marinerenewables.ca

Marine Renewable Energy in Canada – Building & Maintaining Social Acceptance

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marine renewables canada

The power to think bigger.

Marine Renewables Canada

- National industry association for marine renewable energy; established 2004
  - Offices on Pacific and Atlantic coasts
- Members:
  - Technology and project developers, utilities, researchers, and the energy and marine supply chain

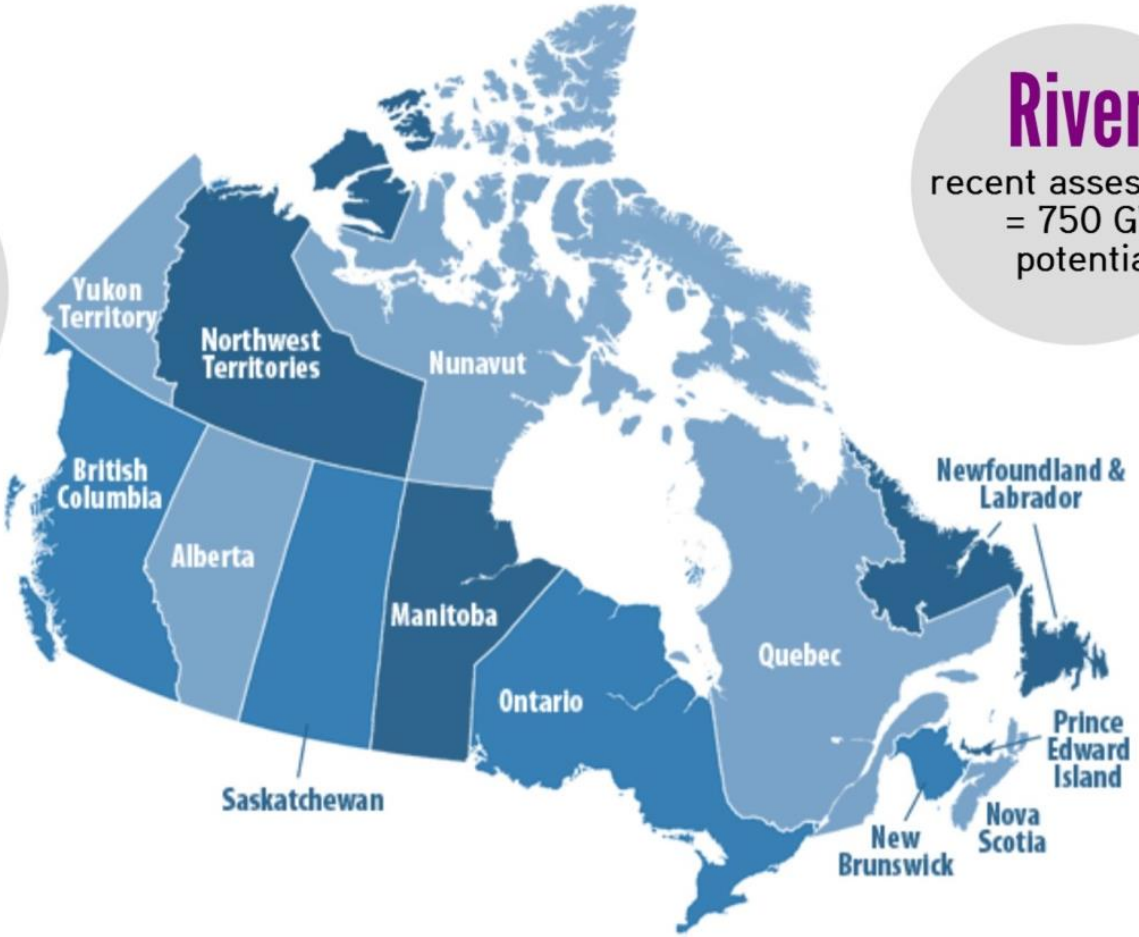
Mission:

Marine Renewables Canada aligns industry, academia and government to ensure that Canada is a leader in providing ocean energy solutions to a world market.

