Tidal Energy Environmental Assessment

The Fundy Tidal project stands to provide an added source of green energy, in conjunction with the existing wind, tidal, hydro and biomass operations Nova Scotia currently has in place. These renewable energy reserves contribute to approximately 17% of Nova Scotia's energy consumption, or roughly 400MW. The addition of the seven most capable tidal energy contributors in the Bay of Fundy (shown in Table A) could on their own produce renewable energy in excess of 330MW. This would push Nova Scotia's renewable energy into the 24% range or roughly 175,000 homes (providing we split the Bay of Fundy Tidal energy 50% with New Brunswick). The 330MW generated are based on the turbines extracting 15% of the available tidal energy so as to not disturb the local ecosystems each would be placed within. If either of the Minas Channel or Minas Passage locations could run at a slightly higher efficiency they could easily provide substantially more renewable energy. If 50% of the tidal energy could be extracted we could see numbers close to 2000MW based on those two sites alone.

Table A – Bay of Fundy Tidal Locations

Location	**Power Generated (15%) MW**
Cumberland Basin	6.5
Minas Channel	131
Minas Passage	166
Cobequid Bay	6.3
Digby Gut	4.9
Petit Passage	9.2
Grand Passage	6.6

The success of this project is relying heavily on the design and strength of the underwater turbines. The Bay of Fundy is recognized as having the highest tides in the world, which in turn can produce a harsh and abrasive environment. Therefore, the materials chosen to build and protect the turbines need to have a very high wear resistance, most notably against the gritty water that is continuously pounding against the outside of the turbine. The material must also have a high enough strength to stand up to contact made by any large rocks carried by the tide. From an environmental aspect there will be some pollution to the surrounding ecosystems based on erosion alone. To reduce any unnecessary pollution the turbine should be checked regularly to ensure there is minimal risk of oil or other harmful pollutants leaking out.

There is potential for large ice flows to flow down certain parts of the Bay of Fundy. Due to their shear mass of these flows the turbines will likely need to be partially mobile so as to not take the brunt impact of an iceberg but simply be moved aside. A tethering system could be introduced to hold the turbine in place but still allow some freedom. The tethers would also need to be made of a material capable of surviving in the abrasive, chlorinated environment.

As suggested earlier, these turbines will likely be placed in a way where only partial amounts of the tidal power is captured thereby not disturb their surrounding ecosystems. Governing the speed in which they turn will reduce the likeliness of killing any marine life, not disrupt the natural tidal flow and subsequently reduce noise and vibrations. The design of these turbines will be critical to take advantage of the countercurrent flow. Depending on their environmental impact it may be possible to funnel water into the turbine increasing its power generation. Further study and test work would be needed to observe the impact of the design.

It will be very important that during the construction and placement of these turbines the natural surroundings are not disturbed. This includes ensuring all the relevant equipment does not spill oil or gas into the Bay of Fundy and an emergency clean up plan is in place should there ba an accident. The material placed on the floor of the Bay of Fundy must not pose any initial or long-term detrimental effects to the bay and its marine life.

Personally, I am a firm believer that the future in electricity is through our renewable resources. The Fundy Tidal project should go forward into its experimental stage and each of the research companies involved should test their model in the bay itself. This way the best design may be chosen based on electrical efficiency and environmental impact. This would lead to further develop prominent sites in the Bay of Fundy where additional high water flow is present. There are eight such additional locations where underwater turbines are being considered. Based on the similar 15% extraction they produce upwards of an additional 100MW. Ensuring the same 50% split between the two provinces we could see total renewable energy production in Nova Scotia climb to 615MW or roughly 26% of its total electrical consumption.

The reduction in green house gases will be considerable; especially if coal fired power plants are partially or completely replaced. The availability for further development of wind and tidal turbines in Nova Scotia is substantial and could provide much needed energy to all areas of the eastern seaboard. That being said the focus should remain on providing power to the two associated provinces at a reduced cost rather then turning an obscure profit and selling the power elsewhere.

The only portion of this project that I do not agree with is when the power generated is not used to promote a greener, more efficient Nova Scotia. It is instead sold to the Northern United States providing no relief for Nova Scotians. It is understood that the emission reduction in the US should lead to cleaner skies in Nova Scotia in the long run as the jet stream brings air northward. However, paying equivalent or higher prices then today for electricity when so much free green energy is being locally produced just seems like another way for NS Power to gouge its customers.

In conclusion any minor environmental impacts would have to be absolved in recognition that the benefits they are providing is much greater then some minor pollution from eroding parts in the Bay of Fundy. If the materials problem can be overcome and it is found these turbines do not greatly disturb the environments in which they are placed we could see a new renovation in electrical power generation in Nova Scotia.

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