



Tidal energy is the term used to describe the energy generated from power found in ocean tidal currents and the use of tidal height differences.

#### What is Tidal Power?

- Tidal streams are currents in the ocean water column, created as the water of the ocean rises and falls with the movement of the tides.
- The two tidal energy sources are referred to as tidal stream and tidal barrage or lagoon.
- More recent commercialization efforts have focused on tidal stream technologies that harvest kinetic energy from the water currents.
- Tidal currents are strongest where the water passage is accelerated around headlands, over shoals or in narrows.
- Historical tidal energy developments focused more on barrage-style infrastructure where a dam-like structure is built across an area with a high tidal range.
- The Annapolis Royal tidal energy station in Nova Scotia, which still operates today, is one of only three such power stations in the world.



*Due to the nature of tidal energy, it is highly predictable and forecastable.*

#### WHY TIDAL?

- The west coast of BC has been identified as having some of the best tidal energy potential in the world.
- BC has numerous areas of tidal energy potential, located in the coasts many fjords and channels.
- A 2006 tidal energy resource assessment identified 89 tidal energy project sites in BC with an estimated 4,000 MW of potential energy.
- Modern tidal turbines are also being installed in rivers, irrigation canals, wastewater flows, and estuaries.
- BC's abundant river and estuary networks provide further renewable energy opportunities for the majority of its population.
- Due to the nature of tidal energy, it is highly predictable and forecastable.

#### THE TECHNOLOGY

- Tidal energy plants will be made up of arrays of individual generators in suitable high-current areas.
- Each tidal energy device is designed to use the energy in tidal stream flows to drive a generator to convert it to power.
- There have been many tidal energy device designs, however three main methods are used:
  - Cross-flow or vertical axis turbines
  - Axial or horizontal axis turbines
  - Reciprocating hydrofoils
- CROSS-FLOW OR VERTICAL AXIS TURBINES – the turbine is placed in the tidal stream flow, as the water flows past, the vertical turbine blades move to rotate a central shaft driving a generator producing power.
- AXIAL OR HORIZONTAL AXIS TURBINES – these turbines are somewhat similar to modern wind turbines; as the tidal stream flows past, the turbine blades rotate a horizontal shaft producing power through a generator.
- RECIPROCATING HYDROFOILS – working like a fish's tail and controlled by pitch, the hydrofoils are forced up and down by the stream flow transferring power to drive a generator.



Our mandate is to develop a viable independent power industry in BC that serves the public interest by providing cost-effective electricity through the efficient & environmentally responsible development of the province's energy resources.



## KEY LINKS

### The Ocean Renewable Energy Group (OREG)

[www.marinerenewables.ca](http://www.marinerenewables.ca)

### The European Union Ocean Energy Association (EU OEA)

[www.oceanenergy-europe.eu](http://www.oceanenergy-europe.eu)

### RenewableUK

[www.renewableuk.com](http://www.renewableuk.com)

### The Ocean Renewable Energy Coalition (OREC)

[www.facebook.com/OceanRenewableEnergyCoalition](http://www.facebook.com/OceanRenewableEnergyCoalition)

### Aotearoa Wave and Tidal Energy Association (AWATEA)

[www.awatea.org.nz](http://www.awatea.org.nz)

### Fundy Ocean Research Centre for Energy (FORCE)

[fundyforce.ca](http://fundyforce.ca)

### Fundy Energy Research Network (FERN)

[www.acer.acadiau.ca/FERN](http://www.acer.acadiau.ca/FERN)

### Offshore Energy Research Association (OERA)

[www.oera.ca](http://www.oera.ca)

## TIDAL POWER IN BC

- In September of 2006, Clean Current Power Systems installed a tidal turbine at the Race Rocks ecological station.
- The turbine, in combination with a solar and battery system, became the first complete ocean energy power system displacing diesel on the island.
- New Energy Corp and Canoe Pass Tidal Energy have received federal SDTC funding and provincial ICE funding for a project near Campbell River.
- The Canoe Pass project is the first tidal energy project to undergo the federal environmental assessment process.
- Site investigations are underway for other potential projects.
- In 2010 BC created the potential for an emerging energy feed-in tariff program that will assist in creating a market for this sector.

## ENVIRONMENTAL & REGULATORY CONSIDERATIONS

- There are no known environment issues for tidal energy.
- Strategic Environmental Assessments have been completed in a number of areas, including the Bay of Fundy.
- While concerns exist for ecological impacts and disruption to local fishing, mitigation measures will be implemented.
- Research continues to be conducted on potential environmental impacts at a number of academic institutions.
- Until devices have spent significant time in the real world applications, environmental impacts can only be estimated.

## SOCIOECONOMIC BENEFITS

- The power from ocean energy will be green electricity, using a renewable source of energy and not emitting greenhouse gases.
- This decreases the need for fossil fuels for electricity production and aids in combating the effects of climate change.
- Canadian green ocean energy will be in demand for energy exports.
- Ocean generated electricity is a method of reducing the risk associated with price fluctuations of conventional fuel sources, creating energy price security.
- Utilizing a number of different energy sources aids in energy security, decreasing the reliance on a single energy source, and increasing energy self-sufficiency.
- Ocean energy project and device development will create direct jobs as well as employment for related industries such as marine manufacturing, engineering and oceanography, and power supply and service sectors.