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Offshore Wind: America's Neglected Renewable Energy Source



By Gemma Alexander

OCT 3, 2022 Electricity, offshore wind, Wind Power



The world's largest wind farm just became fully operational. On August 31, 2022, the second of [four planned wind farms](#) located 55 miles off the coast of Yorkshire, England, powered up. [Hornsea 2](#) can generate enough electricity to power a city the size of Manchester. Its 165 turbines each stand more than 650 feet above sea level; a single rotation of the 250-foot blades takes six seconds and powers a home for a day. All that energy without fossil fuels sounds like a good thing. But wind power seems to have more opponents than other renewable energy sources. What's the problem?

Wind Power

Wind [generates electricity](#) by turning the blades of a turbine, which spins magnets. The spinning magnets generate voltage in a coil of wire. Like solar power, wind is truly renewable and nonpolluting during operations. But unlike solar panels, wind turbines are not made from [toxic materials](#). Relative to other power sources, terrestrial wind farms have a much smaller footprint, and much of the land under a wind farm remains vegetated. [Offshore wind farms](#) do not compete with other land uses like terrestrial wind farms, and reliably windy areas are more abundant in the sea.

What Do You Think?

Are you considering moving because of climate change?

- I'm researching my options to decide
- No
- Yes

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[Distributed wind systems](#) in which a windmill directly powers individual buildings are an option for off-grid living. But as the UK demonstrates, utility-scale farms – on land or offshore – can produce a significant portion of a nation’s electrical power.

Offshore Wind Farms

Forty percent of the electricity in the UK is renewable (up from 11% a decade ago), with offshore wind the largest component. In Britain, offshore wind energy is now [cheaper](#) to produce than gas power. Offshore wind farms are located up to 100 miles from land, in water up to 100 feet deep. Undersea cables connected to coastal load centers feed the energy into the electric grid. They are usually constructed on bases anchored at the bottom of the sea. But new designs for [floating turbines](#) will allow wind farm construction in deeper water with potentially less disruption of the sea floor. Offshore wind farms take longer and are more expensive to build than terrestrial ones. But they can use larger turbines to produce even more power.

Only [12% of electricity in the U.S.](#) comes from nonhydroelectric renewable energy. In 2021, wind turbines generated [about 9%](#) of total U.S. utility-scale electricity generation. The United States only has two functioning offshore wind farms: [Block Island](#) off the coast of Rhode Island and the [Coastal Virginia Offshore Wind](#) project. But there are [40 offshore wind projects](#) in development.

Power Problems

The Department of Energy estimates that U.S. offshore winds have the potential to produce [nearly double](#) the amount of electricity the U.S. needs. However, [two-thirds](#) of the U.S.’ offshore wind energy potential is located in deep water, inaccessible to conventional offshore turbines. But that is not the only barrier to renewable wind power in the U.S.

During the decade in which the UK jumped to 40% offshore wind power, the offshore wind industry in the United States [was slowed](#) by litigation, protracted permitting, [NIMBYism](#), unfavorable energy markets, and complex regulatory frameworks like the “[Jones Act](#)” requiring all merchandise transported within the United States be carried by an American-owned and -operated vessel. Offshore turbines require specialized ships for transport and installation; European companies own nearly all of them.



Wind farms are more expensive to build offshore than on land. But offshore wind farms can use larger turbines to generate more power. Pictured: Wind farm construction in the Baltic Sea

Environmental Impacts

Wind farms' biggest environmental impact is on wildlife, particularly birds and bats. [Estimates indicate](#) that wind farms kill orders of magnitude fewer birds in North America than [domesticated cats](#) do, a number that is negligible compared to the impact of [climate change](#) from other energy sources on birds. This data is based on terrestrial turbines. There is [less information](#) about the potential impacts of offshore turbines. But it's reasonable to assume similar issues and impacts would apply. Migratory routes should be a consideration when siting wind farms, and the industry should continue [developing](#) safer wind farm designs and bird avoidance systems.

As with solar, another concern is [nonrecyclable waste](#). Turbine blades are not recyclable, but they can be [repurposed](#) as footbridges, cell phone towers, and other structures.

The U.S. Department of Energy funds research through the [Wind Energy Technologies Office](#) to better understand and mitigate the negative impacts of wind power.

Support Wind

As other nations begin to reap the rewards of their investment in affordable, sustainable offshore wind power, more Americans are beginning to support its development here. The Biden administration recently [announced](#) initiatives to develop new floating offshore wind platforms. The goal is to develop 30 gigawatts of offshore wind power by 2030. That could power 10 million homes with clean energy, support 77,000 jobs, and spur private investment along the supply chain.

Until now, most progress in offshore wind development has been made at the state level. Residents of coastal states can let their [state representatives](#) know that they support wind energy; others can encourage their [federal representatives](#) to support Biden's initiative. Sponsored by the American Clean Power Association, [Support Offshore Wind](#) provides news updates, case studies, and other information for those who want to learn more about wind power in the U.S.

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