

Restraining (our) nature



BY RACHEL BRIGHTON

If I would preserve my relation to nature, I must make my life more moral, more pure and innocent. The problem is as precise and simple as a mathematical one. I must not live loosely, but more and more continently. — HENRY DAVID THOREAU¹

In 1843, in his review of a contemporary book extolling the liberating potential of mechanical invention, Henry David Thoreau summarized four kinds of renewable energy: wind, tide, waves and “sunshine”.² Of the tides, “ebbing and flowing, lapsing and relapsing”, he wrote:

They turn a few tide mills, and perform a few other insignificant and accidental services only. We all perceive the effect of the tide ... Everything that floats must yield to it. But man, slow to take nature’s hint of assistance, makes slight and irregular use of this power, in careening ships and getting them afloat when aground.

Thoreau described tidal power in terms of manpower. Thus, considering a basin of 10,000 square miles, with a tidal range of 10 feet, it would, he suggested, take 1.2 billion men working around the clock to empty the basin as nature would herself.

Then he described a lift, or press, that could harness this same power to produce a mechanical force.

A large body, of the heaviest materials that will float, may first be raised by it, and being attached to the end of a balance reaching from the land, or from a stationary support, fastened to the bottom, when the tide falls, the whole weight will be brought to bear upon the end of the balance. Also when the tide rises it may be made to exert a nearly equal force in the opposite direction. It can be employed whenever a *point d’appui* [point of support] can be obtained.

This contraption could only work a couple of times a day, the amount of lift it could exert would vary with the tide, and its application is anyone’s guess. Practical or not, Thoreau makes a conceptual point by asking how much manpower tidal power would *replace*.

The twin questions posed in Thoreau’s little study – what other form of energy could tidal power replace and how well might a new contraption work – are germane now, as developers

1. Henry David Thoreau. *Autumn: From the Journal of Henry D. Thoreau*. Boston and New York: Houghton, Mifflin and Company, 1892.

2. Thoreau. “Paradise (to Be) Regained”, *The United States Magazine, and Democratic Review*, 13 (Nov. 1843), 451.

circle over the Bay of Fundy. Before they can swoop, however, they have been told to wait for the public to consider the whys and wherefores of turning the bay's tides into a new source of renewable energy.

Under an independent examination called a strategic environmental assessment (SEA), the province is experimenting with a new approach to managing the exploitation and protection of Nova Scotia's natural resources. The traditional approach to site-specific environmental assessments can rent a community with conflict and antagonism, as happened on Digby Neck, with the panel's review – and recommended rejection – of the Whites Point quarry and marine terminal. A strategic assessment is supposed to create a public consensus before a particular project or site is considered, by gathering evidence that can frame public policy. It begins by posing and seeking answers to a wide sweep of questions, which reach beyond developers' concerns or political motives [see p. 11 for examples].

The SEA anticipates the mood of the times, as expressed in the October verdict from the Digby quarry panel, which made history by rejecting the proposal and calling for, among other things, a comprehensive coastal zone management policy for the province; a moratorium on coastal quarries along the North Mountain subject to the above; and more effective mechanisms for consulting with local government, communities and project proponents. But how seriously is government taking that, or this, experiment in participatory democracy?

As the first stage of tidal development in the Bay of Fundy, the government issued a request for proposals (RFP) in August to design and build a test site in the Minas Passage. The demonstration site will have up to three berths for testing competing forms of technology ahead of commercial-scale development, and which the province is eager to see installed in spring of 2009.

Unlike in Thoreau's model, it will not be the volume of water coursing in and out of the bay that would drive the new machines, it will be the velocity of the current, measured in metres per second, and which is fastest when it is squeezed through a narrow passage. These "in-stream" turbines also differ conceptually from the decades-old barrage system at Annapolis Royal,

where the river is dammed. There, the potential energy of the water, which is trapped at high tide, becomes kinetic energy or rotational energy as it literally falls down over the blades to drive the turbine. The turbine rotates as the water falls through it and drives a generator that produces the electricity. Provided water is flowing into or out of the dam, some power will be produced, but more power if there is a bigger height difference between the water levels on either side of the dam.