Canada's marine renewable resources

Wave

West: 491 TWh/yr
East: 1372 TWh/yr



River

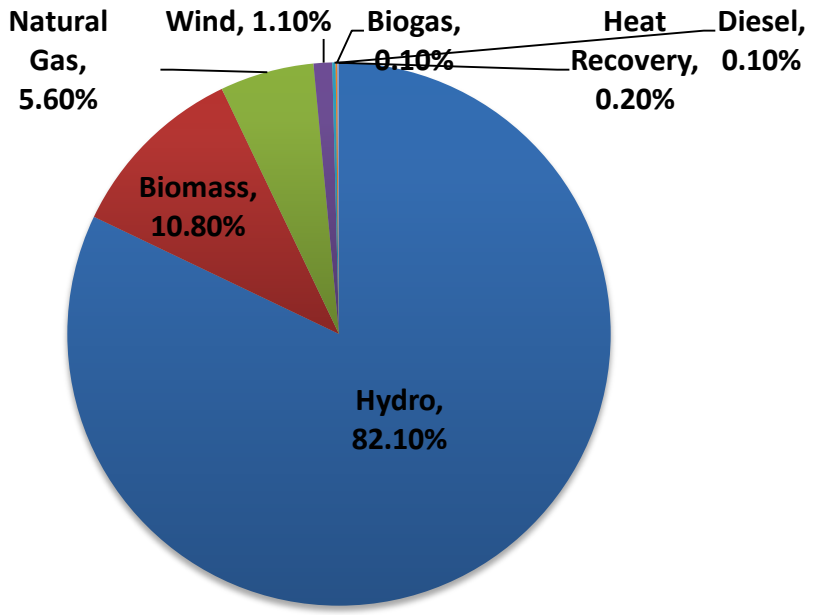
recent assessment
= 750 GW
potential

Tidal

191 sites
370 TWh/yr

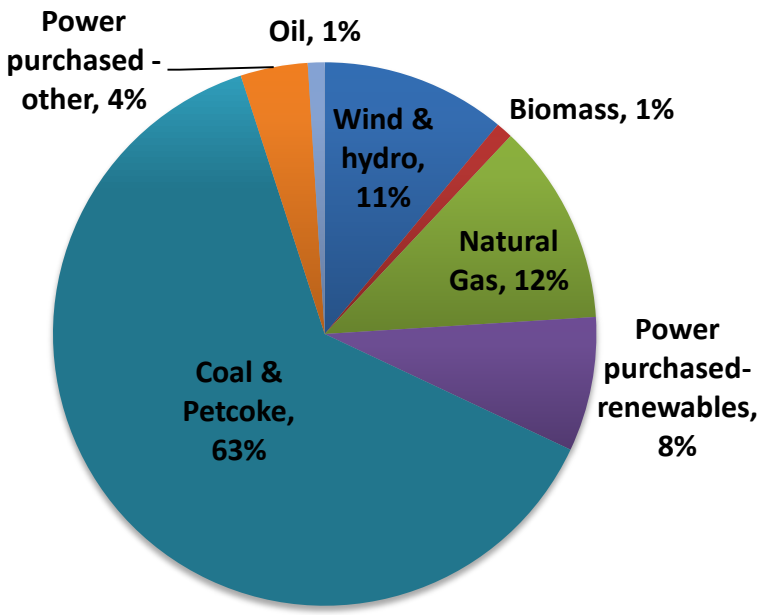
Electricity Context: A tale of two coasts

British Columbia
Generation Mix (2012)

