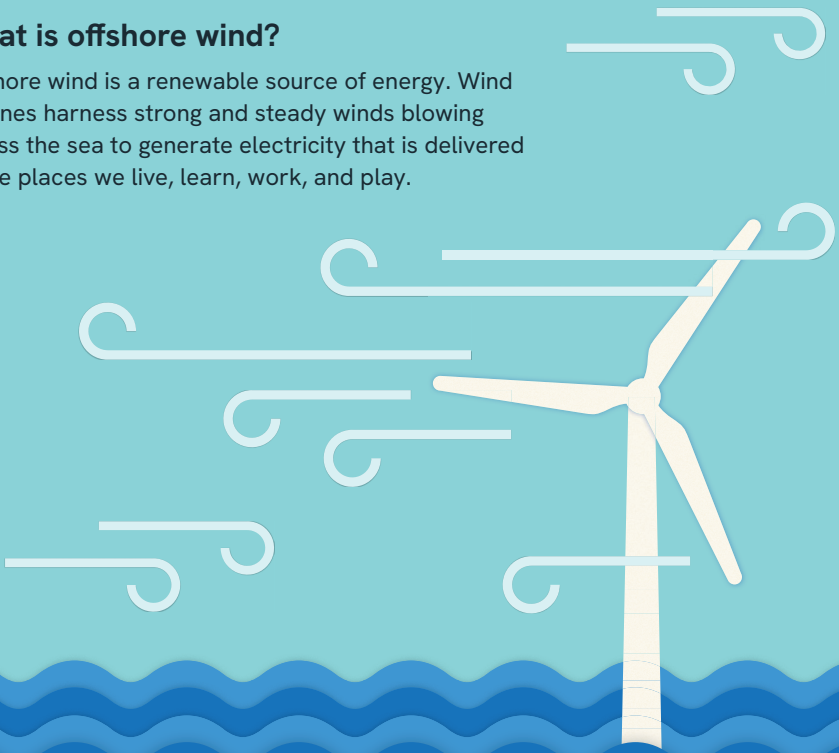




As the wind blows, electricity flows!

What is offshore wind?

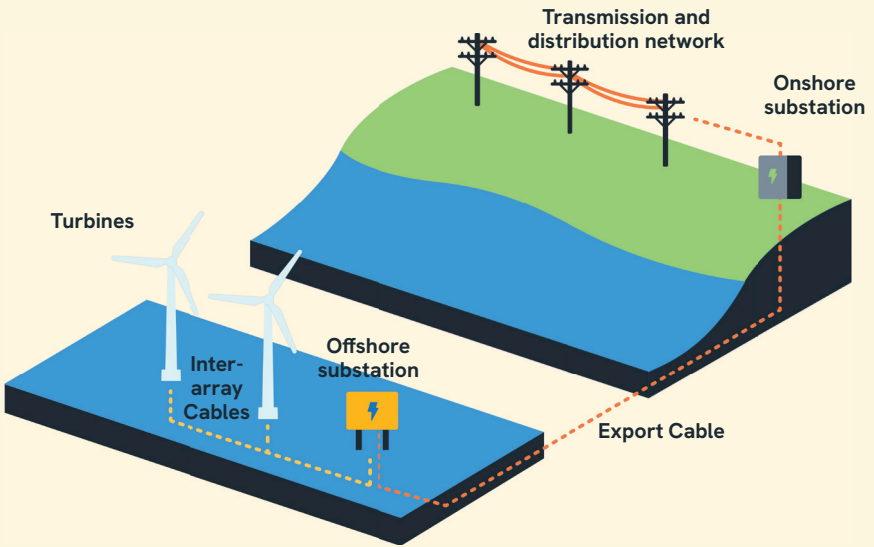
Offshore wind is a renewable source of energy. Wind turbines harness strong and steady winds blowing across the sea to generate electricity that is delivered to the places we live, learn, work, and play.



Off shore wind projects will provide clean, locally produced electricity, help reduce greenhouse gas emissions, and bring significant investments and well-paying jobs to New York. Visit offshorewind.nyc to learn more.

How Does It Work?

