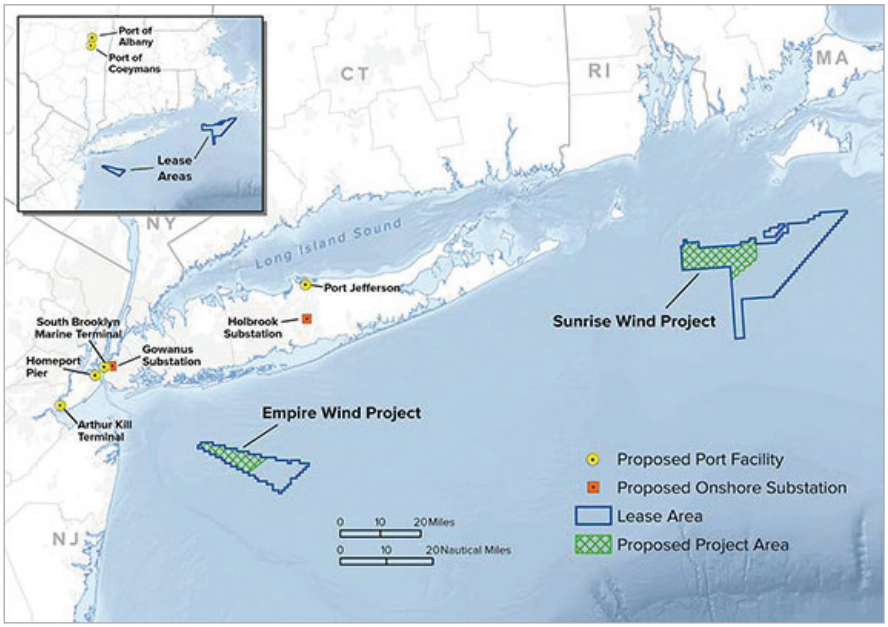
  In August 2019, the U.S. Department of the Interior's Bureau of Ocean Energy Management (BOEM) announced it would be requiring a supplement to Vineyard Wind's environmental impact statement to inform its decision on the project's commercial operations plan, unexpectedly delaying the projected construction schedule. Approval of a commercial operations plan is needed before construction of the project can commence. BOEM explained that the supplement was requested to include a more "robust cumulative analysis" of environmental impacts. This, as explained by BOEM, was needed because a greater buildout of offshore wind is now reasonably foreseeable as contrasted to what was contemplated at the time when the original environmental impact statement was prepared. BOEM announced that this supplement should be available for public comment by early 2020.

  Mayflower Wind (a joint venture between Shell and EDP Renewables) won the second RFP process in October 2019 and was selected to move forward with contract negotiations to provide 804 MW of offshore wind power to Massachusetts.

  Massachusetts is also very active in facilitating development of the local supply chain by upgrading the New Bedford Marine Commerce terminal for offshore wind projects, creating the Massachusetts Clean Energy Center's Wind Technology Testing Center that offers turbine blade certification tests for turbine blade sections up to 90 meters in length, and offering the first-in-the-nation offshore wind training facility located at the Massachusetts Maritime Academy.

- NEW YORK

  New York has set a goal of developing 9,000 MW of offshore wind energy by 2035, with the procurements led by NYSERDA, which has created the OREC program (described previously) to encourage offshore wind energy project development for New York. Under the New York program, NYSERDA procures ORECs from the offshore wind project owners on behalf of load serving entities, which in turn are required to purchase the ORECs from NYSERDA. Project owners retain all energy and capacity revenues generated, while the ORECs act as an additional support mechanism. In its first solicitation, NYSERDA required bidders to submit two offer prices: a fixed OREC price and an indexed OREC price, which is based on reference prices for energy and capacity and serves as a type of contract for differences. In the first solicitation of proposals for offshore wind power, held July 18, 2019, NYSERDA selected two projects, the 816 MW Empire Wind (Equinor US Holdings, Inc.) and the 880 MW Sunrise Wind (a joint venture of Ørsted A/S and Eversource Energy). The selected projects have an expected average OREC cost of US$25.14/MWh and an average all-in development cost of US$83.36/MWh. Previously, and separately from NYSERDA's procurement track since it is a public power authority, the Long Island Power Authority approved a 20-year PPA to take power from the proposed 90 MW South Fork Wind project (Ørsted U.S. Offshore Wind and Eversource Energy). This agreement was amended in 2018 to add another 40 MW of power. The South Fork project is located about 30 miles southeast of Montauk and has an approved site assessment plan.