In contrast, the new turbines (and there are many variations) are more akin to underwater wind turbines or propellers, weighted down to the ocean floor. They are driven by currents passing at high speed, although, as with Thoreau's model, their capacity is limited by the intermittent tides, which means that tidal power is being considered as a supplementary supply and not a base load.

The SEA is conceived as a strategy for making sure we get this job right, and the province has committed to keeping the brakes on until the SEA yields its final report in spring next year. However, at the public meetings held in August as part of SEA process, there was a common concern that developers and government were pressing ahead without due regard for the process. For example, it sounded to many residents around the bay, and to heavy current fishermen in particular, that the exact location for the test site had already been determined. And while the government had said publicly that was not so, the tender documents designated Cape Sharp as the point of landfall, thereby defining a reasonable perimeter for the test site.

People at the meetings also said repeatedly that the SEA process was being undermined by the parallel course being pursued by the department of energy, which issued the RFP in the same month the SEA launched its first round of public meetings. The public's concern was evident in such summary statements from these meetings as:

There was concern that beginning the RFP process now, while the SEA process was underway, would undermine the credibility and effectiveness of the SEA.

The regulatory process flow diagram and the RFP process both

suggest that the province is moving forward very quickly on tidal energy and that this could compromise the SEA process. Nova Scotia politicians should ease up on their promotion about how quickly tidal energy could be developed.

The RFP process appears to be rushed, and the SEA process also has not been given sufficient time.³

The public's confusion is reinforced by the contradictory position of the government, which claimed "no final decision on a demonstration facility will be made until the results of the strategic environmental assessment by the Offshore Energy Environmental Research Association is completed" in spring next year. Yet by early November, it had already decided (not announced) who would get the critical contract to design and build the common infrastructure and install one test device. (Bids for the remaining two test devices were to close in November and be awarded early in 2008.)

In the province's promotion of this "frontier", "pioneering" and "innovative" technology, there is a great desire and rush to be among the first. Yet whether the turbines and generators are "cutting-edge" is quite beside the point. The only merit in the new generation of technology is whether it is a benign and efficient way to generate energy. And will we do it *well*?

With this same concern in mind, some at the public meetings observed that the door might be shut to experimentation by other parties at the demonstration site once the initial contracts were awarded. Again, the government's response was ambiguous. On the one hand, Premier MacDonald trumpeted our place on the frontier. "We will champion the effort for world tidal power innovation", he said, and "we've invited developers from around the world to help us find the best technology." And energy minister Bill Dooks repeated: "We want the best technology for the Bay of Fundy, and today we are calling on developers to show us the best. We need to know which machines can survive the enormous force of our tides, what kind of power they can deliver, and what impact, if any, they have on our environment." On the other hand – well, the government's hand is tied. Although it "would like to see the facility continue to operate into the future

with demonstration of additional technologies", the province "will not own the test facility, it will be owned by the legal entity which will be set up by the selected developers".⁴ Therefore, the developers selected in the first round of bids will, jointly with Nova Scotia Power, almost exclusively control the course of tidal technology in this province.

The province's public aspiration to deploy the "best" technology was further undermined by the tender process, which was considered a rush-job by industry, as stated in the summary of the developers' Q&A session with government on August 16:

The demand for information in the RFP is much too onerous for the timeframe given. Will the Province consider extending the deadline for submissions? (Suggested an additional 3 months.) Much support among the developers in attendance for an extension, others commented that it is too short. If the Province's objective is to demonstrate several different technologies, then an extension must be considered as current timeline is unrealistic and will eliminate potential developers from the bidding.

Although industry wanted to slow down the process, Nova Scotia Power Inc. explicitly opposed their request. The monopoly power company, which supplies most of our electricity and has most to gain financially from this exercise, was also bidding to design and build the test facility and operate one test turbine. And, as already shown, whoever gets in on the ground floor will exert significant control over future development.

