



# Ebb and Flow

Have business realities swamped Maritime tidal power dreams?

BY QUENTIN CASEY

The tides of the Bay of Fundy are renowned for their height and are now sought for their power. But the power packed by those tides is not equal in all areas of the Bay, whose cold water lies between New Brunswick and Nova Scotia.

For instance, the tidal flow is slightly gentler in Grand Passage, the small patch of water separating Westport, N.S. (on Brier Island) from Freeport on Long Island. That's where Sustainable Marine Energy (Canada) Ltd. is testing its tidal energy technology.

SME (formerly Black Rock Tidal Power) is one of six companies currently working to prove the Bay of Fundy tides can be used to generate electricity, at commercially viable prices and output levels. The process has taken longer than device developers originally predicted.



TOP AND PREVIOUS: Sustainable Marine Energy Canada Ltd. installing the PLAT-I tidal energy platform with SCHOTTEL Instream Turbines in Grand Passage, Nova Scotia. The company hopes to achieve first power to the Nova Scotia grid in 2019. BOTTOM AND NR30: FORCE is Canada's lead test centre for in-stream tidal energy technology located in the Bay of Fundy, in Nova Scotia's Minas Passage. Photos courtesy of Sustainable Marine Energy Canada

According to Jason Hayman, SME's managing director, the company's PLAT-I platform is the only operational in-stream tidal energy system in Canada. But it is only a step toward the larger goal of commercial tidal power. SME's demonstration technology, installed last fall and thus far costing more than \$10 million to develop, is not yet hooked to the electrical grid (that milestone is expected later this year) and it's not known when SME will move its technology down the Bay to its berth at the Fundy Ocean Research Center for Energy (FORCE), the main tidal testing ground in Canada.

"So it's very much R&D at this stage," Hayman said in an interview. "But we like to think we're right on the cusp of commercialization."

Located in the Minas Passage area of the Bay of Fundy, 10 kilometres west of Parrsboro, N.S., the FORCE site is funded by the federal government (its largest financial backer), private sector berth holders, and the Nova Scotia government, which has put in \$11 million since 2009. Essentially, FORCE is the facilitator and site manager, providing the basic requirements and infrastructure, including electrical interconnection, for developers to test their technologies. FORCE is also tasked with environmental monitoring.

The tidal power in the Minas Passage is stronger than in Grand Passage. According to Hayman, who splits his time between Halifax and Edinburgh, SME wants to ensure it is ready to deploy at FORCE.

"We are very much taking a staged, stepping-stone approach," he said. "That's very different from the approach that's been taken by some of the larger (companies) and people like OpenHydro, who did the same thing that wind (power developers) did 30 years ago: try to get too big too fast."

Tidal power developers face a number of challenges, most notably testing a new technology in harsh, unforgiving conditions. At FORCE, three of the four current berth holders also face a looming 2020 deadline to achieve commercial output. Hayman wants the deadline extended but so far the Nova Scotia government is non-committal.

Developers also need money—tens of millions of dollars. But venture capitalists, banks and other investors are hesitant to put up money for tidal power. It's a predictable, fossil-fuel-free power source but it's also a high-risk investment with an unknown date of return. At this point, it's unclear when commercial power might actually be generated from the Bay of Fundy.

The pursuit of investment cash could be made more difficult by the sudden collapse of FORCE berth holder Cape Sharp Tidal, including partner OpenHydro, whose technology had been deployed three times at FORCE since 2009. The project's demise has been a disappointment for the industry and there are concerns about its impact on potential investment.

Last July, Cape Sharp—a joint venture project between Dublin-based OpenHydro and Halifax-based Emera Inc.—successfully connected a massive, two-megawatt tidal turbine to the electrical grid, marking the second time Cape Sharp had installed a turbine on the Bay of Fundy floor. (OpenHydro also deployed its technology in 2009).

Shortly after, though, Paris-based Naval Energies' yanked funding from OpenHydro, its subsidiary. The leading developer was suddenly gone. And there was a mess left for others to clean up.

The massive Cape Sharp turbine remains on the ocean bottom, though its rotor is no longer turning, due to a component failure. The question is: how to get it out of the water?

