Harnessing the tides in the Bay of Fundy

In 1606, the French explorer Samuel de Champlain founded the colony of Port-Royal on the east coast of Canada and erected North America's first windmill there. Now, more than 3½ centuries later, Canadians at Port-Royal are harnessing another source of pollution-free energy — the Bay of Fundy tides. And this time around, the technology being used is not just a North American first; it's also a world first.

The idea of using tidal power as a large-scale source of energy has been a Canadian dream for more than 70 years. At its heart is the massive power of the tides in the Bay of Fundy, located between the provinces of Nova Scotia and New Brunswick. They are the largest tides in the world, with as much as 50 feet — about the height of a five-story building — between the level of high tide and of low tide.

Engineers have studied these tides for decades, watching the potential energy build up twice a day — and then watching it ebb quietly away again. They have calculated the amount of electricity that such energy could generate, and they have worked out precisely how that energy could be harnessed. Now they are in a position to see their dreams turned into reality.

At Annapolis Royal, at the mouth of the Annapolis River (just five miles from the site of old Port-Royal), the governments of Canada and Nova Scotia have invested some $57 million to build a tidal power generating station, which will be used to assess the possibility of large-scale development of the Fundy tides.

If the pilot station is successful, then it could open the way to the development of a much larger project, involving the construction of a five-mile dam containing as many as 100 turbines. A project of that size would enable Nova Scotia to meet all of its energy requirements at a reasonable cost, and possibly to become a net exporter of electrical energy.

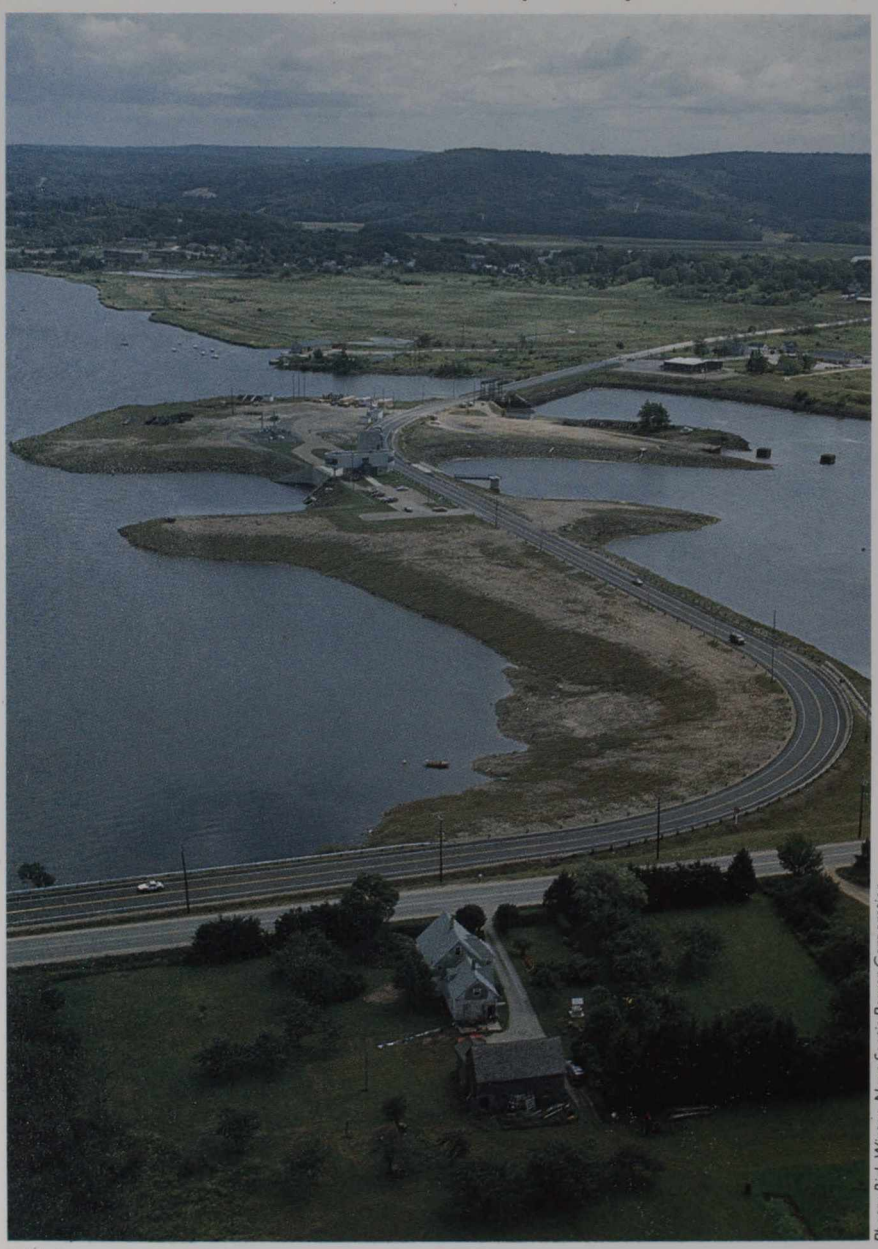


Photo: Rick Winter, Nova Scotia Power Corporation

Tidal power generating station at Annapolis Royal

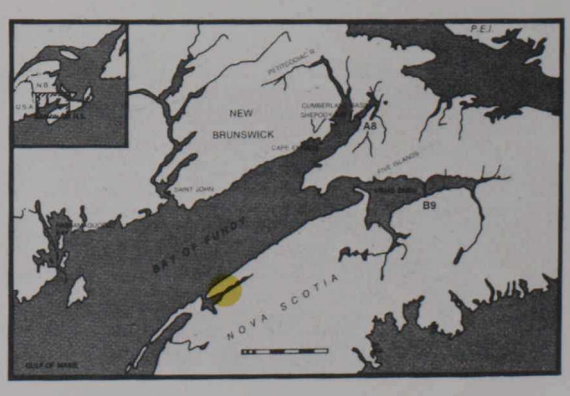
Energy for a small city

The mouth of the Annapolis River was chosen as the site of the pilot project partly because a causeway had been constructed there a few years ago to prevent marshy, agricultural land from being flooded at high tide. The existing sluices in the causeway could be modified and used to hold back water when required, or to let it pass through into the estuary.

The pilot plant — most of which is underground — is located on an island in the middle of the causeway. As the tide rises, water enters a reservoir behind the causeway through the sluice gates and through a Straflo (for straight flow) low-head turbine, which is fitted with 18 adjustable wicket gates.

At high tide, the sluice gates and the wicket gates are closed. They stay that way until, with the tide ebbing, there is a head of water in the reservoir of up to about four feet. At that point, the wicket gates are opened (while the sluice gates stay shut) and the turbine begins generating electricity.

On average, during each tidal cycle, the turbine operates for about six hours, after which the sluice gates are opened, leaving the turbine at a standstill.



Map showing position of Annapolis Royal