

Imagine the power of the highest tides in the world. Imagine the technology to harness it.

FORCE (Fundy Ocean Research Centre for Energy) is Canada's lead test centre for tidal energy technology. FORCE collaborates with industry, government, and researchers to study the interaction between tidal turbines and the Bay of Fundy environment.

FORCE's test site is in the Minas Passage area of the Bay of Fundy near Parrsboro, Nova Scotia, Canada.

About 160 billion tonnes of water flows through the Bay of Fundy each tide, equal to four times the estimated flow of all the freshwater rivers in the world combined.

About 14 billion tonnes of that water passes through the inner bay, at the Minas Passage, creating the highest tides in the world.

Research suggests up to 2500 megawatts of clean, renewable energy may be safely extracted from the Minas Passage, equal to power for nearly one million homes.

FORCE provides a shared observation facility, submarine cables, grid connection, and environmental monitoring at its pre-approved test site.

Submarine cables give FORCE the highest power capacity of any in-stream tidal site in the world (64 megawatts).



11 km of 34,500 volt submarine cable.



Connection to the power grid.



Ongoing research and environmental monitoring.

North America's first commercial scale turbine is towed into position at the FORCE test site.

Participants



Alstom's first one-megawatt prototype (based on Clean Current technology) on Alstom's onshore test rig in Nantes, France.



Nova Scotia Power partnered with OpenHydro to deploy the first commercial scale device in North America at the FORCE test site (2009-2010).



Minas Basin Pulp and Power's technology partner is Marine Current Turbines.



Atlantis Resources is partnered with Lockheed Martin and Irving Shipbuilding.

Tidal Technology

Tidal turbines tested at FORCE are designed to use the flow of the water as a source of power, the way a windmill uses wind.

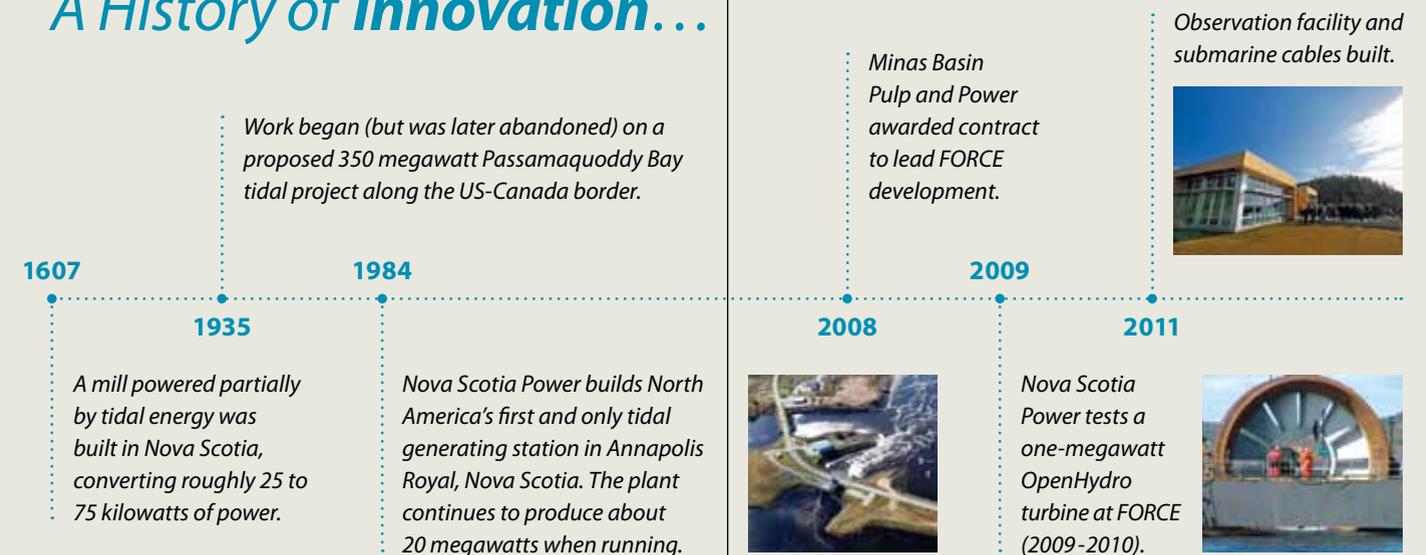
Tidal turbines do not need to spin as fast as windmills to generate power, because water is roughly 800 times denser than air. Power goes up exponentially with speed; every time water speeds double, power goes up eight times!

The Fundy Standard

Tidal devices operating in the Bay of Fundy may experience tides moving at speeds over five metres per second, expanding up to five kilometres horizontally, and rising up to 16 meters vertically—the height of a five-storey building.

If you can produce power under these conditions, and produce it safely and reliably, you can meet the Fundy Standard.

A History of Innovation...





Sensing equipment is lowered to the sea floor 40 meters below where it will measure current speeds by sending acoustic pings through the water column.



FUNDY OCEAN RESEARCH CENTER FOR ENERGY

FORCE Visitor Centre

Open spring to fall, offering educational exhibits, interactive displays, a small theatre, and a direct view of the ocean test site.

Location

1156 West Bay Road, 10 km west from Parrsboro, Nova Scotia, Canada.

Tel: 902.254.2510

Email: visitor.centre@fundyforce.ca

Web: fundyforce.ca/visit

facebook.com/fundyforce

twitter.com/fundyforce

Hours of Operation

10:00 a.m. - 5:00 p.m. daily in July and August. Reduced hours in spring and fall. Closed in winter.

Environmental Monitoring and Research

Tidal devices are required to adhere to strict environmental safety standards and conditions. An environmental monitoring program has been in place since 2009, and devices may be ordered removed if required. The monitoring program has tracked the movement of seabirds, marine mammals, fish, and lobster.

The research program has improved knowledge of the site, using tools like multi-beam bathymetry, side-scan sonar, acoustic monitoring, and acoustic doppler current profiler measurements (pictured above). FORCE receives ongoing monitoring advice through an independent environmental monitoring advisory committee, as well as a research monitoring working group comprised of technical representatives from

industry and academia. Many independent tidal research projects are also underway.

Participation and Support

FORCE is a non-profit institute, supported by the Governments of Canada and Nova Scotia, Encana Corporation, and participating developers: Minas Basin Pulp and Power (with Marine Current Turbines), Alstom (using the Clean Current design), and Atlantis Resources Corporation (in partnership with Lockheed Martin and Irving Shipbuilding).

Additional developers and technologies may participate in the future.

FORCE is administered by a board of directors, aided by environmental monitoring and community liaison advisory committees, and graciously supported by many other partners.