NYSERDA, available at https://www.nyserda.ny.gov/All-Programs/Programs/Offshore-Wind/Offshore-Wind-Solicitations/Generators-and-Developers/2018-Solicitation.

- NEW JERSEY

  New Jersey plans to meet its goal of 3,500 MW of offshore wind by 2030 through an OREC program similar to that of Maryland, and tax incentives. In June of 2019, the NJBPU granted the state's first award of offshore wind to Ørsted's 1.1 GW Ocean Wind project, marking the largest single procurement of offshore wind in the United States to date. The Ocean Wind project is located approximately 15 miles off the coast of Atlantic City, New Jersey. Two additional 1,200 MW solicitations are also anticipated, one in 2020 and the other in 2022. The NJBPU requires New Jersey's electricity supply companies to purchase ORECs from the selected project according to a set percentage of kWh of energy sold in the state. The program's "OREC administrator" facilitates the OREC payments to the project and transfer of ORECs to the electricity suppliers required to purchase the ORECs, as well as the transfer of revenues from the projects' sale of energy and products into PJM back to the ratepayers.

  New Jersey also created an offshore wind tax credit program that provides projects with tax credits up to 100 percent (with a US$100 million limit) of the qualified capital investments made in an offshore wind-related facility. New Jersey is also working to support development of a local supply chain. In October of 2019, the New Jersey Economic Development Authority announced its proposal for an Offshore Wind Technical Assistance Program. Under this proposal, the New Jersey Economic Development Authority will contract an experienced offshore wind advisory and certification company to help assure that local companies possess the requisite credentials to secure offshore wind contracts. In November of 2019, New Jersey's governor issued a new executive order directing the NJBPU, the New Jersey Department of Environmental Protection, and other state agencies to take all necessary actions to promote the development of wind energy off the coast of New Jersey to meet an increased goal of 7,500 MW of offshore wind energy generation by the year 2035.

- RHODE ISLAND

  In addition to having the Deepwater Wind Block Island project, the Rhode Island Public Utilities Commission approved a 20-year PPA in 2019 between DWW Rev I, LLC (a joint venture of Ørsted U.S. Offshore Wind and Eversource) and National Grid for 400 MW from the Revolution Wind project located in federal waters roughly halfway between Montauk, New York and Martha's Vineyard, Massachusetts.

- CONNECTICUT

  In June 2019, Connecticut passed a bill requiring the Department of Energy and Environmental Protection to solicit up to 2 GW of offshore wind capacity by 2030, and on December 5, 2019, the Department selected Vineyard Wind's bid of 804 MW from the development-stage Park City Wind project, allowing the Park City Wind project to enter into negotiations with United Illuminating Company and Eversource Energy, the state's two electric companies, for a long-term PPA. This selection marks the state's third procurement of offshore wind energy and is estimated to provide approximately US$890 million in economic development in Connecticut, including to the Bridgeport harbor and local supply chain.

  Previously in 2018, the state authorized a total of 304 MW from Ørsted's Revolution Wind project Bay State Wind (a joint venture of Ørsted U.S. Offshore Wind and Eversource). A 20-year PPA was signed for the supply of energy from the project. This included commitments to the development of the state pier in New London, with Governor Ned Lamont announcing in May 2019 a public-private partnership investing US$93 million to upgrade the pier so as to support infrastructure requirements of offshore wind projects, with construction on the pier expected to be completed in early 2022.

- MARYLAND

  In May 2019, Maryland passed a law that doubled the requirement for energy obtained from offshore wind by 2030 by requiring an additional 1,200 MW, with the bidding process commencing in 2020 and scheduled to continuing in 2021 and 2022. Maryland has encouraged offshore wind through its own OREC program, under which all retail electricity suppliers must purchase ORECs from selected offshore wind project owners in accordance with guidance set out by the MDPSC. To be eligible for OREC payments, the project owners must sell all energy, capacity and ancillary services associated with the OREC into the regional PJM Interconnection-operated markets and then distribute the resulting proceeds to the electricity suppliers purchasing the associated ORECs from the escrow account. In 2017, the MDPSC awarded the state's first OREC agreements to Ørsted's 120 MW Skipjack project and a 248 MW project owned by US Wind, Inc, with an initial price schedule equivalent to US$131.93/MWh for the projects.

- VIRGINIA

  Virginia recently increased its goal for renewable energy to 30 percent by 2030. This new renewable energy goal includes up to 2,500 MW of offshore wind to be developed by 2026. Construction on Dominion Energy's Coastal Virginia Offshore Wind demonstration project located in Dominion's BOEM lease area off the coast of Virginia Beach began in July 2019 and is expected to be completed in the 2020/2021 timeframe. Dominion has retained Ørsted for the construction of the demonstration project. This is expected to be followed by a commercial-scale project (anticipated to total approximately 2,640 MW that will be developed in three, 880 MW phases).

