

# Bay of Fundy Tidal Energy



UK Canada Renewable Energy Showcase  
Aberdeen  
May 19, 2010

# Minas Basin Pulp and Power Hantsport, Nova Scotia, Canada



# Scotia Investments Ltd. ~ R.A. Jodrey

## Sustainability through People, Community and the Environment

- Minas Basin Pulp & Power 
- Maritime Paper Products 
- CKF Inc. 
- Crown Fibre Tube 
- Newton Falls Fine Paper 
- High Liner Foods Incorporated 
- Scotia Recycling 
- Annapolis Group   
- Avon Valley Floral 



**\$44,000,000 annual energy bill!**



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# Paper Machine



# Our Urban Forest



# Minas Basin is reducing the greenhouse gases of the world by 270,000 tonnes every year

Sparing 1,500,000 trees every year

Saving 580,000,000 gallons of water

Preventing 2,300 tonnes of air pollution

Avoiding 344 Gw hours of electricity (enough to power 38,000 homes)

Preventing 250,000 cubic meters of landfill volume

Employing about 1000 direct and spin-off jobs

Operating a renewable, green, ecological hydro site

Educating the students in our schools, community groups and governments on what we are all about

Making a 100% recycled product for the market place



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# Our Energy Projects



**Wind**

**Tidal**

**Hydro plant**

**Plastic to Diesel**

**Biomass Cogeneration 10 MW**

**Energy Conservation**

**Carbon Trading**

**Energy Supplier to Municipal Utilities**

**Wave**



# Minas created FORCE

Fundy Ocean Research Centre for Energy

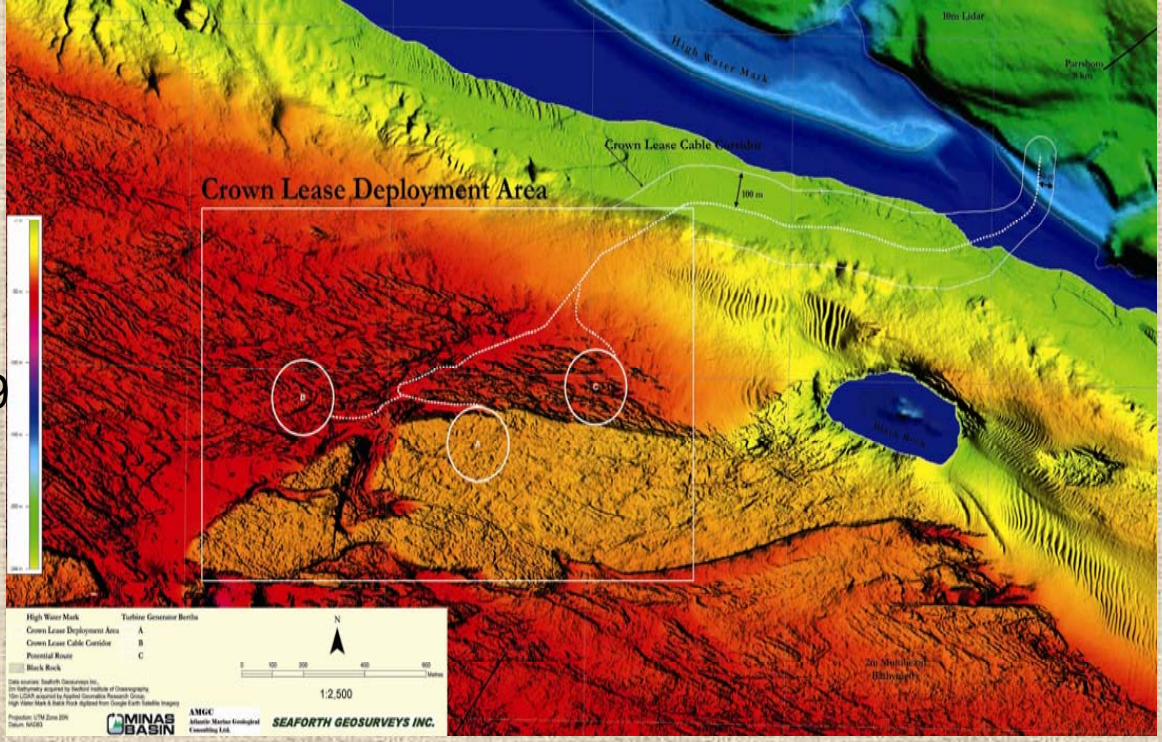


FORCE – not for profit organization

- Mandate – to prove tidal energy can be extracted responsibly
- Timeline – 2015/2016