Offshore wind turbines capture the wind's energy to generate electricity. As wind blows, the blades of the offshore wind turbines spin, turning an electric generator to produce electricity. The electricity flows through cables first to an offshore substation then to an onshore substation. Electricity is transferred to the existing local electricity utility transmission and distribution network until it reaches our homes!



A Tale of Two Grids

In 2021, **92 percent** of Upstate New York's electricity came from clean energy while **89 percent** of electricity Downstate came from fossil fuels. Offshore wind will help bring cleaner and more renewable energy to New York City!

New York State Offshore Wind Goals

- In 2019, the landmark Climate Leadership and Community Protection Act was signed into law, requiring the State to transition to a 100 percent zero-emission electricity system by 2040 and to reduce greenhouse gas emissions 85 percent below 1990 levels by 2050.
- This law requires at least 70 percent of New York's electricity come from renewable energy sources by 2030 and the development of 9,000 megawatts of offshore wind energy by 2035. This is enough offshore wind power to power up to six million homes (for reference, NYC alone contains 3.5 million homes!)

New York City Offshore Wind Goals

- The City of New York has committed to transforming our fossil fuel dependent electricity grid to be 100 percent emissions free by 2040.
- Over the next 15 years, the City of New York has committed to becoming an equitable hub for the offshore wind industry and supporting the development of offshore wind farms out of local port facilities. The City will also ensure that the benefits of the offshore wind industry reach underserved populations and grow the local economy through offshore wind investments.



One full rotation of the turbine blades generates enough energy to provide electricity to a New York City household for 1.5 days.

Where will offshore wind farms be located?

New York's offshore wind projects will be located many miles from shore in the Atlantic Ocean. The closest offshore wind farm to New York's coast will be the Empire Wind 1 project, located approximately 14 miles from Jones Beach State Park on Long Island.

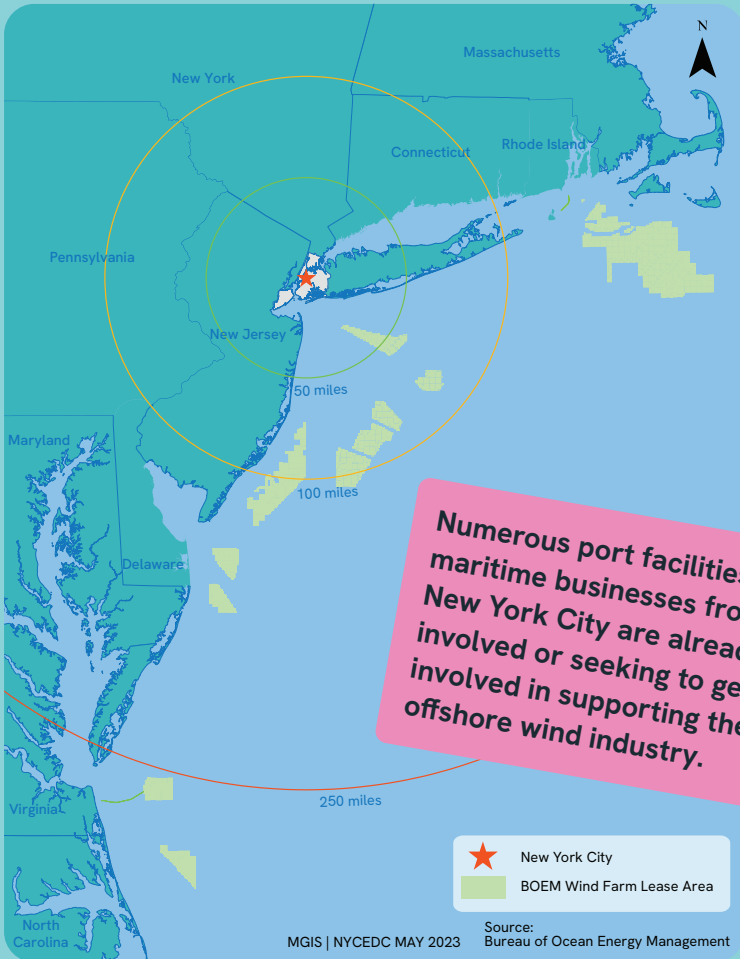
All current offshore wind projects will be at least 14 and up to 63 miles away from the coast— the majority of turbines will be too far to see from New York City's harbors and beaches.

