

Comments on Tidal Energy Environmental Assessment

1: 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?

Marine renewable energy technologies could be easily developed in the Bay of Fundy. The Bay of Fundy provides some of the highest tides in the world. The currents from these tides could provide enormous amounts of renewable energy. The specific technology in question is the tidal in-stream energy conversion. The TISEC (tidal in-stream energy conversion) is similar to a wind turbine. The major difference is that the TISEC is located in the water. The unit is placed in a known current and the blades are rotated from this current. Since the density of the water is much more than that of air, and the currents are far more predictable than air, it makes these units more reliable and efficient. The concerns from the unit are the impact on the marine ecosystem. There are two TISEC designs; the first is a pillar with a set of blades suspended from it on either side. The second design is buoyant, and is therefore anchored to the sea bed. The blades from the first design may or may not be under water at all times. The speeds of the blades should not be so as to damage any marine life if they were to swim in the unit. There is minimal disruption to the sea bed to install these units, and they are placed in such a manner to allow vessels to still be able to sail close by. This technology seems to be the less damaging to the marine life than the other possibilities. The possibilities are the tidal lagoon energy conversion, and wave energy conservation. Tidal lagoon requires the construction of a large dam with turbines in the dam. The dam could be potentially harmful to marine life, and disrupt a large area of the marine floor where it is built. The wave conservation is mostly on the surface of the ocean and is more of an aesthetic concern and for commercial and recreational sailing. Based on the current technologies available to extract tidal power from the Bay of Fundy, power generation can be done in such a manner that it will not have significant impacts on the marine ecosystem.

2: Can these technologies be developed without significant socio-economic impacts on fishers and the fisheries and on other marine and coastal resource users?

The technologies can certainly be developed without significant socio-economic impacts on the fishers and the fisheries and on other marine and coastal resource users. If the technologies are not placed in any major shipping route, or in a well-inhabited area that is fished by many fishers, there should be very little impact on the users. For example, the TISEC can be placed in such a manner that ships are still able to pass by without influencing or being affected by the unit. As long as they are placed in an area where there is not fishing, there is no

chance of the fisherman losing their area or getting nets or traps caught up in the turbines. The Lagoon energy conservation would be generally constructed in shallower areas. This will be out of the way of any major shipping route, but this is the technology that is suspected to induce the most ecological impacts. There will be a loss of coastal area where it would be built which may be upsetting to some people if it is not built in a area that is generally not visited by people. For the wave technology, the most concern would be that it would disrupt boats sailing in the area. It would still be possible to locate the unit in such a manner that is out of the normal shipping route or fishing area. Therefore, it is entirely possible to place these technologies in such a manner that they have a very little socio-economic impact. This is highly dependant on location.

3: What contribution can marine renewable energy technologies make to community and regional economic development in Nova Scotia?

There are quite a few things which would be contributed to the community and regional economic development of Nova Scotia. An opportunity which comes to mind is the sometimes struggling ship building operations of the region. With a large undertaking such as this, there will be the need for barges, and tug boats, other self propelled craft. By winning contracts for this work, shipyards will have the ability to keep competitive wages and the province's skilled labour may not head west for jobs with higher salaries.

There are other jobs which will be created through tidal energy projects. Large amounts for workers will be need for the construction of these devices, and the ongoing maintenance of such machines will keep many jobs around in the years to come.

Engineering jobs to research and create more efficient tidal power generators will be made as well. Undoubtedly there will be a large amount of discoveries made in the course of a project of this nature. These technological advances could be packaged and marketed worldwide, creating a niche in the energy market for Nova Scotia.

The manufacturing industry would also have a lot of opportunity with the development of this project. Turbines have to be precisely crafted and maintained to function properly. Since it is inherently cheaper to buy products with low shipping costs, local producers will likely be favoured when finding companies to manufacture things like turbine rotors, blades and ducts.

4: Under what conditions should pilot projects be permitted?