- MAINE

  In November 2019, Maine Public Utilities Commission approved a contract with Central Maine Power and Maine Aqua Ventus for the 12 MW Maine Aqua Ventus floating demonstration project. This project is part of the Maine Offshore Wind Initiative, a state initiative to identify opportunities for offshore wind development in the Gulf of Maine.

BOEM Regulatory Road Map

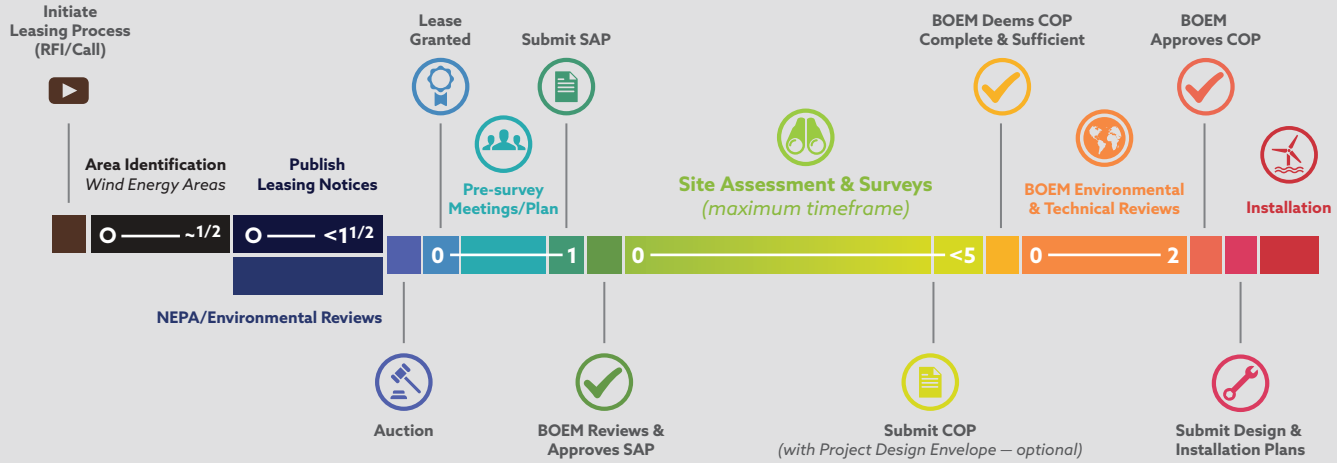


Image courtesy of BOEM

Project Permitting and Environmental Considerations

Now well over a decade into the development of offshore wind in the U.S., the permitting and approval process for offshore wind projects remains lengthy and complicated, and the estimated time for review and approval remains a critical factor in determining when projects can begin construction and achieve commercial operation. BOEM oversees the development of wind projects in U.S. federal waters. BOEM has published the roadmap above outlining the overall offshore wind development process.

When BOEM grants a lease to an offshore wind project, development of the project is conditioned on BOEM approval of detailed plans for that project (e.g., the assessment and construction operation plans). This requires review pursuant to the National Environmental Policy Act (NEPA). NEPA requires that federal agencies, like BOEM, review the potential environmental impacts associated with its decision to issue an approval. A project will also need to obtain other permits from various federal agencies (e.g., United States Army Corps of Engineers) and will be subject to certain state and local permits. As a result, the due diligence with respect to environmental permitting and support for the ongoing development of upcoming projects, or potential financings or acquisitions remains complex and highly project-specific.

In addition, several environmental permits must be obtained. Numerous environmental studies and consultations of governmental agencies are involved in obtaining these permits (including the BOEM lease, BOEM approval of a Site Assessment Plan, and BOEM approval of a Construction and Operations Plan). The full diligence of a project also requires the careful assessment of potential environmental issues associated with onshore interconnection.

Many environmental and stakeholder issues need to be considered during the permitting process and related stakeholder discussions and negotiations. These issues are amplified by the scale of the offshore wind projects being developed and the location of these projects close to major U.S. cities. Permits may be appealed, and some permits provide for opportunities for public comment. Depending on the stage of project development or timing of a proposed acquisition or financing, certain aspects of permitting may require additional scrutiny during a due diligence process.