Approved Site

September 2009



# 35 KV Submarine Cables

approx. 8 km

approx. \$9 million (supply & install)

Installation – mid-2011



# FORCE ~ Observation Facility



**FORCE**

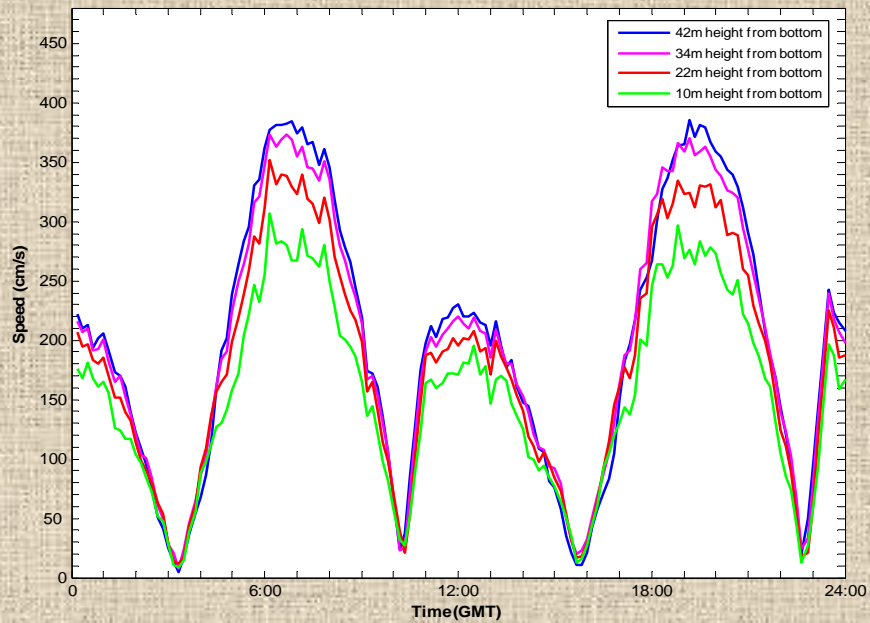
# Minas Passage



# Water current profiling

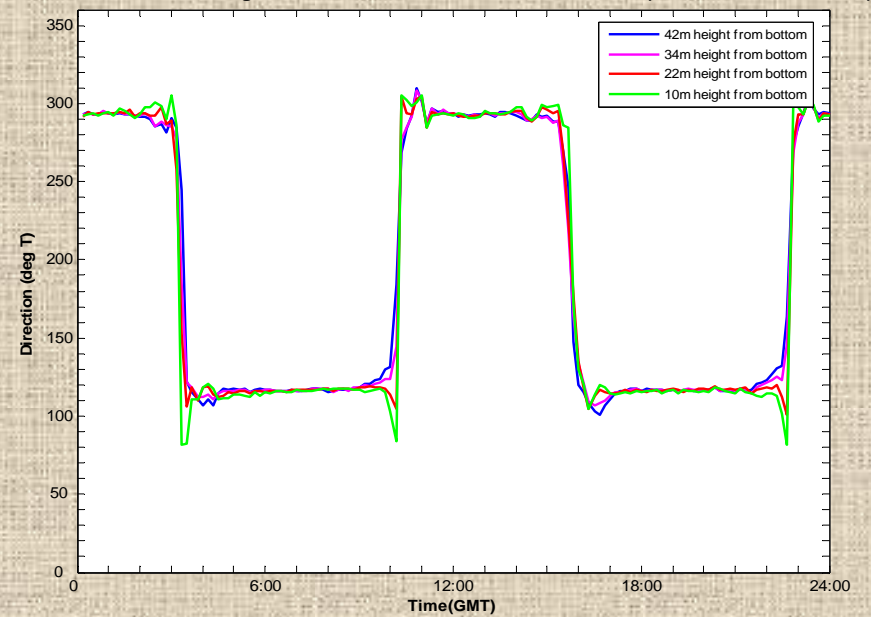
## Current Speed

Current Speed during Median Tide on June 10, 2008, Minas Basin (45°22'15'' N, 64°26'53'' W)