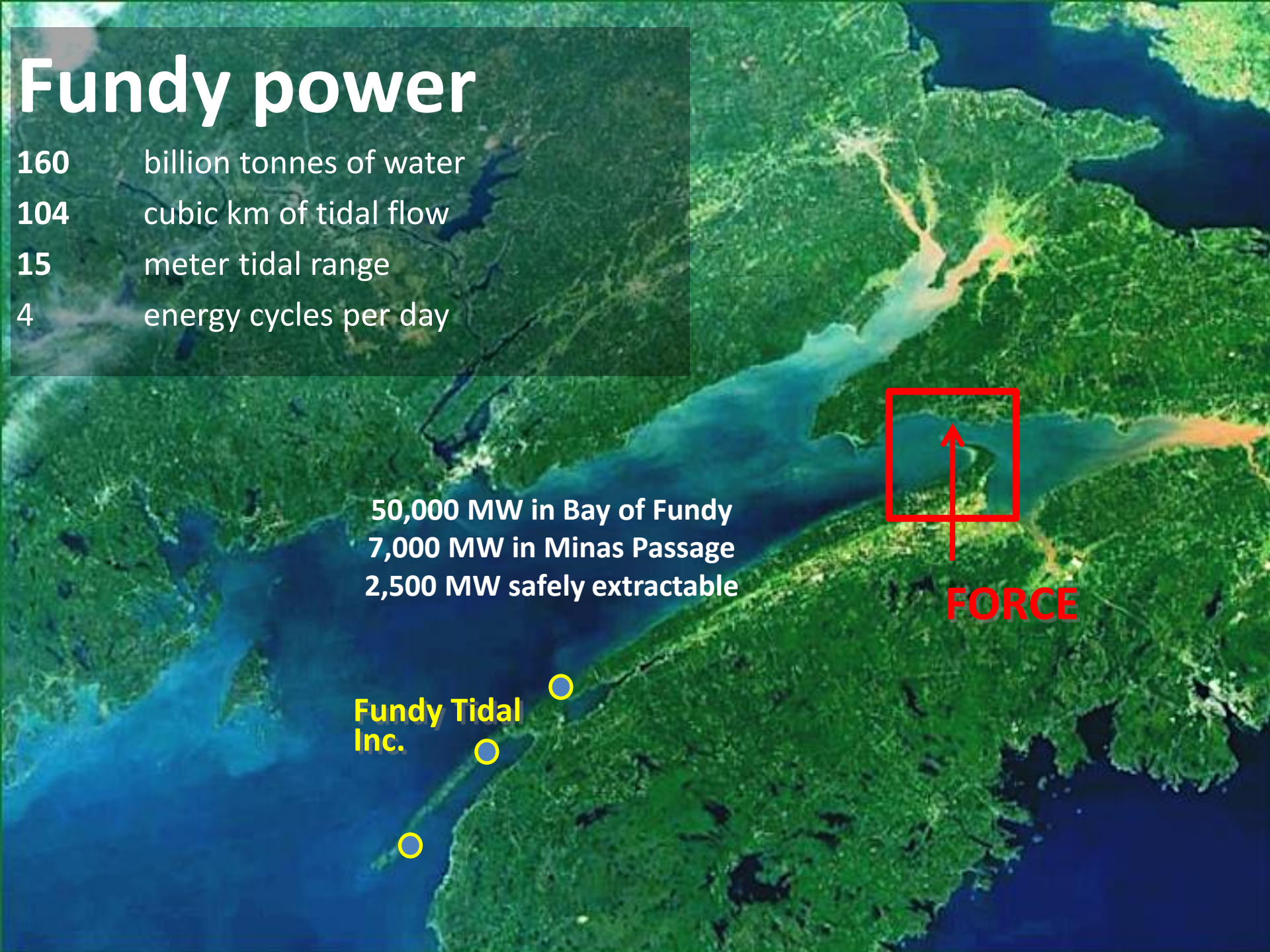


Ministry of Energy & Mines (BC)
http://www.empr.gov.bc.ca/EPD/Electricity/supply/Pages/default.aspx

Nova Scotia
Generation Mix (2013)

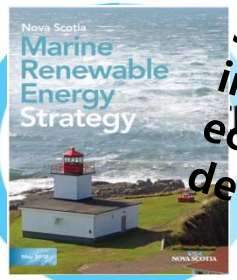


Department of Energy (NS)
http://energy.novascotia.ca/sites/default/files/files/Electricity-Review-NS-DOE-Market-Trends-Report.pdf


Fundy power
160 billion tonnes of water
104 cubic km of tidal flow
15 meter tidal range
4 energy cycles per day
50,000 MW in Bay of Fundy
7,000 MW in Minas Passage
2,500 MW safely extractable
FORCE
Fundy Tidal Inc.

Nova Scotia, world leader in tidal energy

Engagement of region's utility & IPPs



Strategy focus: industrial & economic development

Market driver: FIT, COMFIT world-leading

FORCE: Common development site

Community involvement: Fundy Tidal Inc.

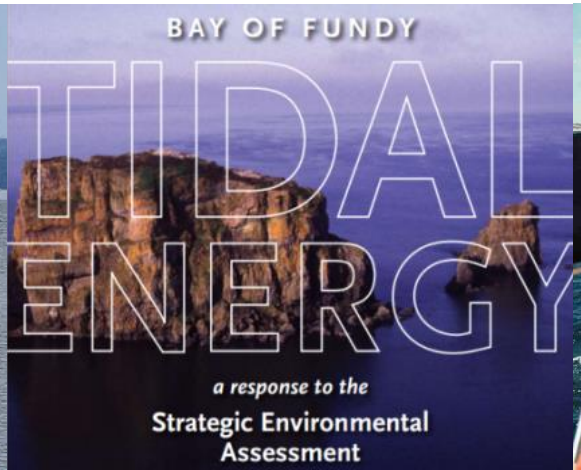
- Multi-technology
- International developers

Drivers & Challenges for Tidal Energy

- Drivers for policy
  - Electricity mix: Energy diversity & security; need for clean, local resources
  - Economy: Rural economy declining; opportunities in developing solutions for world market
  - Environmental: GHG emission regulations – 10% below 1990 levels by 2020
- Challenges for social acceptability
  - Environmental uncertainties
  - Displacement of other industries
  - Impact to electricity rates
  - Costs vs. realizing local industrial benefits
  - “Why bother?”

