

Bay of Fundy In-Stream Tidal Energy Response

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Can marine renewable energy technologies, and specifically tidal in-stream technologies, be developed in the Bay of Fundy without significant impacts on the marine ecosystem?

The Bay of Fundy contains one of the strongest tidal resources of anywhere in the world. Consequently so, the Minas Passage in the Upper Bay may house the highest tidal energy potential of any tidal passage on the planet. This immense renewable energy resource has the capacity to drastically reduce Nova Scotia's dependency on fossil fuel fired power plants and effectively decrease the emission of harmful greenhouse gases.

Traditional tidal energy generation methods involve practices which have a large footprint on the environment. This includes dam-based systems which halt the flow of tidal waters in a holding basin before releasing it through a turbine generator. Examples of which include the tidal plant near Annapolis, Nova Scotia.

Modern in-stream tidal technologies which have been in development for the past few years are similar to land wind turbines which harness the energy in a moving fluid. These in-stream tidal generators do not require dams or large containment basins and therefore have a greatly reduced footprint on the environment. However, like any construction project or foreign installment to an environment, there will be an associated impact to the ecosystem.

The OpenHydro in-stream system proposed for the Bay of Fundy would employ turbines that are fixed to the seafloor and would be invisible from the surface. The potential for environmental impact in this case is limited to subsurface ecosystems including benthic habitat, fishers, and migratory wildlife. Depending on the location, installment of in-stream power generation devices could also affect fisheries and aquaculture. However, selecting an appropriate location could reduce or completely erase the impact to certain elements in that ecosystem.

The most likely and appropriate site for commercial development of in-stream tidal power generation in the Bay of Fundy is the Minas Passage. Based on preliminary assessments this site has the greatest potential for tidal power generation for Nova Scotia. The Minas passage

is also ideal as development of this site would have a limited impact on marine ecosystems.

The majority of the seafloor of Minas Passage is exposed bedrock with gravel deposits close to the northern and southern shores. Due to the limited seafloor habitat there is very minimal lobstering or scallop dragging in the passage. Marine mammals which frequent the Bay include right whales and the harbor porpoise which is listed in the Species at Risk Act. Right whales congregate in the southern part of the Bay of Fundy to mate, nurse young, and feed; however, they do not migrate to the Upper Bay. In addition, whales, porpoises, and dolphins are uncommon in Minas Basin apart from small pods of harbor porpoise and Atlantic white-sided dolphins which periodically visit in the summer (Bay of Fundy Ecosystem Partnership 2005). Consequently with limited commercial fishing in passage and with minimal migration of large marine mammals, an in-stream tidal generation installment would not significantly interfere with the surrounding ecosystem.

When considering the possible negative impacts to marine ecosystems we should also examine the environmental benefits which will result from the commercial development of in-stream tidal power generation. This immense renewable energy resource has potential to greatly generate clean energy at a known cycle and depending on the extent of development, scenarios range between 100 to 600 megawatts within 10 years. Figuring conservatively, a tidal farm which operated at 100 MW could provide energy to over 70 000 homes. This would greatly reduce the amount of energy required from coal and oil fired power plants to sustain Nova Scotian homes. The reduced fossil fuel usage would significantly lower the emissions of harmful greenhouse gases due to power generation. This has environmental benefits province wide.

In addition to having positive environmental impacts, the development of a commercial in-stream tidal generation system in the Bay of Fundy would stimulate the region by creating jobs, promoting renewable energies and energy efficiency, and inspiring further innovation and development in the region.