

**Comments of
GWave™ Maritimes
on
Discussion Paper:
“Marine Renewable Energy Legislation
for Nova Scotia”**

Nova Scotia Department of Energy

About GWave™ Maritimes

The comments herein are filed by GWave™ Maritimes, a Nova Scotia company dedicated to the development of cost-effective wave energy in Nova Scotia and other areas of Atlantic Canada. GWave™ Maritimes is collaborating closely with GWave™ LLC to develop and commercialize a revolutionary wave energy conversion technology that will be cost-competitive with fossil-fired generation on a total delivered cost. A combination of factors make Nova Scotia a potentially leading market for this technology, including favorable wave conditions, the province's dependence on coal- and coke-fired generation, and the province's commitment to substantial increases in renewable energy.

GWave™ Maritimes appreciates the thoughtful work the Department of Energy in preparing its discussion paper on marine renewable energy legislation. The paper correctly identifies many of the most pressing questions that future legislation will need to address to put Nova Scotia in a worldwide leadership on marine renewable energy technology. We also appreciate the opportunity to comment on this discussion paper both in writing and in the upcoming forums hosted by the Department. Rather than attempting to provide comprehensive answers to each of the questions posed in the discussion paper, GWave™ Maritimes would like to address those questions of particular import from its perspective.

What in your view are the most important opportunities for Nova Scotia?

The growing interest in renewable power creates important opportunities for Nova Scotia not only to redevelop its own energy infrastructure, but also to serve as a leader in the renewable energy industry. The substantial tidal resource of the Bay of Fundy, while undoubtedly of substantial commercial interest, is not the only opportunity before the province. Nova Scotia's coastal waters have excellent wave energy potential that, with the right technology, can be harnessed economically and with low impact on other users. Together with potentially economic on-shore renewable resources, economic wave, wind

and tidal resources have substantial promise of reducing or even ending Nova Scotia’s dependence on imported coal, improving the balance of trade, and providing low-cost energy to the province’s businesses and residences to keep Nova Scotia industry competitive on a world stage.

Furthermore, Nova Scotia is at the crossroads connecting the substantial hydroelectric resources of Newfoundland and Labrador to the northeast and the power markets of New England and New York to the southwest. Subsea cables between Newfoundland and Cape Breton and between the Yarmouth area and New England would be substantial boons to the Nova Scotia economy and will be essential to the province’s long-term success in fully capturing the value of its substantial marine energy resources. The link to Newfoundland would provide access to low-cost, highly controllable energy to serve as a firming and shaping resource to marine energy resources, which are intrinsically variable. Links to the United States would provide access to a large market hungry for—and willing to pay a premium for—renewable power.¹

Finally, Nova Scotia can seize a global leadership position in marine renewable energy, creating a truly “green” industry—producing marine energy devices using renewable power—and the associated “green” jobs in manufacturing, research, engineering, and maintenance. Other parts of the world are vying for this role—Oregon and the UK have invested substantially in wave energy development, for example—but with its strong combination of a highly educated workforce, excellent native marine resources, and an infrastructure to support manufacturing and ship-building, Nova Scotia can and should compete for leadership.

What are the values that government should focus on when developing legislation that will impact the viability of these opportunities?

Governments should not pick winners and losers—in the end, only markets can serve that role. The roles of government should, instead, be to set a level field for competitors,

¹ Undersea cables directly from Nova Scotia to the United States would complement expanded transmission to and through New Brunswick. Any single import path to New England is limited, for reliability reasons, to 1,200 MW. Consequently, to build up a substantial export industry of marine renewable power, the province will need multiple independent transmission paths.

to reduce the cost of innovation, and to create a common infrastructure with open access for renewable technologies. For example, access to the transmission grid is a significant cost for offshore renewable energy facilities and if there is a concentration of a potential renewable energy resources, such as in the Bay of Fundy or coastal areas of Cape Breton, it would be wise to develop a common undersea "plug in" facility as part of the high-voltage grid, much as Germany has provided for its offshore wind farms. Building this infrastructure enables competition and development of economic resources at lower total cost and lower environmental impact, compared with a project-by-project interconnection approach. Further, by focusing development of marine renewable energy projects in "competitive renewable energy zones," the province would limit potential impacts on other marine users, much as zoning in cities preserves the integrity of neighborhoods.

