

So You Want To Build An Offshore Wind Farm

How The Offshore Wind Industry Can Help Stop Climate Change

By Benjamin Canton



<https://www.bp.com/en/global/corporate/news-and-insights/press-releases/bp-advances-offshore-wind-growth-strategy.html>

In August 2021, the intergovernmental panel on climate change (IPCC) released the most [comprehensive report](#) to date detailing the impact of climate change on the world, much of it irreversible and caused by humans. But not all hope is lost. It's still possible to avoid even worse effects of climate change. However, to do this will require an incredible reduction in carbon emissions. The world will have to move away from fossil fuels and switch to more sustainable sources to meet our energy needs. One way to accomplish this is offshore wind energy.

Anyone who's been to the ocean knows how windy it can be. The farther away from shore, the windier it gets. Even better, offshore wind is much more consistent in speed and direction than onshore wind, where obstructions like buildings or hills can affect the wind speed.

This makes the ocean a great location to build wind turbines. The motion of the wind spins the turbine blades which are attached to a generator. As the blades spin, the turbine creates electricity that can be [sent through transmission lines to the mainland](#) and used in existing electrical grids. To generate enough electricity to power a densely populated area, many of these turbines are built close to each other. This is called a wind farm.

So how can offshore wind help reduce the impact of climate change? About half of the population in the United States is [concentrated in large cities near the coast](#). Building offshore wind farms would provide [clean energy to all of those people](#) and would eliminate the need to transport and energy sources such as oil and gas. This would reduce carbon emissions into the atmosphere helping to slow climate change. Furthermore, the wind is essentially [unlimited](#). The national renewable energy laboratory estimates that the total amount of offshore wind resources [amounts to four times as much](#) as the country's energy usage. Other benefits include job creation and the [prevention of overfishing in wind farm locations](#).

Despite the potential of the wind to provide electricity to everyone on the U.S. coastline, this energy can't be harnessed without building wind farms. The offshore wind industry is very new in the U.S. and currently, [no commercial wind farms exist](#). There have been attempts to construct them in the past, although they often fail. One of these attempts, Cape Winds, highlights the potential drawbacks of building offshore wind farms. The Cape Winds project was supposed to be located in Nantucket Sound, off the coast of Cape Cod. However, the wind farm was still visible to residents. Many of them were rich and had considerable influence. The Cape winds project [became caught up](#) in costly legal battles and was eventually abandoned in 2017. Additionally, the fact that the farm was visible from the coastline caused [potential issues](#) for

property values and the tourism industry. Adverse impacts on marine life and birds were also a factor.



Recent technological advances in floating wind turbines can help solve these issues. Unlike near-shore turbines, which are attached to the sea bed using monopiles, floating wind turbines are placed on floating platforms that are attached to the ocean floor using mooring lines. This allows floating turbines to be placed farther away from the shoreline, out of sight from the mainland. This is especially relevant in areas with deep water, such as off the coast of California, where the ocean floor is too deep to support fixed-bottom turbines. Placing the turbines farther away from shore also allows them to access even stronger winds.



<https://www.windpowerengineering.com/comparing-offshore-wind-turbine-foundations/>

Floating turbines have their own set of issues though. They are [much more expensive](#) than fixed turbines and the cost of energy can exceed 200USD/MWh, about four times as much



as the cost/MWh for a fixed offshore turbine. The floating platforms also use more material, especially steel, than their fixed counterparts. This is an [issue because steel production is a major emitter of greenhouse gases](#). Since the floating platform is not fixed to the ground, wind and waves can interact with the platform causing it to move, creating new engineering challenges involving stabilizing the turbine.

These issues demonstrate the need for investment in the offshore wind industry to fund both commercial wind farms and research in new offshore wind technologies. This is already starting to happen. The Biden administration recently approved the offshore wind farm, Vineyard Winds, which is estimated to start generating electricity in 2023 and will be able to [power 400,000 homes by 2023](#) after construction is finished. Additionally, technological advances in floating wind turbine technology are estimated to lower the [cost of production by 70%](#) by 2050. This will make offshore wind turbines more affordable to construct, allowing them to become a competitive alternative to fossil fuels and a more attractive option for investors.