There can be major environmental concerns when dealing with the bottom of the ocean since it is the habitat and breeding, and feeding ground of countless marine plants and animals. This concern should be the number one influence when putting conditions on the projects being permitted. Birds, mammals, fish and other living organisms all rely on the ecosystem found within the Bay of Fundy, and destruction of the habitat by tidal power generation is a very real concern.

Along with the possible destruction of habitat, disruption of fisheries routes could happen. Instead of tidal power generation being a good thing, many of the local communities might start to resent the projects if they disrupted their economic well being. Other industries

which should be considered when outlining policies for these projects are tourism and marine transport such as ferries through the Digby Gut, and Gypsum through the Minas Passage. If any of these were to be blocked, by construction or have limits on the maximum depths which vessels could navigate, many people would become upset with the project. As long as there is minimal disruption, then it should be permitted.

5: What ongoing research and monitoring is required to gather the information needed to make decisions about commercial developments?

There are many types of technologies out there that will be required to obtain research and monitoring data which will help make decisions about commercial tidal developments in the Bay of Fundy. The aquatic ecosystem in the Bay of Fundy will have to be watched very closely prior to, and during tidal power construction and operation. A key piece of information that should be monitored is the effect of the commercial development on the habitat and behavior of fish.

By setting up a radar (sonar) station, fish location and tracing around the site can be determined. Flow meters can be placed around the development to determine the disruption of wave motion that occurs due to the presence of the development. If the machine does disrupt or change the wave motion then research should be done to analyze the effect of altered wave action on fish, sand movement (sub surface and shore deposition) and on seafloor creatures.

Research should be done to see if the inlet, exhaust and mechanical workings of the commercial developments will be a treat to the lives of sea animals. If sea animals can swim, get stuck or get sucked inside of these machines and be hurt or killed. Prior to implication in the field, pilot plant research should be completed to determine some controlled effects of a commercial development of a tidal power plant. A wave tank can be used to simulate the wave motions of the ocean and a scaled version of the power plant can be inserted to observe effects. The influence of noise and vibrations on aquatic life and subsurface disturbance due to mechanical parts moving inside of the power generation machines should be monitored. A change in sediment movement or sizing can affect how deposition and sand movement occurs.

6: What other steps are required to determine whether, where and how commercial projects should be developed, regulated and managed?

The provincial government and other governing agencies need to establish guidelines for the protection of the environment, aquatic ecosystem and emission standards (in the form of noise, fluid and waste pollution).

To determine where projects should be developed, companies should do environmental site assessments to determine the disturbance that will be created by going forward with the project. The sites should be surveyed for potential problem areas such as unconsolidated soil, depth of water, wave height's and frequency, sensitive aquatic life. If any of these problems exist the company should have to develop a plan to be approved outlining how they are to approach and develop the site for the project in a sustainable manner as not to destroy habitats.

Projects should be regulated in a sustainable manner as well, this will ensure that “green” sources of energy, such as tidal power, do not end up unnecessarily harm the environment. They should be managed and periodically inspected by an outside inspection company to ensure that the machinery is functioning properly, not leaking and not harming the environment.

The implication of tidal power projects will not only affect the aquatic system that harbors it but may also affect communities and residences located close to these machines. If noise is to be emitted or cabled running from these machines, the communities should be made aware and be given the opportunity to voice concerns and opinions about the construction of such a project.

We are a current supporter of the tidal power projects in the Bay of Fundy. Since the Bay of Fundy is home to the highest tides in the world, it is also home to a wealth of untapped power. I hope to see well developed regulations governing the activities that the tidal power plants and companies can do during operation and the protection of the wonderful life in and around the Bay of Fundy. With that being said, we are also a supporter of shifting Nova Scotia away from our dependence of coal. Seeing a rapid development and implementation of tidal power projects would be a very encouraging scenario. We would be happy to see some of these projects becoming fully operational within the next 3-5 years.