The stage of project development or timing of a project acquisition, knowledge of the sequence and expected completion of all required studies and the permitting and approval process can all impact possible permitting concerns and timeline considerations for the development process and the expectations underlying an acquisition, financing or construction process. Project due diligence for upcoming transactions should include a thorough review and understanding of project permitting as well as environmental and stakeholder issues associated with a particular project. Issues can then be managed and allocated in line with the business expectations of the parties involved.

> "Public participation from ocean users and coastal communities is essential to help the U.S. fully realize the benefits of offshore wind power. Early feedback helps projects avoid potential conflicts, benefiting wind developers and other ocean users alike."
>
> — Laura Smith Morton, Senior Director of Policy and Regulatory Affairs, Offshore at the American Wind Energy Association (AWEA)

California and Pacific Coast Market Updates

Over the next few years, California is likely to see significant progress toward establishment of an offshore wind sector similar to the progress already achieved for the U.S. Atlantic seaboard. The potential benefits of offshore wind energy off the coast of California are not in doubt. The NREL has found that there are 112 GW of offshore wind resource potential on the California coastline. This untapped energy potential could play an important part in California meeting its energy goals under SB100, which mandates 60 percent of the state's energy mix to be sourced from renewables by 2030, and 100 percent carbon free electricity by 2045. In particular, the availability of offshore wind at peak demand times means it has the potential to support grid reliability when onshore wind, solar and solar + storage cannot meet peak demand.

However, siting offshore wind projects in the Pacific Ocean presents unique challenges compared to siting projects along the Atlantic seaboard. California has various governmental approval requirements specific to the state, and the U.S. Department of Defense (DOD) has unique military interests off the central coast of the state. Also, the depth of the Pacific Ocean precludes the use of fixed foundation wind turbines and instead requires floating platforms with underwater cable tethering to the ocean floor in depths of thousands of feet, with cables also extending to the shore for transmission interconnection.

BOEM has jurisdiction over Outer Continental Shelf (OCS) ocean waters at least three nautical miles offshore of California. In 2016, BOEM established an Intergovernmental Task Force (the Task Force) in partnership with the State of California to promote information sharing regarding assessment of the potential for offshore wind energy projects and BOEM's leasing process in the Pacific OCS. From October 2016 through September 2018, the Task Force conducted extensive stakeholder engagement meetings with members of coastal and fishing communities, Native American tribes, academics and scientists, NGOs, renewable energy developers and local, state and federal agencies.

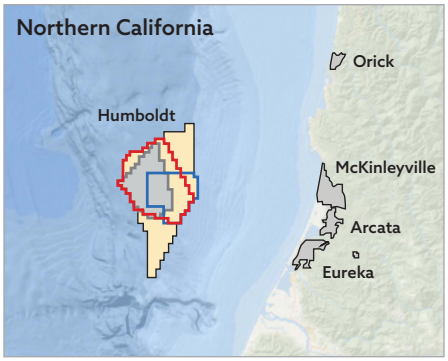
In October 2018, BOEM published a Call for Information and Nominations for Commercial Leasing for Wind Power Development on the Outer Continental Shelf Offshore California (the "Call"). BOEM identified three "Call Areas" based on the stakeholder engagement process and a number of other factors, including close proximity to existing transmission infrastructure. The Humboldt Call Area is on the north coast, comprising 206 square miles, beginning 21 miles offshore of the city of Eureka in northern California. The Morro Bay Call Area is on the central coast, comprising 311 square miles beginning 24 miles offshore of Cambria, CA. The Diablo Canyon Call Area is on the central coast, comprising 556 square miles beginning 22 miles offshore of Los Osos, CA.

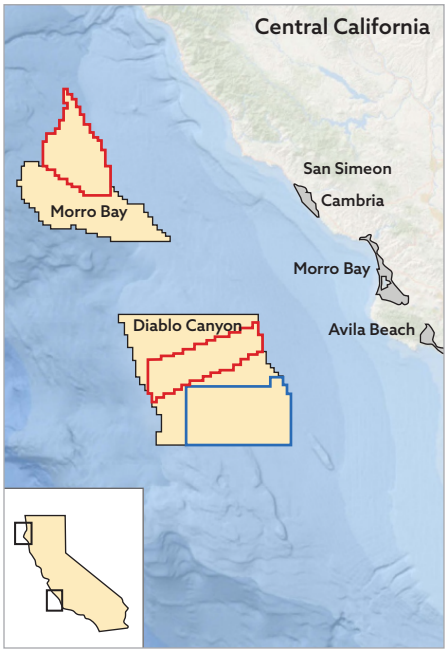
Fourteen companies responded to the Call with indications of interest to build offshore wind projects along the California coast, as depicted below, with some Call respondents already making efforts to build development momentum, including in at least one case entering into cooperation agreements with fishing industry and local municipality stakeholders. In addition, Redwood Coast