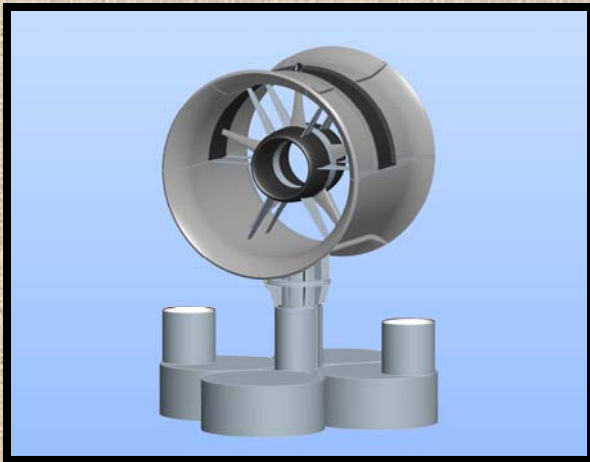


## Current Direction

Current Direction during Median Tide on June 10, 2008, Minas Basin (45°22'15'' N, 64°26'53'' W)



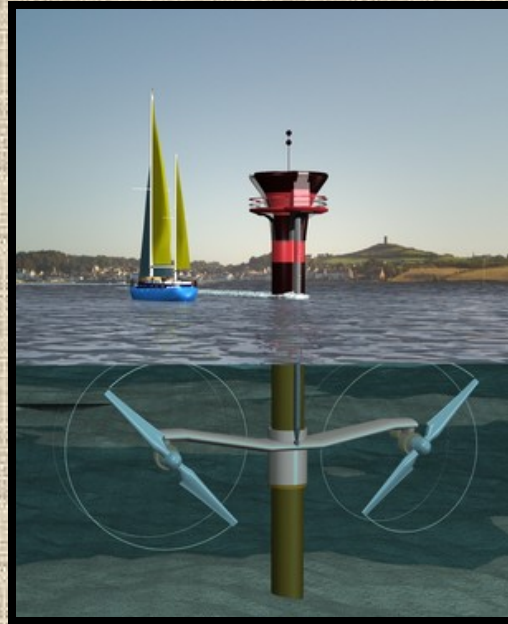
# Technologies



**Clean Current Power Systems**

**Alstom**

(Canada/France)

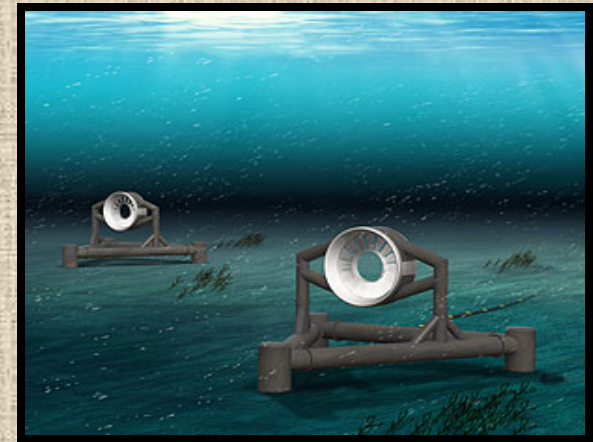


**Minas Basin Pulp and Power**

(Nova Scotia)

**Marine Current Turbines**

(Bristol, England)



**Nova Scotia Power**

(Nova Scotia)