On a perfectly clear day, if you fully extend your arm and look at your thumb from Jones Beach (Long Island), turbines will be visible at less than a quarter the size of your thumbnail. From New York City beaches, the majority of turbines will be too far to see.



As of early 2023, New York has five offshore wind projects in active development, totaling more than 4,300 megawatts. That’s enough energy to power more than 2.4 million homes. The City of New York will directly support the development of three of these five offshore wind farms through the redevelopment of the municipally-owned South Brooklyn Marine Terminal (SBMT). SBMT will support the following offshore wind activities:

- Staging and assembly
- Operations and maintenance
- Sub-station / interconnection



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Planning and Development

Offshore activities and infrastructure for an offshore wind project



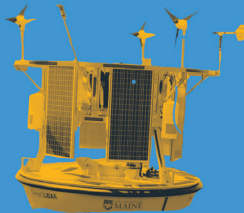
Offshore ornithological and mammal-surveying craft

Bird and marine mammal survey aircraft collect data to inform responsible development practices.



Geological and hydrographical surveys

These surveys gather data about the sea floor environment to inform offshore wind farm sites and cable routes.



Wind resource and metocean assessment

These assessments help to provide data from the atmosphere and ocean to help determine where to build wind farms.

Construction and Installation

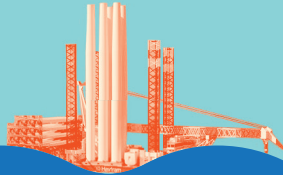
Weather and ocean data

Weather forecasting and metocean data (information about wave heights, wind speeds, etc) is needed to plan for offshore wind farm installation schedules.



Wind turbine installation vehicle

This vessel transports the turbine components to the site and installs the turbine on the foundation.



Offshore substation

These substations are used to collect and convert each turbine's electricity into a voltage high enough to make the journey to shore.



Monopile

Monopiles support the weight of a wind turbine by anchoring it firmly into the sea bed.



Jacket

Jacket foundations support the weight of the wind turbine by anchoring it firmly into the seabed using a set of pin piles.



Jack-up installation vessel

Vessel that transports and installs various large-scale components of offshore wind farms by using retractable legs to lift the vessel above sea level.

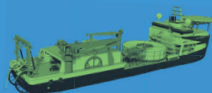


Array cable

Array cables connect all wind turbines to the offshore substation.

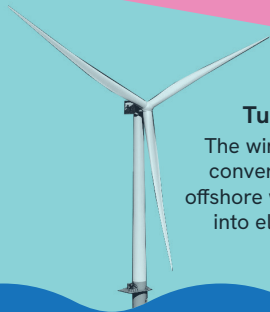
Cable-laying vessel

This vessel lays the cables between the wind turbines and offshore substations and between the offshore and onshore substations.



Operations and Maintenance

Fun fact: Did you know? Every vessel working on offshore wind energy has a Protected Species Observer on board looking out for wildlife. If any species from a sea turtle to a whale is spotted, operations are paused until the coast is clear.



Turbine
The wind turbine converts kinetic offshore wind energy into electricity.



Service operation vessel (SOVs)

SOVs provide workers with an offshore operation, maintenance, and service base. Workers usually work two to four weeks out at sea!

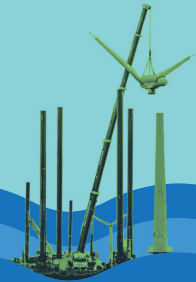


Crew transfer vessel (CTVs)

CTVs provide access for offshore wind technicians and workers to the wind turbines to perform maintenance on the wind turbines.

Decommissioning or Repowering

- At the end of the useful lifecycle of an offshore wind farm, it can either be decommissioned or repowered.
- Decommissioning is the removal and shipment to shore of all turbine and offshore wind components including the turbine, rotor, nacelle, and tower.
- Repowering involves replacing older wind turbine units with new, higher capacity turbines or retrofitting them with more efficient components to extend the life of a wind farm.