BOEM'S SUMMARY OF NOMINATIONS FOR THE CALIFORNIA CALL

#	Nomination	Humboldt	Morro Bay	Diablo Canyon
1	Algonquin Power Fund (America)	■		■
2	wpd Offshore Alpha, LLC			
3	Avangrid Renewables, LLC			
4	Castle Wind, LLC			
5	Cierco Corporation			
6	EDF Renewables Development, Inc			
7	EDF Renewables North America, LLC			
8	EC&R (eON) Development			
9	Equinor Wind US, LLC			
10	Mission Floating Wind, LLC			
11	Northcoast Floating Wind, LLC			
12	Northland Power America Inc.			
13	Redwood Coast Energy Authority (RCEA)	■		
14	US Mainstream Renewable Power, Inc.	■	■	■
	Total	**10**	**11**	**11**

https://www.boem.gov/Nominations





Energy Authority, which controls the electricity supply for ratepayers in Humboldt County, CA, selected a consortium of companies to enter into a public-private partnership to pursue development of an offshore wind project in the Humboldt Call Area.

BOEM will hold auctions for leases after preparing an environmental assessment pursuant to NEPA, and consulting with stakeholders and federal, local and tribal agencies regarding possible environmental consequences of leasing and site assessment activities. In addition, the DOD uses portions of the central coast Call Areas (Morro Bay and Diablo Canyon) for offshore military training and operations. BOEM and DOD are collaborating to identify portions of the Call Areas compatible with offshore wind development and military activities. BOEM expects to hold the offshore wind lease auctions in 2020.

In the meantime, however, some industry players are focused on activities closer to the shore. Several companies have expressed interest in supplying offshore wind in state waters off the coast of Vandenberg Air Force Base in Santa Barbara County, CA. Ideol, a French offshore wind developer, has recently applied with the California State Lands Commission for a lease to do data collection to determine suitability of the area for a future offshore wind project.

Ultimately, one cannot doubt the viability of the potential offshore wind market on the Pacific coast. Despite the extensive regulatory requirements and long timeline to bring projects to fruition, the prospects for California offshore wind are bolstered by the state's aggressive renewable energy targets, track record as a leader in onshore renewable energy, significant energy load, and the high level of interest from project developers, investors and stakeholders. Importantly, Offshore Wind California (OWC), a nonprofit coalition of industry partners formed in October 2019 with the mission of promoting policies and public support for offshore wind development in California through public education and advocacy. OWC is advocating for California to set a goal of a minimum of 10 GW of offshore wind by 2040 to support the state in reaching its goal of 100 percent carbon free electricity by 2045.

Japan Market Update

Japan has installed approximately 3,500 MW of wind power as of the end of 2018, most of which consists of onshore wind. Offshore wind projects account for only 20 MW of this total, and these projects are relatively small, near-shore, and are operating now for the purpose of research and testing conducted by the government. Many developers and industry investors, however, see great potential in Japanese offshore wind. With the Act for Promoting Utilization of Sea Areas in Development of Power Generation Facilities Using Maritime Renewable Energy Resources (the "Offshore Wind Promotion Act") that came into effect on April 1, 2019, the Japanese government is now strongly promoting offshore wind projects. Some industry experts forecast a potential for 10,000 MW of offshore wind by 2030.