**OpenHydro**

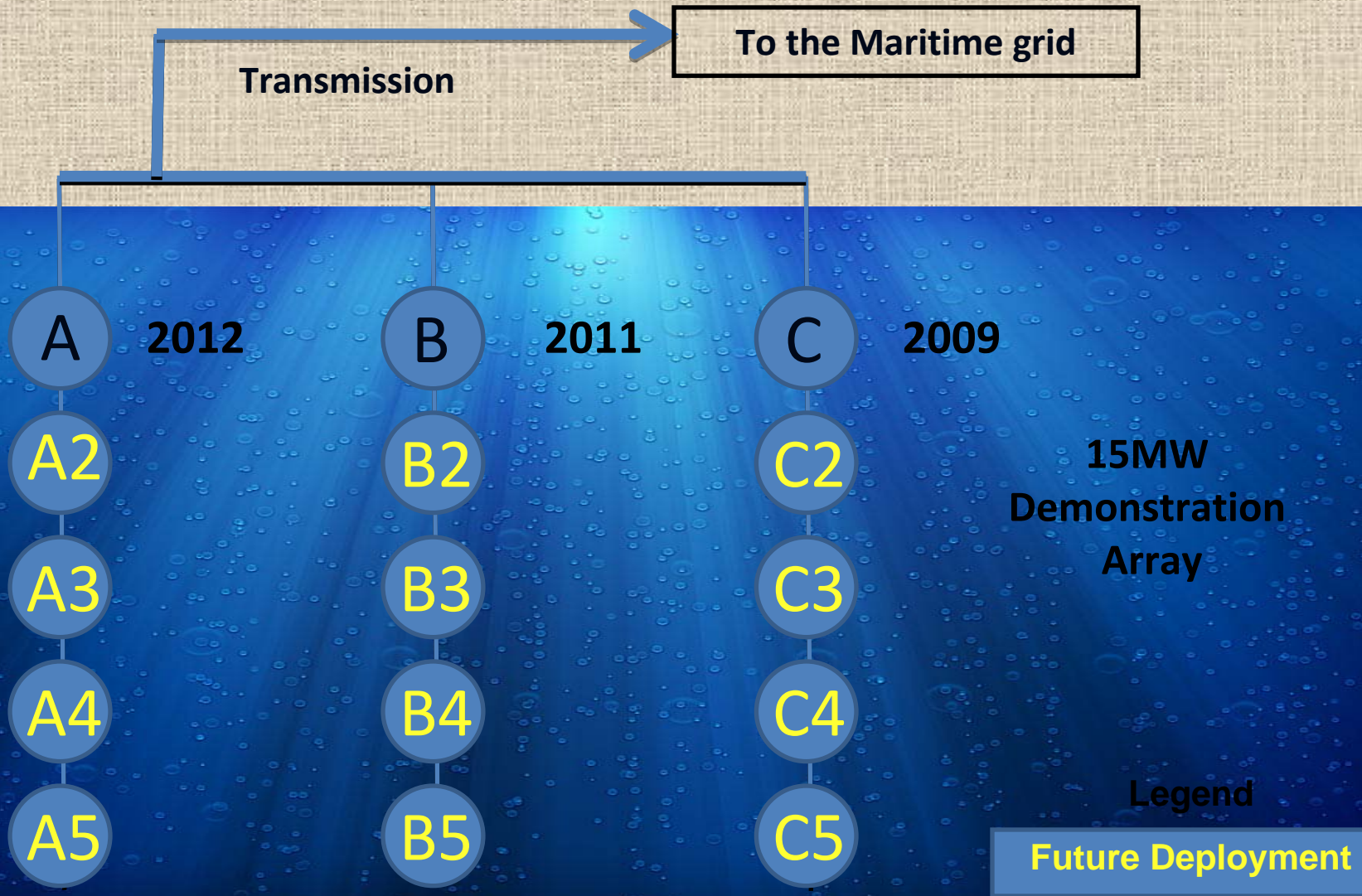
(Ireland)

# Marine Current Turbines Ltd.

- MCT - Based in Bristol, England
- *1.2MW SeaGen deployed in Northern Ireland's Strangford Lough in 2008*
- *capacity to generate power for about 1500 homes*
- *SeaGen - largest & most powerful tidal turbine in the world*
- *rigorous monitoring programme*
- world's top tidal energy company
- Renewable Energy Developer of the Year in the UK (2009)
- World leader in the development of new technology for exploiting tidal currents for large-scale power generation