The concept of "competitive renewable energy zones," or CREZs, have been deployed in Texas and California. They are a valuable concept for the province to consider. CREZs would serve several functions that facilitate sensible development of renewable energy resources. Although their application in a marine environment is novel, it is not dissimilar to the ocean lease program in the U.K. or the offshore wind policy in Germany. Designation of CREZs allows policy decisions regarding the balance of the marine environment among alternative uses by identifying marine areas that have desirable properties in several dimensions:

- High-quality wave, wind, or current resource;
- Acceptable balance with other commercial uses, such as fishing and shipping;
- Acceptable balance of interest with Aboriginal and other communities, including positive benefits achievable from employment, etc. and negative effects such as degradation of environment or aesthetics;
- Access to transmission to integrate the resource to serve provincial load and/or allow export to other markets.

Another role of government that supports general development of the marine renewable energy industry without "calling winners" is the expansion of research and data collection. Scientific information is a prime example of a "common good" that

provides benefits to everyone and, therefore, are best gathered once and disseminated broadly. For example, working with potential developers who have identified potential general areas of interest for development of marine renewable energy, the province—either directly or through research grants to universities or other researchers—could collect basic information on wind, wave, and currents that would then be made available to the public. Likewise, studies on the potential environmental impacts of various technologies funded by the province would create valuable baseline data and substantially advance the dialog of what appropriate limits and resource-specific studies should be required for experimental and commercial marine renewable energy facilities, without imposing costly and redundant study requirements on each successive renewables developer.

Further, the province needs to determine how transmission costs associated with an increase in renewable energy generally and marine renewable energy in particular should be allocated. Although we often refer to the transmission “grid” as though it were as simple as a house’s wiring, allowing appliance to plug in wherever, in fact the transmission system is a purpose-built, complex piece of infrastructure. Any significant change in where electricity is injected (or withdrawn) is likely to require capital expenses, over and above the direct cost of interconnecting a particular generation unit to the nearest substation. In Texas, the policy decision has been made that the cost of transmission system upgrades to support delivery of renewable power from the designated CREZs to load centers will be covered by the utilities’ transmission service charge, i.e. assessed to load, not generators. As a direct result, Texas has enjoyed a substantial buildout of wind generation, far exceeding buildout in other areas of the United States that impose a “generator pays” policy. When the economics are considered carefully, with highly inelastic demand any “tax” such as the transmission cost is ultimately borne by buyers, not sellers: sellers adjust their sales price to reflect the extra cost. Given that consumers ultimately bear the cost regardless of how the transmission costs are assessed, and given the observed reality that charging these costs up-front to renewables developers thwarts new construction, we urge that Nova Scotia adopt a policy, like Texas, that includes the build-out of transmission to integrate renewable

energy in CREZs as part of the utility’s transmission infrastructure and rates. Part of this rate-based build-out should include subsea nodes, or concentrators, that allow many renewable energy projects to attach to a common point in the CREZ, with a single point of landing. The alternative—having each project build its own subsea interconnection point and lead back to a terrestrial substation, will be more disruptive to fragile coastal ecosystems, which have been a substantial source of concern with other offshore energy development projects.

Renewable marine energy legislation also needs to ensure that the legitimate interests of other users of the marine environment are fairly balanced. For example, the First Nations have relied on the coastal waters of the province and the Gulf of Maine for millennia, but these peoples have not shared proportionally in the economic gains in Canada. As the marine renewable energy industry develops in Nova Scotia, particular attention should be given to (a) not unduly impacting the ability of Aboriginal and other commercial fishermen from earning their livelihoods while (b) ensuring that the First Nations benefit at least proportionally from the development of low-cost energy and associated jobs.

What should the Government of Nova Scotia do to ensure all users of the marine environment are treated fairly?

What features should be included in the licensing system to ensure development takes place in a manner that balances private and public interests?