Nova Scotia's minister of energy and mines, Derek Mombourquette, will only say the province is seeking a "private sector solution." "I personally believe that it needs to be retrieved," he said in an interview. The cost of retrieval also remains unknown. A security bond will only cover some of the cost, which Mombourquette declined to estimate.

The province expects one or more operators to be producing tidal electricity in the next three to five years. Beyond that, it's not clear how much electricity will be commercially developed. (According to a 2015 report prepared for the Offshore Energy Research Association in Halifax, the Minas

Passage could yield 2,500 megawatts of power with minimal impact on tidal flow).

Mombourquette insists the collapse of Cape Sharp's project has not impacted tidal investment in the province. "I'm still very optimistic about the potential for the province because we continuously see the investment coming, both privately and publicly," he said. "We very well could be the world leader in tidal energy."

According to Sue Molloy, the four FORCE berth holders are regularly out talking to investors.

"It's a business story now. It's not a technology story. The technology is far enough along that it can do what's expected," said Molloy, a consulting engineer, researcher and adjunct professor at Dalhousie University, specializing in ocean engineering. She was also FORCE's first science officer and previously served as the president and general manager of Black Rock Tidal Power.

"Without an ability to take on high-risk financing, it's really, really difficult for these companies to get

these projects done," she added. "If the money was there we would have turbines in the water, I have no doubt. It's a money problem."

In September, 2018, the federal government announced \$29.8 million for Halagonia Tidal Energy Ltd., which is developing a nine-megawatt, \$117-million tidal energy system at FORCE, using both floating and submerged turbines. The company has said its goal is to have the project—capable of producing enough energy to power 2,500 homes—in the water by 2020.

Molloy says more government funding will be needed, given private investor hesitation and the cost advantages held by traditional power sources, such as coal. She points to technological advancements such as cellular phones, radar, and coal and nuclear power.

"These big things happen when government puts money in, because government takes big risk," she said. "We just need a couple of good systems in there working properly for the banks not to see it as such a high risk."

Halagonia is a subsidiary of Ireland's DP Energy. DP is also behind a second FORCE berth holder: Rio Fundo Operations Canada Ltd. (formerly Atlantis Operations Canada Ltd.). DP did not respond to requests for an interview. Likewise, no one was made available from Minas Tidal, a third berth holder at FORCE. (SME is the fourth berth holder; U.S.-based Bigmoon Power has also tested technology in recent years, outside of FORCE).

That silence from developers, and their reluctance to make public promises, doesn't surprise Molloy, given the media coverage of OpenHydro's bankruptcy. "If I was in charge of one of these projects right now, I would keep everything on the down low—let's not talk about anything until we have something ready to go," she said. "Why do it? Your whole industry could be killed if somebody makes a mistake again."

Developers are now hustling to prepare their demonstration technologies for launch at FORCE. Three of the berth holders must hit commercial operation by 2020, or

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risk losing their power purchase agreements. (Halagonia has until 2021).

“I’d say it’s a stretch goal for sure,” Tony Wright, the general manager at FORCE, acknowledged in an interview. “It would be very challenging at this point.” In fact, there are no scheduled turbine deployments for 2019.

Back at SME, Jason Hayman says the 2020 deadline must be extended so the companies can do a proper job of launching. “Otherwise you create this gold rush mentality where people take silly risks,” he said.

The province, however, won’t say if the deadline will be changed. “We cannot speak to policy options under consideration,” said JoAnn Alberstat, a spokesperson for the department of energy and mines.

In the meantime, SME—whose largest shareholder is Schottel Hydro of Germany—continues to seek more funding. “We are still a pre-revenue company that is trying to navigate its way through the ‘valley of death’ to commercialize our technology, and that will require

further support from both private and public sectors,” Hayman said.

SME also continues to test its platform in Grand Passage. Hayman says SME has already proven its floating 280-kilowatt system can be installed using small vessels and that its turbines generate according to predictions. A next significant step will involve connecting it to the grid and, later, moving it to FORCE and increasing its output by 50 per cent.

“It’s basically learning by doing, as opposed to putting something down on the seabed and then hoping it will all work and if it doesn’t, you’re up for a massive couple million dollar bill to get it out,” he said, taking a shot at the Cape Sharp project.

“It’s like doing some hill walking before we go mountaineering. And if you look at it, FORCE really is the K2 of tidal energy. You don’t want it to be your first time.” |nrm

FEEDBACK

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