# FORCE Project Schematic



# Government Support

|                                      |                     |
|--------------------------------------|---------------------|
| EcoNova Scotia                       | \$7.0 million       |
| Atlantic Canada Opportunities Agency | \$0.8 million       |
| NRCan                                | \$20.0 million      |
| <b>Government</b>                    | <b>\$28 million</b> |
| <b>Total Project</b>                 | <b>\$76 million</b> |

Gov't - vital in moving project forward

- mitigated risk
- one-stop regulatory oversight
- will require Gov't support in future

# Technology Cluster

- Coopetition among FORCE members
- Ocean Renewable Energy Group (OREG)
- Gaining strength in local marine sciences research
- Some dialogue with OTANS
- Network expectations with US activities (both coasts)
- Open communications with SuperGen parties

# Academia/Gov't Research

- Bedford Institute of Oceanography - engaged
- Acadia & Dalhousie University - engaged
- National Research Council - engaged
- Engineering-related research yet to get underway
- Office Energy and Environmental Research (OEER)
- \$4 million to date
- Other \$millions in the pipeline

most-studied tidal site in the world (for near-field effects)

# Local Skilled Workforce

- Minas is located on the shore of the Bay of Fundy
- Environmental permits – all with local talent
- Gravity Base fabrication & assembly – local
- Submarine cable installation - local
- OpenHydro deployment – local marine industry coupled with OpenHydro Installer know-how.

Drilling & Moorings in tidal races

(technology transfer from UK)

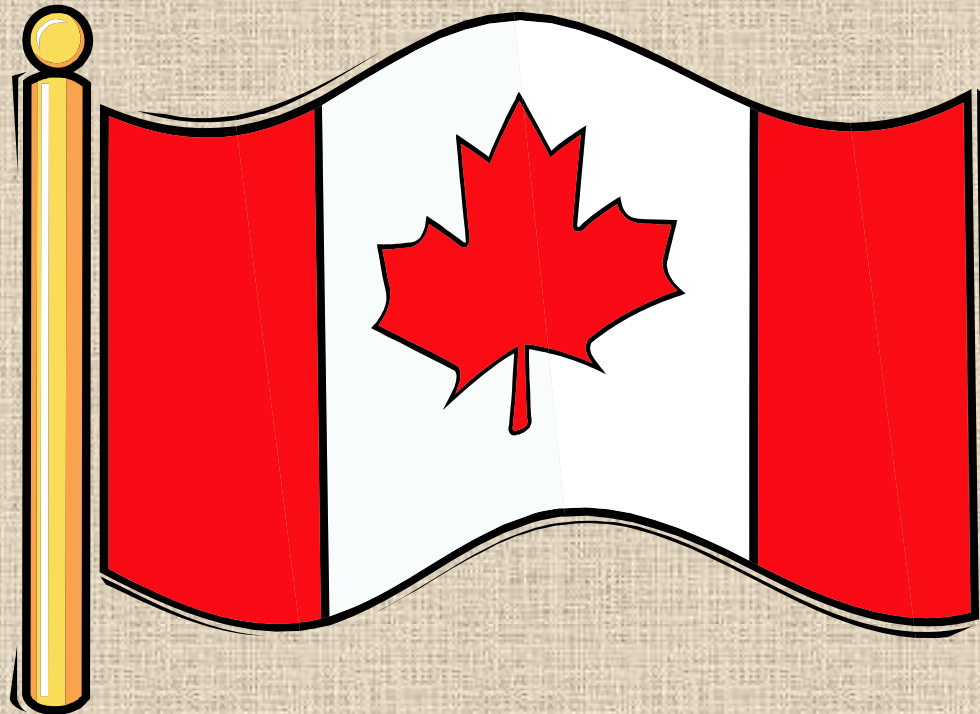
(Canadian involvement is less expensive?)

# Engaging with similar companies

- Partnered with Marine Current Turbines
- Minas is looking to optimise NS/Canadian input
- EU investment community more experienced

## Intellectual Property

- Initial/majority IP with MCT
- More IP to be created with moorings/fixings/deployment
- Incremental IP to be shared proportionally



Thank you



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