

Overview of New York State's Great Lakes Wind Energy Feasibility Study

Gwen Gallagher

Coastal Climate Specialist email: geg59@cornell.edu

What is the Great Lakes Wind Feasibility Study?

In 2020, New York State Energy Research and Development Authority (NYSERDA) was instructed by New York State (NYS) Public Service Commission to conduct a feasibility study for offshore wind in the Great Lakes (GL), specifically in Lake Ontario and Lake Erie.

In 2022, NYSERDA released the <u>New York State</u> <u>Great Lakes Wind Energy Feasibility Study Report</u>,

which included 12 supplemental technical reports, and a white paper. In the white paper, NYSERDA summarized the key findings in the Feasibility Study, analyzed the potential role of offshore wind from Lake Erie and Lake Ontario in the State's renewable energy portfolio, and assessed if GL Wind could contribute to the Climate Act goal of 70% renewable energy by 2030.

NYSERDA concluded that "Great Lakes Wind currently does not offer a unique, critical, or costeffective contribution toward the achievement of New York State's Climate Act goals beyond what existing, more cost-competitive programs are currently expected to deliver."

In other words: NYSERDA does not recommend that NYS pursue offshore wind in the GL at this time.

What topics does the report cover?

- Freshwater wind energy in the GL
- Ports and Vessel Infrastructure, Supply Chain
- Interconnection
- Project Costs and Benefits
- Environmental impacts, human resources and shared uses, permitting
- Stakeholder perspectives

How much offshore wind energy (OWE) could be generated in Lake Erie and Lake Ontario?

In order to study the physical characteristics of the lake, including potential wind energy generation, the lakes were analyzed in a 2x2 mile grid, as shown below. The researchers focused on 4+ miles from shore in order to avoid expected nearshore visual and environmental impacts.

The study assumed 4-7 MW turbines, which are smaller than typical turbines planned for the Atlantic Ocean. The table below details the potential energy generation at different distances from shore. Overall, Lake Erie could generate up to 2 GW and Lake Ontario could generate up to 18 GW.

Could existing ports in the GL support offshore wind infrastructure?

The study investigated 7 ports, 4 on Lake Ontario and



3 on Lake Erie, to determine what modifications would be needed to meet OWE port requirements. The table below details specific port requirements such as: channel depth, crane availability, quayside space, and air draft (constraints include bridges or powerlines). All ports would require significant upgrades, but the most promising options presented were Oswego, Buffalo, and Erie. Although Dunkirk is not unfeasible, the port is relatively small and has minimal space to expand.

| | | Channel Depth | Cranes | Quayside Space | Air Draft |
|--------------|------------|------------------|--------|-------------------|--------------|
| Lake Ontario | Ogdensburg | | | | |
| | Clayton | | | | |
| | Oswego | | | | |
| | Rochester | | | | |
| Lake Erie | Buffalo | | | | |
| | Dunkirk | | | | |
| | Erie, PA | | | | |

Table of ports detailing if they fulfill OWE port requirements. The port is either ready to go (green), would need modifications (yellow), or is unfeasible (red). Adapted from NYS GL Wind Energy Feasibility Study: Infrastructure Assessment.

What about vessels?

In addition to port limitations, there are offshore wind vessel constraints as well. The study investigated 9 vessel types needed for offshore wind construction and maintenance and found that most of the vessels are too large to transit the locks and canals. The study outlined some vessel solutions, including custom-built vessels for the GL or non-conventional adaptations to existing vessels.

How would OWE in the GL connect to the grid?

In order for OWE to connect to the grid, there are a few things to consider, including:

- Headroom, or the capability of the grid to support additional energy generation
- Nearby available Points of Interconnection (POI), or locations where OWE could deliver power to the land-based grid. All POI considered were within 20 miles of the lakes
- Potential for simple transmission upgrades, which are less costly than new transmission projects

The study found that there is limited headroom capacity to connect OWE, and noted that OWE would have to compete with other renewables.

How would OWE in the GL impact wildlife and habitats?

Birds and Bats: The study area of Lake Erie and Lake Ontario falls within the Atlantic flyway migratory path. Thirty-four migratory birds that use this path are

endangered, threatened, or species of concern. Bird clades that rely on the Great Lakes are: water birds, shorebirds, land birds, raptors, and gulls and terns. Their use of the GL is varied – some forage nearshore and/or offshore and many nest, stopover, and roost in nearshore habitats. Less is known about bats, but important habitats for birds likely overlap with important areas for bats.

 Potential impacts include: displacement, behavioral disturbance, short-term habitat changes <u>during</u> <u>construction</u> and displacement, collision, lighting attraction, and reef effects <u>during operations</u>.

Invertebrates: More research is needed to understand distribution of different invertebrate species beyond depth and substrate preferences. The study notes that Zebra Mussels and Quagga Mussels, both invasive, can colonize hard substrates like OWE infrastructure.

• Potential impacts include: turbidity, injury/mortality, contaminant release <u>during construction</u> and displacement, connectivity, and creation/modification/ fragmentation of habitat <u>during operations</u>.

► Fish: Almost all fish in Lake Erie and Lake Ontario use nearshore (<15 m depth) for spawning and early life stages, use offshore and/or deep benthic zones as adults, and many migrate. There are 10 endangered, threatened, or species of special concern in the study area, 8 of which reside in the nearshore zone.

 Potential impacts include: behavioral disturbance, displacement, injury/mortality, contaminant release, turbidity <u>during construction</u> and behavior disturbance, displacement, and reef effect <u>during</u> <u>operations</u>. Fish with swim bladders would be more sensitive to sound/ particle motion during construction.

Habitats: Lake Ontario and Lake Erie's shoreline habitats include wetlands and dunes, as well as sensitive habitats such as: critical habitats for endangered species, Areas of Concern, a proposed National Marine Sanctuary, NYS Critical Environmental Areas, and significant coastal fish and wildlife habitats. These habitat constraints would have to be considered during siting.

References for this fact sheet include: NYS GL Wind Energy Feasibility Study Report, NYSERDA White Paper, and the Physical Siting Analysis, Infrastructure Assessment, Interconnection, and Relative Risks, Minimization/Mitigation, and Benefits technical reports, all found on NYSERDA's <u>feasibility study website</u>.



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New York Sea Grant Stony Brook University IDC Building, Suite 102 500 Innovation Road Stony Brook, NY 11794-5001

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