

## Offshore Wind: ECCC Input and Analysis

The information provided herein is presented in response to the June 17, 2024 RA Information Request for ECCC.

### Strategic Assessment of Climate Change:

The [Strategic Assessment of Climate Change](#) and its associated technical guides describes the greenhouse gas and climate change information that proponents of designated projects need to submit at each phase of a federal impact assessment. It also explains how the Impact Assessment Agency of Canada or lifecycle regulators, with support from expert federal authorities, will review, comment on and complement the climate change information provided by proponents.

Offshore wind projects, if designated, would need to follow the climate change and greenhouse gas (GHG) guidance presented in the SACC and the Technical Guides, and consider the GHG emissions from the construction (including pre-construction), operations, and decommissioning phases of off-shore wind projects.

### Offshore Wind Scope:

At this time, ECCC is unable to comment on the exact GHG emissions likely to be produced by the construction, operations and decommissioning of off-shore wind power within the PFDA's due to variability in project factors and unavailability of Canada-specific and project-specific data.

Emissions from offshore wind projects can vary depending on many factors, including water depth, distance from shore, type of platform (floating or fixed), the size of the turbines, the number of turbines, and vessel types used. These factors are not yet known for the PFDA's.

During the construction phase, GHG emissions would result from activities related to development (including surveys of the area), the transportation of components, seabed preparation, foundation installation, cable laying, wind turbine installation, sub-station installation, and crew transportation.

During the operations phase, GHG emissions would result from activities including inspection of equipment, maintenance, and the replacement of components.

During the decommissioning phase, GHG emissions would result from the removal of the foundation, the cables, and wind turbine, as well as dredging and the transportation of components and crew.

Table 1 below outlines the potential equipment used in each phase of the project's lifetime:

*Table 1: Offshore Wind Project Activities<sup>1</sup>*

<b>Project Phase</b>	<b>Equipment used</b>
Construction	<ul style="list-style-type: none"><li>- Survey vessels</li><li>- Barges, tugs, transportation vessels</li></ul>

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<sup>1</sup> [NYSERDA Webinar Vessel Types 11May2022 \(1\).pdf](#)

	<ul style="list-style-type: none"> <li>- Dredging vessels, fall pipe vessels</li> <li>- Lifting and crane vessels</li> <li>- Cable laying vessels</li> <li>- Semi-submersible vessels</li> <li>- Crew vessels</li> </ul>
Operations	<ul style="list-style-type: none"> <li>- Crew vessels</li> <li>- Service and diving vessels</li> <li>- Heavy machinery</li> <li>- Crane vessels</li> </ul>
Decommissioning	Similar equipment to the construction phase

#### Nova Scotian Grid and Current Conditions:

According to Canada's [National Inventory Report](#), in 2022 Nova Scotia emitted 5790 kt CO<sub>2</sub>eq from the production of electricity. Coal is the largest source of both GHG emissions and electricity produced, followed by natural gas and other combusted fuels. Table 2 below outlines the GHG emissions from Nova Scotia's electricity generation in 2022, broken down by generation source.<sup>2</sup> It should be noted that there are currently no operating offshore wind projects in Canadian waters.

*Table 2: NIR - Electricity Production in Nova Scotia*

<b>Electricity Generation Method</b>	<b>GHG emissions (kt CO<sub>2</sub> eq)</b>	<b>Electricity generation (GWh)</b>
Coal	3,680	3,850
Natural gas	880	1,630
Other fuels	1,220	1,250
Hydro	Negligible	880
Other renewables*	Negligible	1,150

\*Includes wind, tidal and solar

The overall emission intensity of the 2022 Nova Scotian electricity grid is 660 g GHG/ kWh.

#### Offshore Wind Electricity Generation:

The Government of Canada's [Fuel Life Cycle Assessment Model](#) contains emission intensities for different methods of electricity production. The emission intensities for selected electricity production methods are presented in Table 3 below. The scope of these emission intensities covers operational activities only, such as combustion of fossil fuels and equipment maintenance.

*Table 3: Fuel LCA Model Values for Electricity Production*

<b>Electricity Generation Method</b>	<b>Current Used in Nova Scotia</b>	<b>Emission Intensity (g CO<sub>2</sub> eq/ kWh)</b>
Coal (bituminous)	Yes	1,129.16
Natural gas	Yes	318.63 to 588.65
Heavy fuel oil	Yes	1,198.56
Diesel	Yes	1054.46

<sup>2</sup> [En81-4-2022-3-eng.pdf \(publications.gc.ca\)](#) Table A13-4

Onshore wind*	No	0.06
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\*The Fuel LCA model does not contain data on emission intensities for off-shore wind generation.

Overall, the carbon footprint of wind power is significantly lower than that of fossil-based power and is comparable to other non-fossil power generation technologies.

Though studies have been performed evaluating off-shore wind, none are specific to Canada, and therefore there exists a data gap for exact emissions intensities for Canadian off-shore wind power. Data from other countries indicates that the total emissions of onshore and offshore wind projects are generally comparable, and would be within the same order of magnitude, so it is likely that Canadian off-shore wind power would be similar to that listed for onshore wind in Table 3.<sup>3</sup>

Electricity produced from offshore wind projects result in a carbon intensity much less than that of typical fossil fuel generation methods.<sup>4</sup>

#### Conclusion:

Offshore wind projects, if designated, would need to follow the climate change and GHG guidance presented in the SACC and the Technical Guides. This includes providing an estimate of the GHG emissions associated with each project phase, including construction, operations and decommissioning.

Overall, offshore wind generation is shown to produce less emissions than most electricity generation methods currently in use in Nova Scotia.

In cases where a fossil fuel electricity generation plant is shut down directly as a result of the development of offshore wind projects, offshore wind would result in an overall reduction Nova Scotia's GHG emissions. Note that in order to make this claim, Proponents would need to demonstrate a clear correlation and causation between their offshore wind projects being built and the decommissioning of specific fossil fuel generation plants.

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<sup>3</sup> [Assessing the life cycle environmental impacts of wind power: A review of present knowledge and research needs - ScienceDirect](#)

<sup>4</sup> [Life cycle assessment of a floating offshore wind farm in Italy - ScienceDirect](#), Table 7