SUBMISSION | Marine Renewables Canada Comments on Ontario Integrated Energy Resource Plan Consultation

Submitted to: Policy Coordination and Outreach Branch, Ministry of Energy and Electrification
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Marine Renewables Canada (MRC) is the national association for offshore wind, tidal, wave, and river current energy, representing 180 members including technology and project developers, suppliers, researchers, and communities. Many of MRC's members are focused on realizing offshore wind development opportunities in Canada, including companies already developing offshore wind projects internationally, as well as numerous suppliers who have a wealth of experience from working in Canada's offshore and marine industries. Through this membership, MRC is the voice for the offshore wind industry in Canada and has been advocating for a supportive and predictable policies that can both catalyze growth and ensure sustainable development of the sector.

Given work underway by the Ministry of Energy and Electrification to build out an affordable, reliable and clean energy system to meet the exception growth needs of Ontario, MRC believes it is an ideal time to highlight how harnessing offshore wind in the Great Lakes could support Ontario's clean electricity needs. MRC is pleased to have this opportunity to provide input on how offshore wind could be considered in Ontario's *Integrated Energy Resource Plan*, which will consider the long-term view of energy use across the economy and all sources of energy. We look forward to future discussions on this topic with the Government of Ontario and are readily available to provide assistance and/or additional information beyond this submission to support policy and planning efforts.

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1 Great Lakes Offshore Wind Potential

Wind resource assessments estimate that the Great Lakes' potential power capacity is 160 gigawatts for fixed-bottom wind turbines and about 415 gigawatts for floating wind energy systems[1]. Wind speeds are over 9 metres/second in many parts of the Great Lakes, offering a strong and consistent energy resource.

In the past, Ontario has explored the possibility of offshore wind in the Great Lakes, which could provide clean electricity to densely populated areas proximate to the shores. According to a 2008 report

[1] National Renewable Energy Lab (NREL), 2023, *"Exploring Offshore Wind Energy Opportunities in the Great Lakes."* *https://www.nrel.gov/news/program/2023/exploring-offshore-wind-energy-opportunities-in-the-great-lakes.html*

prepared for the Ontario Power Authority by Helimax Energy Inc., wind farms located at 64 sites in the Great Lakes could produce 111.5 terawatt-hours (TWh) of electricity per year.[2] Given the evolution of offshore wind technologies, with new individual turbines up to 15 MW, it is likely that this potential is now even greater due to efficiencies realized and greater capacity factors.

With both Greater Toronto and Hamilton Area, bordering Lake Ontario, close to one third of Canada's population could benefit from future offshore wind development in the Great Lakes. In fact, offshore wind could provide enough clean electricity to meet all of Ontario's growing demand while ensuring affordability, according to report published by the Ontario Clean Air Alliance.[3]

Given, the Ontario Independent Electricity System Operator's (IESO) projection of increased electricity demand of 115% by 2050, its 2022 *Pathways to Decarbonization* report, which outlines a strategy to move Ontario to net zero GHG emissions by 2050 by meeting 65% of the incremental electricity needs with new renewable energy and the remaining 35% with new nuclear. Importantly, it points out that "offshore wind was assumed to be available for development in the Pathways scenario" despite the current moratorium on offshore wind development in the Great Lakes and proposes offshore wind providing 11 TWh toward new electricity supply by 2050.

2 Opportunities and Benefits

While offshore wind has not yet been developed in Ontario, it remains a significant untapped resource that can help meet clean electricity demand and merits consideration. Developing offshore wind in the Great Lakes offers the following opportunities and benefits:

- **Higher capacity factors, more electricity:** Offshore winds in the Great Lakes differ from onshore winds. With a capacity factor of up to 42% (compared to 37% for onshore wind and 16.9% for solar in 2022)[4], offshore wind can produce large amounts of clean electricity that can help meet Ontario's increasing clean electricity demands. Offshore wind is also a more consistent resource than other variable renewable energy resources, offering advantages when it comes to system planning and integration.

- **Affordability:** The offshore wind industry has experienced dramatic cost reductions over the last 10 years, evidenced by the global weighted average levelized cost of energy (LCOE) for offshore wind declining by 59% to USD 8.1¢/kWh.[5] As offshore wind deployment continues to increase

[2] Ontario Clean Air Alliance, 2023. *"Great Lakes Wind Power: Now is the Time*.**"** https://www.cleanairalliance.org/wp-content/uploads/2023/04/Great-Lakes-Wind-Report-apr-17-v_01.pdf
[3] Ontario Clean Air Alliance, 2023.
[4] International Renewable Energy Agency, 2023, "*Renewable Power Generation Costs in 2022*", https://mc-cd8320d4-36a1-40ac-83cc-3389-cdn-endpoint.azureedge.net/-/media/Files/IRENA/Agency/Publication/2023/Aug/IRENA_Renewable_power_generation_costs_in_2022.pdf?rev=cccb713bf8294cc5bec3f870e1fa15c2 [IRENA 2023].
[5] IRENA 2023, Note 4.

worldwide, costs will continue to decrease, making this abundant source of renewable energy more affordable.