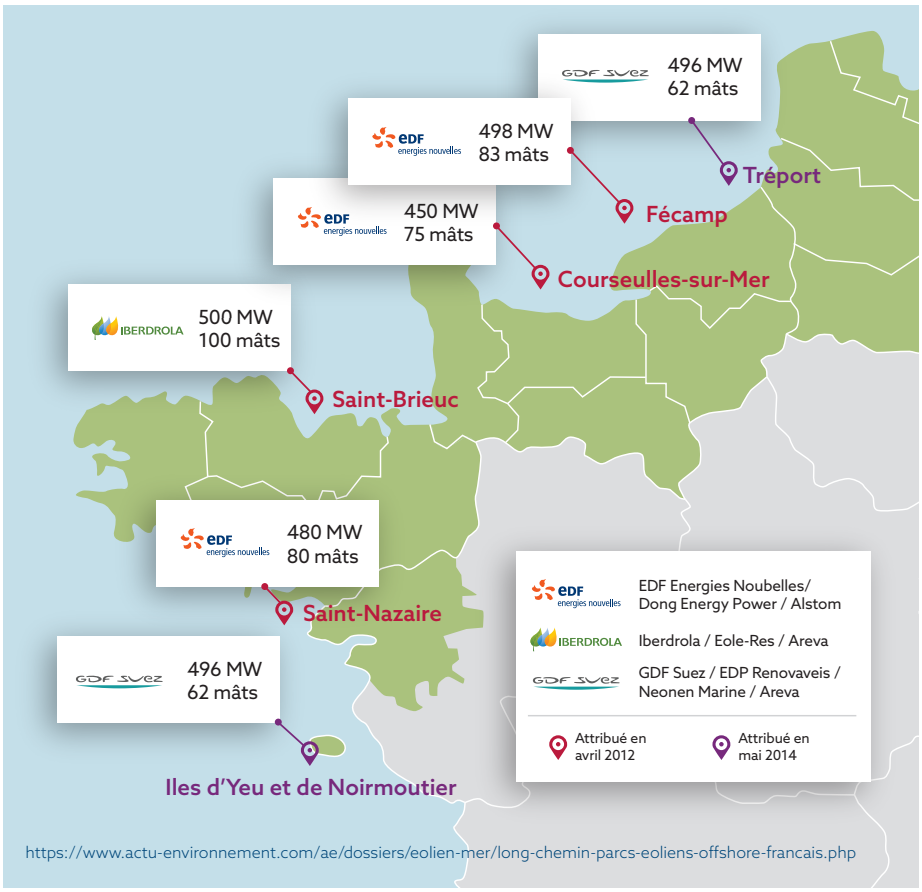
Japan has been promoting renewable energy under its feed-in tariff (FIT) since July 2012. The Offshore Wind Promotion Act adds another significant element to this trend. The new law enables projects to exclusively utilize a designated outer sea area for up to 30 years (term can be extended). Under the Offshore Wind Promotion Act, the government will designate "promotion areas" annually, and developers selected through a public bidding process will obtain FIT approval and permission to use the designated outer sea area to operate a wind power project. The government announced four sea areas as "prospective areas" on July 30, 2019, and is expected to accelerate the process of designating promotion areas under the Offshore Wind Promotion Act.

Since the Offshore Wind Promotion Act introduces a completely new scheme to Japan, uncertainty exists about the actual implementation of the new law. Moreover, Japan has seen multiple amendments to the FIT system from time to time, and further amendments are expected to take place in the years ahead as Japan undertakes an expansive reformation of its energy policy. Developers and investors will need to be aware of potential amendments to these laws and regulations.

Since the offshore market in Japan has no established players, opportunities for new investors are present in the sector, especially considering that numerous non-Japanese companies have installed onshore renewable energy projects recently under Japan's FIT program. European and American companies are recognizing this potential, including opening offices in Japan to focus on the offshore wind market in Japan and other active markets, such as in Taiwan.

France Market Update

Offshore wind projects have been in the making in France since 2011 when the French government launched its first call for tenders. This call represented a maximum capacity of 3,000 MW spread over five zones: Le Tréport, Fécamp, Courseulles-sur-Mer, Saint-Brieuc and Saint-Nazaire. A second call for tenders was issued in March 2013. This call targeted two sites (le Tréport and a zone between the islands of Yeu and Noirmoutier) for a total installed capacity of 1,000 MW.



https://www.actu-environnement.com/ae/dossiers/eolien-mer/long-chemin-parcs-eoliens-offshore-francais.php

The procedures for these tenders had structural issues that led to various problems, including challenges in French administrative courts. The disputes have led to significant delays in the construction of these offshore wind farms. For instance, the final authorizations for the Fecamp and Courseulles-sur-Mer offshore wind projects were confirmed by France's Council State (Conseil d'Etat) only on July 24, 2019. The final authorizations for the Saint-Nazaire offshore wind project were confirmed on June 7, 2019.

In addition, the electricity purchase prices resulting from these calls for tenders were very high compared with the downward trend in the construction costs of offshore wind farms. This pricing discrepancy led the French government to consider whether it was advisable to continue the projects. This risk was avoided due to a renegotiation of FITs conducted by the French government (with the support of Orrick's team). The new tariffs were validated by the European Commission on July 26, 2019, and the deployment of these projects will now be able to begin.

Consequently, the Saint-Nazaire project has just reached financial close on September 2019 and construction will start soon.

Regulatory Regime

The delays and difficulties in the deployment of offshore wind farms resulting from the first two calls for tenders have led the French government to modify its regulatory framework to simplify the development of future projects. The implementation of an offshore wind project in France still requires numerous authorizations, but many of them have been adapted to solve the difficulties raised by the first calls for tenders.