A significant obstacle to development of marine renewable energy elsewhere in the world has been the lack of coherent licensing systems that fairly balance private and public interests. For example, Cape Wind Associates in Massachusetts have already spent nearly 10 years and \$45 million running a gamut of local, state, and federal regulatory and judicial proceedings, and any construction is still likely a year or more away. Few developers have that level of persistence and funding.² The province should, therefore, strive to develop a “one window” approach, working in a highly collaborative

² The *lack* of a coherent licensing protocol for offshore resources in the United States, however, presents a competitive opportunity for Nova Scotia to provide the renewable power that New England has such difficulty developing locally.

way with federal authorities and public interests, to grant consolidated, comprehensive licenses through a single process. The exact nature of what goes on *within* the process is not nearly as important to developers as the *interface* between the developer and the review process. Regardless of whether jurisdiction is divided, shared, or collaborative, the developer needs to have a single application and permitting process that, once complete, is final and can support investment without material regulatory or judicial risk.

It is also important to GWave™ Maritimes that the licensing process recognize facial differences between the various risks and community impacts of various technologies. Like many wave energy converter, the GWave™ technology merely requires a moored vessel, comparable to mooring a boat. Moreover, if adverse impacts occur, the device can be removed at any time quickly and completely. The environmental assessment required should impose much lower standards before and during initial testing of such a low-impact device than would properly be imposed on, say, technologies that have a obvious potential to harm the environment, e.g. barrage tidal dams or open turbine blades on the sea floor. These standards during the R&D phase should be primarily focused on gathering data for the Environmental Impact Assessment that would be required for a full commercial-scale installation.

Much of the "balance of interest" ultimately comes down to money. When a wind developer builds a wind turbine in a farmer's field, the farmer receives payments in compensation for the fact that the farmer cannot use that land for growing crops, for the inconvenience of having maintenance crews on his land, and other costs. Likewise, if marine renewable energy technologies displace other productive uses or imposes costs on other users, there should be a consideration paid to those displaced, collected from the project through lease payments or royalties. Conversely, however, if marine energy technologies are deployed in an area of little or no alternative economic use, and if they have little or no impact on the environment, aesthetics, or future uses of that site, then the project should be assessed little to no charge. This may strike many as the wrong outcome, but it is not. Leases of oil drilling rights have positive charges because the oil resource is exhaustible. The marine resource, however, is not "used up" by being tapped

(or, if it is because, say, there environmental considerations limit the amount of the resource that should be developed), then there should be a positive price for the lease.

A zero- or low-priced lease does not mean, however, that the province is capturing no economic value from the renewable energy. The province has other tax structures, such as corporate income tax, to capture some of the value directly. Indirectly, the province also benefits through lower energy costs, reduced fuel import costs, increased jobs directly associated with the renewable energy facility, and increased jobs created by new industries that build the renewable energy devices either for local use or export.

Considering the proposed staged development approach what process should Nova Scotia use to award development rights?

As discussed above, the province should designate CREZs through a collaborative stakeholder process, based on criteria designed to balance public and private interests.

Within CREZs, R&D rights should be granted in as expedited a way as possible. R&D projects require only a small fraction of the total area of a CREZ, so small-scale, defined-term demonstration projects should be allowed on permissive terms. As discussed earlier, the environmental licensing for R&D projects should also be scaled down, provided that the developer commits to monitor environmental impacts as part of the R&D phase and is committed to remediating adverse impacts (potentially by removing the device). The scale of environmental requirements should reflect the plausible effects of the technology as well as the particular ecosystem requirements of the CREZ (which should be determined at the time the CREZ is designated).

R&D rights should pave the way towards a commercial development license, so that a developer who has gathered valuable information about the required characteristics of the technology to utilize the local conditions is not subsequently shut out by a competitor. Development licenses should require clear timetables for progressing the project, so that inactive licensees cannot block entry of competitors.

Provided that CREZ areas are drawn well and include sufficient area to realize the resource potential, it seems unlikely in the near term that there should need to be an "aye/nay" decision on particular license applications from credible developers. Should it

become necessary to allocate area within the CREZ because of over-subscription, the province should consider two options. First, it may be appropriate to expand the CREZ's area to reflect the greater-than-expected market interest in development. If this is not deemed appropriate because, say, of impacts on commercial fishing, then the leases should be allocated through an auction process, much as offshore drilling leases are allocated today. In doing so, however, the province should recognize that, in so doing, it is limiting the potential utilization of a valuable, exportable commodity.