- **Local economic development and new jobs:** Globally, the offshore wind market is growing quickly, with over 75 GW installed capacity[6] and an estimated market value of up to $1 trillion by 2040,[7] according to a recent report from the International Energy Agency. As Atlantic Canada has begun to pursue offshore wind, several studies have been conducted to estimate the local economic impact. One study[8] conducted by the Atlantic Economic Council estimated that just during the early stages of offshore wind development (i.e. between 2024-2030) the total construction value for offshore wind could be about $7 billion. As a result of the capital intensiveness of offshore wind, the Atlantic Economic Council also concluded that offshore wind projects could create significant local benefits, due to offshore installation, subsea work, research and development, and other supply chain requirements which could largely be completed locally. The study estimated that achieving Nova Scotia's initial 5 gigawatt (GW) goal for offshore wind development, could create 5,000 jobs in Canada.[9] While a similar study has not yet been conducted for Great Lakes offshore wind development recently, given the nature of development and required activity in close proximity to a project, it can be expected that similar impacts would be realized in Ontario.

3 Recommended Actions to Support Offshore Wind

Given the potential offshore wind development in the Great Lakes has for producing reliable and affordable clean electricity for Ontario, **MRC's overarching recommendation is to include offshore wind in Ontario's Integrated Energy Resource Plan and future electricity planning as an integral resource to help meet future electricity demand.**

To support this recommendation, MRC offers **suggested actions to help enable responsible and sustainable development of offshore wind** in the Great Lakes.

a. Lift the Moratorium on Offshore Wind Development

The moratorium on offshore wind development in the Great Lakes has been in place since 2011, pointing to the need for more scientific research before development could move forward. Since then, the Ontario Ministry of Natural Resources undertook some studies on the impacts of

[6] Global Wind Energy Council, 2023, "*Global Offshore Wind Report 2023.*" https://gwec.net/global-offshore-wind-report-2024/#:~:text=A%20total%20of%2075%20GW,by%20the%20end%20of%202033.
[7] International Energy Agency, 2019, "*Offshore Wind Outlook 2019*", https://iea.blob.core.windows.net/assets/495ab264-4ddf-4b68-b9c0-514295ff40a7/Offshore_Wind_Outlook_2019.pdf.
[8] Atlantic Economic Council, 2024. *"Implications for Atlantic Canada's Economy in the Pursuit of Net-Zero Emissions: Economic Opportunities with Existing Clean Energy Technologies."* https://cdn.ymaws.com/atlanticeconomiccouncil.ca/resource/collection/49A8EE1E-D8BE-4955-B708-CD3EBE5AC6D9/Net-Zero_-_Wind-Hydro-Gas__Jan31,_2024_.pdf [Atlantic Economic Council Report].
[9] Atlantic Economic Council Report, Note 9.

offshore wind farms on fish and fish habitat, with the report concluding that offshore wind can be implemented with minimal aquatic impacts if proper mitigation measures are applied and appropriate baseline and effects monitoring is conducted."[10] [11]

To establish an environment of investment certainty and regulatory predictability, the moratorium should be lifted. Otherwise, Ontario continues to risk missing out on the billions of dollars of investment that are going into offshore wind globally. Investors will go to jurisdictions that have an optimal environment for success which includes a strong resource and a predictable regime. As offshore wind will be needed to meet Ontario's 2050 electricity demand and net zero goals, lifting the moratorium now will position the province to pursue offshore wind as part of its electricity mix.

b. Support Enabling Research and Commission an Assessment of Great Lakes Offshore Wind Opportunities and Challenges

In parallel with lifting the moratorium, enabling research should be conducted that analyzes any existing scientific and/or data gaps. This will help de-risk development, ensuring that development moves forward responsibly and begins with a solid understanding of potential impacts and sufficient mitigation measures to meet regulatory requirements. While some research has already been conducted to answer key questions on environmental impacts, decommissioning, technical aspects, etc., a broader study similar to the recent National Renewable Energy Lab[12] assessment of the United States Great Lakes would help to identify broader economic impacts of development as well as other factors that would support the sustainable growth of offshore wind such as infrastructure, vessels, technology options, electric grid connection and integration, supply chain and workforce, and impacts (positive and negative) on Indigenous peoples and communities. This suggested research should not delay or pause progress towards development, but instead work in parallel, to facilitate responsible development approaches and regulatory processes.

c. Leverage and Engage in Offshore Wind Enabling Activities Already Underway

Initiatives led by both federal and provincial governments to support offshore wind development in Atlantic Canada have been underway for several years. These include regional assessments of offshore wind for Nova Scotia and Newfoundland and Labrador, amendments to the offshore Accord Acts federally and provincially to establish a regulatory framework for offshore renewables, development of *Offshore Renewable Energy Regulations* under the *Canadian Energy Regulator Act*, numerous studies and data collection, review of land tenure and auction

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[10] Ontario Ministry of Natural Resources, 2011. *"Offshore Wind Power Projects in the Great Lakes: Background Information and Science Considerations for Fish and Fish Habitat, Aquatic Research Series"* https://www.ontario.ca/page/research-related-renewable-energy-projects

[11] Ontario Clean Air Alliance, 2023.

[12] NREL, 2023. "*Great Lakes Wind Energy Challenges and Opportunities Assessment.*" https://www.nrel.gov/docs/fy23osti/84605.pdf

processes internationally, and an extensive supply chain study that is currently underway and being led by MRC.

While the environment of the Great Lakes is notably different than the Atlantic Ocean and not all initiatives and tools being developed would be relevant or applicable, a great deal of information, enabling policies, and lessons learned could be leveraged to support offshore wind activities in the Great Lakes. There is an opportunity for Ontario to engage in these discussions with federal and provincial counterparts that would help support and possibly accelerate offshore wind development in the province.