An operator still needs to win a call for tenders to develop an offshore wind project in France. If the French Energy Code presents this procedure as an alternative procedure, the French administration has clearly stated that every project submitted outside of a call for tenders will not be processed. The call for tenders is launched by the French Minister of Energy based on specifications drawn up with the Energy Regulatory Commission (Commission de Régulation de l'Energie). This competitive bidding procedure may also be a competitive dialogue governed by Articles R. 311-25-1 and seq. of the Energy Code.

Winning a call for tender allows the operator to obtain an operating permit for the offshore wind project. The development of the project also requires the completion of a contract for differences (CfD). It grants the operator a "premium" based in part on the spot electricity prices, a reference electricity tariff and the reference market price. The operator must also obtain a permit to occupy the project area and comply with interconnection timing requirements.

Following the first calls for tenders, the Government also decided to reform the regulations relating to the grid connection of electricity production facilities.

Marine renewable energy installations have also been added to the "major risks" identified in Article L. 111-6 of the Insurance Code to promote their insurability. To enable the operator to benefit from the latest technological developments and construction techniques, Law No. 2018-727 of August 10, 2018, for a State in the service of a trusted society created the "envelope permit." This permit allows the operator to obtain an authorization for a project with variable characteristics. The operator may change a project within limits set in advance to benefit from the latest technological developments, without modifying the authorizations granted. Finally, Decrees No. 2016-9 of January 2016 and No. 2017-81 of January 2017 modified the litigation regime for legal actions against some authorizations required for an offshore wind project to limit the duration of these actions. By speeding up those proceedings, the Government aims to clear the operator's risks as swiftly as possible to allow projects to be quickly implemented.

Outlook

These regulatory evolutions led to a successful call for tenders launched on December 15, 2016, (Dunkerque project) and an award on June 14, 2019, to a consortium consisting of EDF, Innogy and Enbridge for a capacity of 600 MW at a rate of less than €50/MWh. This project certainly will not be the last project launched in France. The draft multiannual energy programming (PPE) for the period 2019-2028 provides for the launch in 2023 and 2024 of projects with capacities between

1,000 and 1,500 MW at a target price of €60/MWh and then the launch each year of a project (floating or fixed) of 500 MW per year starting in 2025. Thus, bottom fixed offshore wind energy projects should continue to develop in France through future calls for tenders depending on the success of the wind projects being built now and in the near future.

A new call for tender for a major bottom-fixed offshore wind project (1 GW) is expected to be launched in 2021 in Normandy off the coast of Cherbourg. The public debate—the first stage of the public assessment process of the project, focused on its opportunity—started in the fall 2019.

Floating wind turbines are expected to play a growing role in France's offshore wind sector in the coming years. Floating wind turbines can generate power in deep water, where the sea winds are stronger and more consistent. Installation of these turbines has the benefit of not needing to construct solid foundations or use the kind of special construction vessels needed for fixed offshore wind turbines. Floating wind power technology is still at the pilot stage, but the technically exploitable potential of the floating wind power in Europe is estimated at 600 GW. France is reported to have the second largest resource behind England. The Environment and Energy Management Agency has already launched several calls for pilot projects. These projects benefit from grants authorized by the European Commission on February 25, 2019.

The French Government showed its support for the development of floating wind turbine technology by including floating offshore wind turbines in the PPE for the period 2019-2028. A call for tenders is expected to be launched in 2021 for a capacity of 250 MW, located in Brittany. Another project in the Mediterranean is expected to be launched in 2022 with a capacity of 250 MW. Depending on the evolution of the costs of this technology, a call for tenders for a capacity between 250 and 500 MW could be launched in 2024 and then, potentially, tenders for one project per year from 2025 and onward for 500 MW.

A new version of the draft PPE will be issued by the French energy administration for public consultation in early 2020.

UK Market Update

The UK offshore wind industry has been a great success story, starting with the first project of four "nearshore" turbines at Blyth in 2000. In 2018, the UK accounted for over 50 percent of the European operating offshore wind capacity, and this capacity will contribute an estimated 10 percent of the UK generation mix in 2020. Currently, there are some 37 operational offshore wind projects in UK waters with a nameplate capacity of 8.4 GW. There is a further 5.1 GW of offshore wind fully permitted and in procurement.

However, there is still some way to go in the development of UK offshore wind, with an aim to quadruple offshore electricity production capacity by 2030 and a target of 30 GW of operating capacity by 2050.