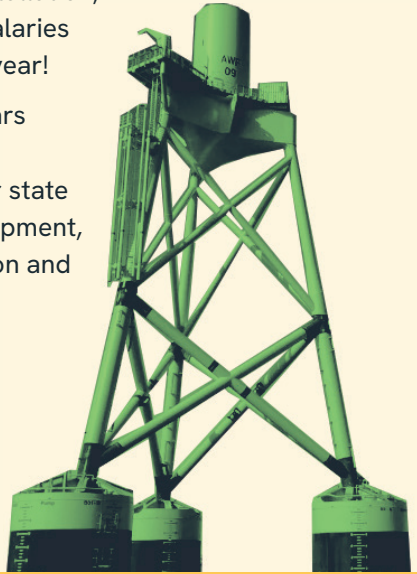
Offshore wind developments can generally be delineated into one of the following five phases: Planning and development, manufacturing and assembly, construction and installation, operations and maintenance, and decommissioning or repowering.

Activities across these five phases can occur both onshore and offshore. Onshore activities include but are not limited to, manufacturing of large offshore wind farm components, public engagement, electrical studies, surveys, port construction, engineering, permitting, and more! Depicted on this spread are major components, vessels, and activities that occur to develop an offshore wind farm.

Working in Offshore Wind

New York's five offshore wind projects alone will generate more than \$12.1 billion of economic activity across the state, including New York City. These wind farms will support more than 6,800 jobs in development, manufacturing, installation, and operations and maintenance with salaries averaging approximately \$100,000 per year!

In the next two decades, billions of dollars are being invested into New York State's offshore wind energy infrastructure. Our state will see thousands of new jobs in development, manufacturing, installation, and operation and maintenance of offshore wind facilities.



New York State is taking new steps to support workforce development in partnership with the offshore wind industry, including a \$20 million Offshore Wind Training Institute (OWTI), a \$10 million National Offshore Wind Training Center (NOWTC) with Sunrise Wind, and a New York City focused \$5 million Ecosystem Fund with Equinor to establish the statewide infrastructure to educate, train, and employ workers in offshore wind. New York City has invested \$10.5 million in the City University of New York (CUNY) to build the necessary training facilities and programs to help New Yorkers gain meaningful employment in the offshore wind industry. These investments will particularly benefit New York's low-income and environmental justice communities.

To learn more about offshore wind career pathways and training opportunities, visit offshorewindtraining.ny.gov.

What kind of work can I do in offshore wind?

There are 118 occupations needed in the offshore wind industry across five phases of an offshore wind farm's lifecycle.

● **Planning & development**

Design of offshore wind projects and identification of supply chain needs

● **Manufacturing & assembly**

Creating and putting together all the components that make up a wind turbine

● **Construction & installation**

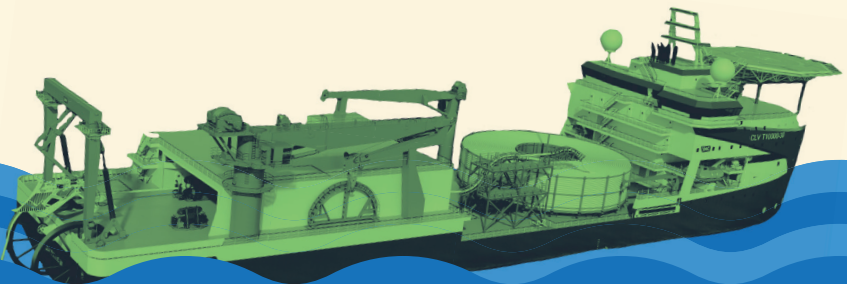
Construction of onshore facilities (including ports and substations) and offshore substation, cable laying, storage and assembly of parts, and installation of turbine components

● **Support Services**

Work to support the other aforementioned phases of work, which could include transportation, training, research, and consulting.

● **Operations & management**

Servicing turbines, vessels, and other parts of an offshore wind farm to maintain operations



Moving Toward a Clean Energy Future

Off shore wind energy will play an important role in meeting New York's goal of 70 percent renewable electricity by 2030 and 100 percent zero-emission electricity by 2040 as mandated by the Climate Leadership and Community Protection Act (Climate Act). New York is building a more reliable, resilient electric grid for the climate of today and tomorrow.

To learn more about offshore wind visit, offshorewind.nyc.

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