



## Offshore Wind on the Horizon

BY MEGAN CLEVELAND

U.S. waters contain an estimated **2 terawatts** of potential offshore wind capacity—equivalent to approximately twice the capacity of current U.S. electricity generation and enough energy to power roughly 1.6 billion homes. Increased global adoption and technological advances have driven state policymakers to explore offshore wind development in domestic waters.

With additional transmission infrastructure, offshore wind could provide power for high-density coastal and Great Lakes states, which account for nearly **80 percent of U.S. electricity demand**.

Offshore winds are stronger and more consistent than onshore winds—providing more stable energy production—and are typically strongest during the day, when energy is in high demand. The U.S. Department of Energy estimates that offshore wind

development could create up to **160,000 jobs by 2050**, offering states significant coastal and economic development opportunities.

The first offshore wind project was installed in Denmark in 1991. Since then, several countries have developed robust markets. European countries dominate the market with approximately 11.7 gigawatts (GW) of installed capacity, accounting for **90 percent** of 2016 global installations.

The U.S. offshore wind market is nascent, yet growing. The **first commercial U.S. installation** began operation in December 2016. Located off Rhode Island, the 30-megawatt (MW) Block Island Wind Farm produces enough electricity to power **17,000 homes**. The domestic offshore wind pipeline includes at least 28 additional projects, totaling approximately 2.4 GW. Proposed installations are concentrated in the North Atlantic, where shallow waters make development more economical. While

**Did You Know?**

- U.S. waters contain more than 2 terawatts of offshore wind potential—enough to power 1.6 billion homes.
- The first commercial U.S. offshore wind installation began operation in December 2016 off the coast of Rhode Island.
- At least 13 states have developed offshore wind policies.

waters off the Pacific coast and Hawaii have greater offshore wind potential, they are too deep for current technology.

Although similar to onshore wind turbines, offshore turbines are larger, have greater generation capacity and are anchored to the seabed by foundation systems. To operate in harsh ocean environments, the turbines are modified to prevent corrosion and withstand storm waves, hurricane-force winds and ice flows. To connect to the grid, offshore turbines transmit electricity to a nearby service platform, which is connected to an onshore substation via a high voltage cable beneath the seabed.

Offshore wind faces technological and market barriers. More than **58 percent** of U.S. offshore wind potential is in waters too deep for conventional turbine technology. Although offshore wind costs are declining, they remain comparatively high. For example, the costs of offshore projects entering service in 2022 are nearly **three times higher** than the costs of efficient natural gas power plants and onshore wind projects. Additional concerns that researchers and developers are working to address include the turbines' visual impacts and effects on wildlife.

## State Action

States have authority over offshore wind development in waters up to three nautical miles from their shores. Wind project siting and permitting processes vary widely between states and public utility commissions, land use committees or siting boards generally oversee these processes. Several states, including [Maine](#), [Maryland](#), [New Jersey](#) and [Oregon](#), have developed specific offshore wind siting and permitting policies.

At least 13 states have established policies on offshore wind. States have taken a broad range of approaches to encourage development, with varying success. Over the past decade, several states established offshore wind provisions in their [renewable portfolio standards](#), commissioned feasibility studies and created incentives; however, these policies alone were not strong enough to encourage development.

Rhode Island legislation in 2010 ([H.B. 8083A](#), [S.B. 2819A](#)) provided for the development of the first commercial U.S. offshore wind project. In 2010, the Public Utilities Commission (PUC) [rejected](#) a power purchase agreement between Deepwater Wind and National Grid for a proposed project. In response, the legislature enacted the companion bills that allowed National Grid to enter into an amended agreement with new pricing terms and definitions to facilitate PUC approval of the Block Island Wind Farm, allowing for development to begin.

Recent state actions include mandating offshore

wind procurements and encouraging deep-water port development for offshore wind manufacturing and shipping. States are also working to address the lack of domestic manufacturing for these larger offshore turbines, which remains a barrier to deployment.

Massachusetts enacted [legislation](#) in 2016 mandating that electric utilities procure 1.6 GW of offshore wind by 2027. Additionally, the state completed an [assessment](#) of the potential of Massachusetts ports to participate in offshore wind activities.

In 2016, New York's governor [committed](#) to building 2.4 GW of offshore wind by 2030. In conjunction, the New York State Energy Research and Development Authority is developing an [action plan](#) to cost-effectively build offshore wind projects while driving economic development.

Maryland enacted [legislation](#) in 2013 that provided for offshore renewable energy credits (ORECs) for up to 2.5 percent of the state's electricity supply from offshore wind. In May 2017, the Public Service Commission [awarded](#) ORECs to two developers to finance and construct offshore wind projects totaling 368 MW. To receive the credits, the developers must invest in port infrastructure upgrades and local manufacturing.

## Federal Action

The 2005 Energy Policy Act authorized the [Bureau of Ocean Energy Management](#) (BOEM) to issue leases, easements and rights of way for alternative energy projects, including offshore wind, on the Outer Continental Shelf. In addition to BOEM, several [federal agencies](#) are involved in the permitting process for offshore wind. The leasing process includes several environmental compliance reviews, including those required by the National Environmental Policy Act.

Since 2009, BOEM has executed at least **14 leases** located off eight states for offshore wind development. Additionally, BOEM is assessing potential commercial interest for additional development in six areas off Hawaii and South Carolina.

In September 2016, the Department of Energy (DOE) and the Department of the Interior released a [National Offshore Wind Strategy](#), which outlines the environmental and economic benefits of offshore wind, identifies challenges to development and establishes a federal action plan. Additionally, DOE has [allocated](#) over \$200 million for offshore wind research, development and demonstration projects.

Congressional legislation on offshore wind was introduced in 2015 and in 2017. Offshore wind projects are eligible for the federal Renewable Energy Production Tax Credit.

## Additional Resources

[U.S. Department of Energy and Department of Interior National Offshore Wind Strategy](#)

[Northeast Wind Resource Center](#)

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