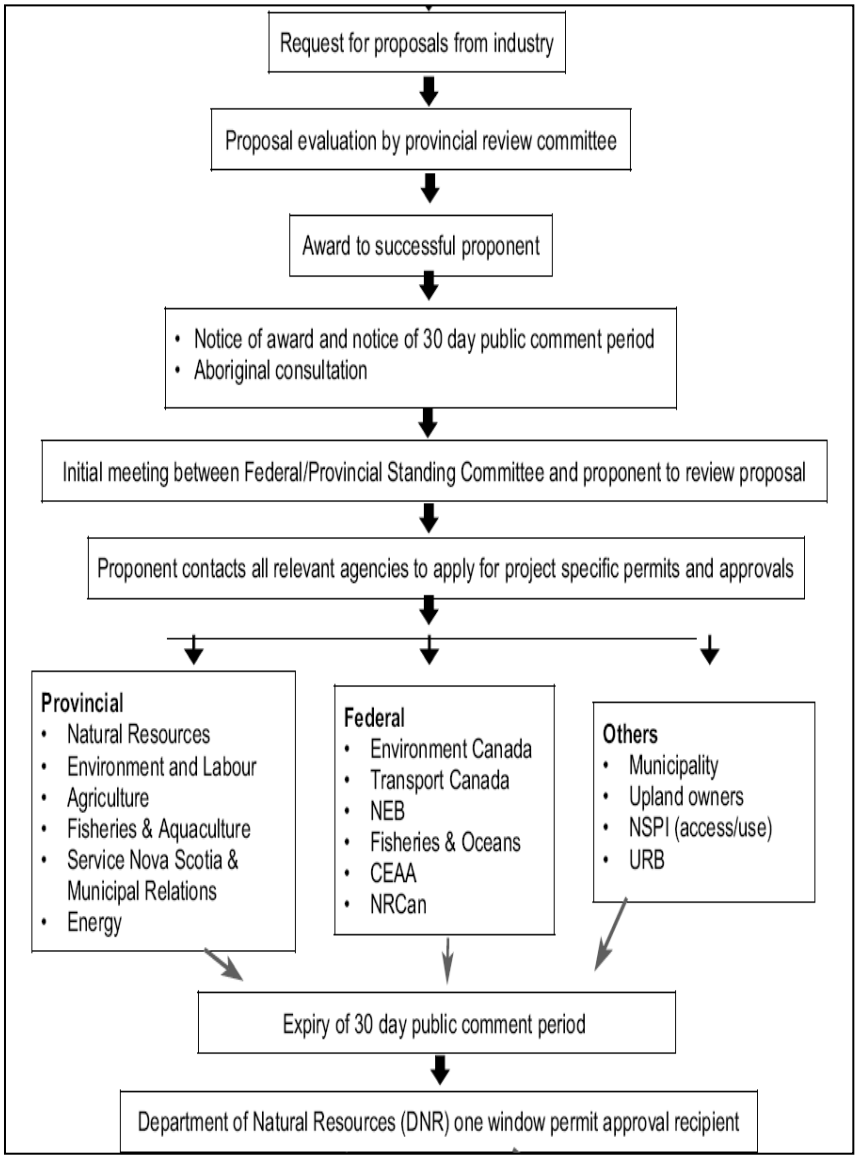
Engaging the public and stakeholders

- Strategic Environmental Assessments (SEA)
  - Forum for stakeholder input: other industries and users of the resource, nearby communities, First Nations, researchers
  - Informs policy and regulatory development
  - Ongoing as industry progresses – 3 to date (2008 – 2014)



Effective & predictable oversight

- One Window Process
  - Coordinates regulatory process and permitting
- Development of resource-specific legislation
  - Planning, rights allocation, OHS, environment, etc.
- Statement of Best Practices
  - Guidance to industry, policy makers, regulators, etc.
  - Adaptive management approach encouraged



Understanding the environment

- Engagement of local universities/researchers

  - Acadia University/Acadia Tidal Energy Institute
  - Fundy Energy Research Network (FERN)
  - Cape Breton University
  - Dalhousie University
  - University of New Brunswick
  - National Research Council
  - Offshore Energy Research Association
  - University of Manitoba
  - University of Victoria
  - College of the North Atlantic