The role of Nova Scotia Power in the renewable energy game is a conundrum. At the beginning of 2007, the province enacted the Renewable Energy Standard Regulations, bestowing an obligation upon Nova Scotia Power and the six municipal utilities to increase their provision of electricity generated through renewable sources. Renewable energy must make up five per cent of the mix by 2010 and, by 2013, 10 per cent must come from new, post-2001, renewable sources. The opening up of tidal power, and the pace with which it is being pressed, are driven by this particular regulation and by the legislated goal of reducing greenhouse gas emissions. Would Nova Scotia Power – which propels plumes of smoke from its coal-burning generators and

3. Offshore Energy Environmental Research Association. *Fundy Tidal Energy SEA Community Forums Report*, 2007.

4. Procurement Services, Public Tenders Office. Addendum 2 to Tender 60132673 for the Department of Energy, September 4, 2007.

which has delayed its conservation program for years – be pursuing a speculative new source of power if the MacDonald government had not stipulated this requirement? The power company stubbornly resisted the idea of “the best” technology in favour of the most expedient. What does that say about its commitment to reducing climate change through the prudent use of technology?

(Nova Scotia Power currently controls the market, but smaller developers are hoping to cash in on the growing consumer interest in green power and the expectation that the regulatory wall will soon come down so they can sell green power directly on the retail market. In Wolfville, at one of the public meetings, some speculators in the room were already shifting their play from wind to tidal, while others were considering an energy play for the first time, as with the chap who said to me: “I want to sell green energy to the Granola set in Wolfville.”)

Government is doing its job in legislating a slow shift to renewable energy. But it’s a pretty thin smokescreen for shielding Nova Scotia Power’s coal-fired energy empire. As the SEA process evolves, it must separate political gesture from fact, and establish a clear contract between exploring tidal energy and diminishing our dependence on heavily polluting fossil fuel.

Until there is the political will to do away with dirty coal, and a collective will to radically reduce demand, it is brute force to summon nature to yield to us once again. The Bay of Fundy is by no means an industrial virgin. Her waters support aquaculture, shipping and fishing and her watershed has nourished agriculture since the white settlement of this province. As even Thoreau suggested, she’s there for the taking. But wind answers to no country, nor does the sun, nor waves on the sea. The Bay of Fundy is altogether different. She is our body of water and we must approach her with care.

The Nova Scotia Policy Review will, in subsequent issues, evaluate the government’s response to the forthcoming report from the strategic environmental assessment.

Twenty questions

These were among the questions raised during the public meetings held in August as part of the first phase of the strategic environmental assessment (SEA) of tidal energy in the Bay of Fundy.

1. Can tidal energy wean us off fossil fuels farther into the future?
2. Who is going to own this resource?
3. In the Bay of Fundy, are tidal currents stronger at the top, middle or bottom?
4. Would the silt load near the bottom exert greater force on turbine blades?
5. How will the SEA predict the cumulative impacts of tidal energy?
6. Will ocean renewable electricity be used to shut down coal-fired plants?
7. What will be the impact of sediment-laden ice moving in the Bay of Fundy?
8. Why is the province promoting tidal energy?
9. What use do we want to make of the energy? Replace coal, replace wind, export it, or use it to attract a new industry such as hydrogen production?
10. Can tidal be used to produce hydrogen fuel and create local development in small communities?
11. Will there be room for ongoing innovation?
12. Will there be royalties charged for the use of the seabed?
13. How much energy could be removed from the bay before significantly affecting tides, which in turn would then affect the entire ecosystem?
14. The fastest currents are found in constricted areas. Would tidal energy technology have an effect on what is trying to move through these constricted areas?
15. What should be the link between resource extraction and community development, including possibility of some of the revenues going to local communities?
16. Will the proposed demonstration projects be too small to accurately predict biological effects?
17. What is the total potential tidal energy?
18. How many units will have to be put in water to make project economically viable?
19. To what extent is Nova Scotia Power involved in the SEA process?
20. Is it worth developing tidal power just to generate 15 per cent of Nova Scotia’s power requirements?

From the Fundy Tidal Energy SEA Community Forums Report, 2007.