In 2008, the then Labour-led British Government passed the Climate Change Act, which sought to impose on successive governments a legally binding obligation to cut greenhouse gas emissions in the UK by 80 percent of the 1990 baseline for the year 2050. Encouraged by developments in technology in the intervening period, in 2019 with cross-party support the now Conservative-led government amended the 80 percent target so that the UK now has a legally binding obligation to cut the 1990 baseline by 100 percent by 2050. Among much political fanfare, the UK is now committed to becoming a "net zero" economy by 2050.

Clearly, any such target requires extensive and detailed policy amendments and, not surprisingly, the current constitutional and political crisis in the UK has impacted the development of this policy. The British Government had intended to deliver a strategy and policy paper for the achievement of the net zero economy at the end of August/early September 2019. It was widely expected that offshore wind would be a fundamental part of this strategy. Being somewhat distracted, the British Government has failed to deliver the strategy and policy paper.

To date, the development of the UK offshore wind industry has proved hugely popular at a local level in some of the UK's most economically deprived areas, providing investment and employment in areas that had been decimated because of the collapse in traditional industries such as fishing. In 2019, extensive press coverage was given to the economic renaissance of the former fishing port of Grimsby because of the proliferation of large offshore wind projects on the Eastern seaboard of the UK.

In recognition of the wider economic benefits of the offshore wind industry in March 2019 the UK Government published their offshore wind industrial sector policy *(www.gov.uk/government/publications/offshore-wind-sector-deal)*. This policy is likely to be supported and developed by governments of all political persuasions for the foreseeable future.

In accordance with the requirements of European competition law and in common with other member states of the European Union, the UK has moved away from a system of FITs or tradeable green certificates to support offshore wind. European law has required a competitive auction process for renewable energy support regimes, and in the UK this has taken the form of a CfD which is, in essence, a government-backed financial instrument providing a fixed level of pricing for a generator's power output.

CfD auction prices for offshore wind have shown a dramatic reduction over the course of the three auction rounds held so far. Round 1 CfD prices for offshore wind were approximately £110/MWh, and these were substantially reduced to £57/MWh in Round 2. On September 20, 2019, results of the Round 3 auction were announced, which delivered a CfD price of £39/MWh.

Understandably, the British Government has seized upon this record low power price for offshore wind as a vindication of the policies followed to date and justification for a planned 300 percent increase in offshore wind construction. Elsewhere in the industry, some concern exists as to the viability of a £39/MWh power price and the underlying economic assumptions behind the successful bids.

What is clear is that offshore wind enjoys widespread political support in the UK and is now significantly less expensive than many other forms of energy generation. The CfD for the nuclear power plant under construction at Hinkley Point C was priced at £89.5 when signed and, with indexation, is currently priced at £101.99. With construction expected to commence in 2027/28, it is highly likely that UK consumers will be paying 400 percent more for electricity generated from nuclear power to that from offshore wind.

As an island nation with rich wind resources and a favorable political environment, there seems every prospect that the UK will continue to push ahead with its targeted 20 GW increase in offshore wind generation.

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OFFSHORE WIND ENERGY AT ORRICK

Orrick is an innovator and global leader in renewable energy and has been for more than 40 years, regularly advising on first-of-a-kind, industry-shaping transactions. Our team has been working on offshore wind matters since 2007 and is actively advising on offshore wind transactions and project development.in the U.S., Europe and Asia.

In the U.S. Orrick lawyers negotiated the first domestic PPA for offshore wind power. Since that time, we have advised on financings, tax credit qualification, joint ventures, M&A transactions, OREC programs, permitting and leasing, and investment strategies for projects in the Atlantic and Pacific Oceans.

Our Tokyo lawyers have been advising the developers and sponsors of wind projects in Japan for over 20 years and are currently advising on numerous onshore and offshore wind projects, including projects that are planning to utilize Japan's recent Offshore Wind Promotion Act. We work with the Japanese government, clients, embassies and an organization for cross-regional coordination of transmission operators regarding various new legislation and interconnection issues in Japan for offshore wind. We also represent clients on project development, permitting and regulatory requirements, and draft and negotiate various agreements, including interconnection agreements, PPAs and offshore site leases.

In Europe, Orrick lawyers represent a range of investors and developers in offshore wind projects, preparing and negotiating multiple EPC contracts for the supply and installation of wind turbines, and advising on procurement contracts. Our experience includes advising the UK government in granting extensions for offshore wind farm sites for the UK's second round offshore wind program, designing the UK's Round 3 offshore wind program and advising the UK government on the operation of the United Nations Convention for Laws of the Sea (UNCLOS). Additionally, we represented the French government on the development of the first six offshore wind farm projects launched in that country and in connection with seabed leases, PPAs and transmission agreements for offshore wind projects.

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