  - Research in key areas:
    - Resource modeling advances, acoustic tracking of fish and mammals, benthic bio and geo assessment, modeling of energy extraction impacts, grid integration
  - Major role in developing environmental risk framework
  - Development of best practices and educational materials for communities




Market drivers & impact

- Encouraging community involvement & industrial advancement – FITs
  - Community-based FIT (COMFIT)
    - $0.652/kWh, based on $10 million/MW to install
    - Potential 15% ROI to investors
    - Small-scale devices, under .5 MW
    - Community ownership (51%)
    - Distribution connected – limits impact to electricity rates
  - Developmental FIT
    - Rate range $0.375 to $0.575 per kWh
    - Transmission connected
    - Large-scale devices, .5 MW and higher
    - Designed to kick-start 15-20 MW commencing in 2014
    - Cap limits impact to electricity rates

Context: Electricity rates in Nova Scotia: 13.79 cents to 14.251 cents per kilowatt-hour

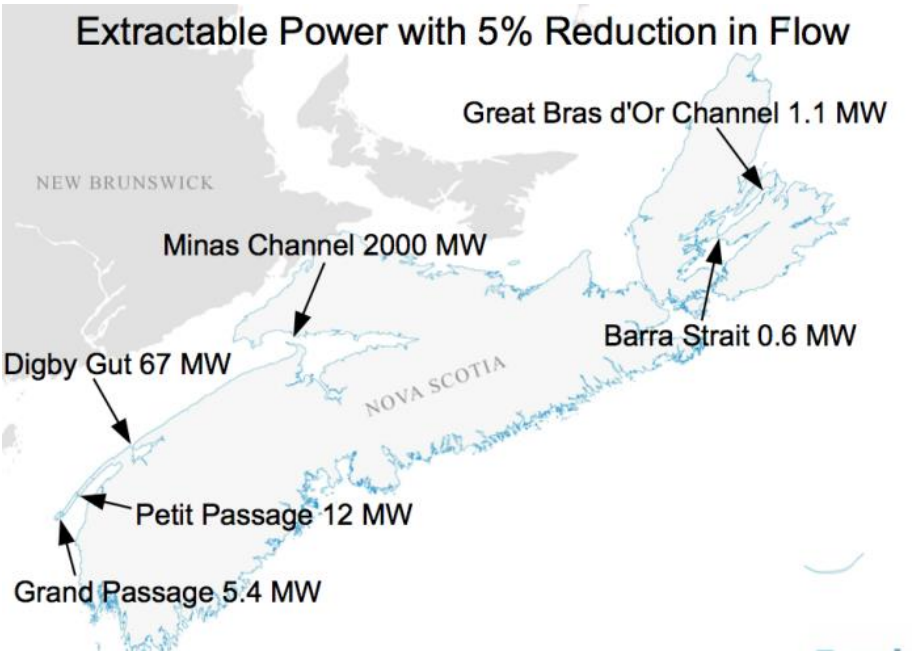
Industry catalyst: FORCE

(Fundy Ocean Research Center for Energy)

- Industry incubator
  - Encourages collaboration (reduction of costs/risks)
  - Shared infrastructure: 64 MW subsea cables, onshore substation
  - Focused research
- Social engagement & acceptability
  - Community Liaison Committee
  - Environmental monitoring
  - Dissemination of research


Community-scale development: Fundy Tidal Inc.

- 5 projects under Nova Scotia's COMFIT (65.2 cents/kWh)
  - Grand Passage (500 kW)
  - Petit Passage (500 kW)
  - Digby Gut (1.95 MW)
  - Great Bras d'Or Channel (500 kW)
  - Barra Strait (100 kW)



- Community ownership through Community Economic Development Investment Funds (CEDIF)
- Recent partnership w/Tribute Resources & Tocardo to develop array project
- Clean Current Power Systems to demonstrate turbine in 2014/2015

Maintaining social acceptance

- Support a common strategy
  - Collaboration, cooperation among industry, government, and academia/researchers
- Communications, outreach
  - Education/ Research dissemination
  - Marine renewables as part of the energy mix
- Build confidence
  - Success in early projects, showcase achievements
- Community involvement/ownership
- Realize local industrial benefits
  - Use of local suppliers/services; focus on innovation

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ICOE 2014
INTERNATIONAL CONFERENCE ON OCEAN ENERGY

NOVEMBER 4-6, 2014
Halifax, Nova Scotia Canada

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