



OREG 2009 Spring Event Summary Report

Prepared by the Ocean Renewable Energy Group

From the:

**OREG 2009 Spring Event
Bay of Fundy Tidal Energy Forum: Working Together for
Sustainable Success**

**May 13th and 14th, 2009
Annapolis Basin Conference Centre
Cornwallis, Nova Scotia**

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Introduction

The Ocean Renewable Energy Group held its eighth national conference at the Annapolis Basin Conference Centre in Corwallis, Nova Scotia on May 13th and 14th of 2009. The event format was a departure from past events, with a focus on regional development and the introduction of delegate working group sessions. The overall goal of the event was to challenge all regional stakeholders to look beyond individual projects, technologies or sites, and to focus on how to make the best technical, operational, regulatory and financial decisions for a sustainable success. Communication and collaboration efforts were encouraged for all players in the region, from New Brunswick, Nova Scotia and the Bay of Fundy/Gulf of Maine US states.

In order to encourage local participation, knowledge sharing and interaction, an open house was held on the evening of May 12th. This event drew approximately 150 people, only half of whom were the OREG delegates, demonstrating that the local interest in the Bay of Fundy renewable tidal resource is growing. A series of brief presentations set the scene of ocean energy as a significant part in turning Atlantic Canada into a renewable energy powerhouse, with emphasis was on the significance of the early project work just starting. The public discussion that followed focused largely on how to exploit early success, whether special training was needed and how the industry is already using local skills.

The main event sessions on May 13th were designed to set the context for the working group discussions to follow on May 14th. Presentations focused on the current initiatives in Fundy and the Gulf of Maine and the scale and timing of challenges we face in creating an ocean energy sector that delivers an energy, environmental, and economic win. Martin Wright kicked off the event with powerful insight based on the series of “firsts” in the industry that Marine Current Turbines has achieved. He argued that ocean energy must play its part in addressing climate change challenges and economic transformation that must be met with the same urgency. He also set challenges for governments to keep their eye on the end goal and make sure they do not trigger unintended consequences that deflect from the path forward. He emphasised the scale of the opportunities and challenges faced as we develop the first generation of ocean energy technologies that are being developed without the benefit of military scale investment and drivers that gave us the steam nuclear and gas turbine generators..

Presentations through the rest of the day demonstrated that foundation steps are being laid by regulators, the early project planning, preliminary discussions between marine stakeholders and the ocean energy sector, and the emerging local suppliers and service capability. Nova Scotia Power's Terry Toner ended this preparatory day with his *three door* analysis challenging participants to consider the three development pathways, one destined to fail, one being the *go big* option that makes Canada a player when benefits start to flow, and the third being the type compromise with which we are all too familiar. He concluded with the fact that going through the third door brings you to a sign that says "go back to door one"!

The second day was used to engage the delegates and in working group sessions based on sector “theme” areas: research and academia; government; industry and supply chain; and utilities and

system operators. Moderators encouraged the participants to bring forward all of the challenges, concerns, and opportunities that have been seen through working in the industry to date. Other issues and questions from those new to the industry were also encouraged. Once all of these were brought forward, discussion focused on possible actions and solutions. The goal was to look for areas of collaboration to move forward on these actions and to prevent duplication of efforts. All of the delegates then reconvened and the results of each working group session were presented.

The end of day two tied everything together, starting with Mark Rogers of Natural Power Consultants and his review of the success of the working group discussions and their contribution to OREG's ability to define:

- What the sector is asking for in its effort to meet regional and national needs; and
- How we define success in establishing the emerging energy pathway and how to measure success as we move along it.

A panel discussion offered John Richardson, Maine Economic Development Commissioner, an opportunity to suggest that the progress may require engagement of sustainability-focused foundations as well as government, utility and private interests. His view was that government must take a lead in articulating a vision for how ocean energy can play its potential role; and that the vision clearly has one choice: *go big or go home*.

Mark Savory, VP of Nova Scotia Power, highlighted the challenge in getting short-term actions right, while keeping an eye on what is needed for the medium and long-term. He stated the importance of first steps being to understand how to make decisions about deployment of ocean energy while learning about the technology and environmental interactions; both impacts on and impacts by. During this process, the creation of early market drivers, adaptive management approaches, cost reduction through experience, and economies of scale must all be addressed. The result of the short and medium-term efforts will be the demonstration of the role and value of renewable ocean energy to the electricity, climate change, and economic challenges of coming decades.

With some interaction between symposium participants and the panel it was clear that pitting ocean energy in competition with more mature renewables could well result in *unintended consequences*. This brought the conversation back to the clarity and understanding required from a government vision. This vision is a common requirement for New England and Atlantic Canada, and could be addressed if ocean energy became an agenda item for the Council of New England Governors and Eastern Canadian Premiers. Regional goals could be achieved with the appointment of sector leaders and if the research capacity in Canada and the US can work to optimise intellectual, equipment and facility resource use. OREG will be working with Commissioner Richardson to launch that agenda.

Industry and Supply Chain Working Group

Issues/Challenges

- In-situ
- Land-base
- Regulatory
- Aspirations of industry
- Process
- Connections
- Mechanical engineering (wind?)
- Advocacy and development
- Oceanographic and engineering services
- Winches
- Fabrication, welders
- Project development
- Ocean solutions provider
- NSRD
- Small scale
- Fresh water and salt water projects
- Municipal interests
- Communications
- Economic development
- Joint venture financing
- Consulting
- Geographic considerations
- Need access to information
- Intellectual property
- Manufacturing of components
- Materials
 - o Structural steel vs. composites
- Support to deploy
- Site specific information
- Regulatory approval (research project?)
 - o All levels
 - o Permission to test machines
 - o Value of interconnections
- Off the shelf components exist (no value in demonstration phase) – mature technology transfer
- Grid connect concept
- Characteristics of a commercially viable project?
- Maintenance intervals and support in the water – marine contractors
- Permanent magnets; in conjunction with invertors; rotor speed
- Small companies being bought out by larger companies
- How does the industry define success?
- Economic spin-off value
- Emerging demand and political will in North America
- To some extent the growth of the industry will be dictate by big companies
- Building an industry
 - o R&D
 - o Community interest and roles of stakeholders
 - o IP and patent issues
 - o Sub-contractors (design, manufacturing)
 - o “friendly” regulatory and permitting environment for project development
 - o First to market
 - o Centre of excellence
 - o Cluster
 - o Goal?
- Minas Basin project become “best in class”; export of expertise
- Oil industry analysis and other “spin-off” industries
- Need more certainty in regulatory environment
 - o One-stop shop in other jurisdictions
 - o Facilitate the approval process
- Need real time data
- Issue of perception in the general public
- Need to resolve ownership of seafloor – fed vs. provincial property rights
- In BC, new technology companies, need for PPA with utility
- Strategic partnerships with academia
- Green credits
- Demand side management
- Proposed merchant lines – getting electricity to market – Atlantic Canada corridor with a renewable energy portfolio
- Infrastructure support – Digby deep water port
- Digby-Saint John ferry for land-based support services

- Constraint – undersea cables 12 month lead time
- Shoreline connections – 2 yrs?
- Need to learn best practices from the first three units

Priority Actions

- **Streamline government regulatory process**
- **Mandatory power purchase from IPPs (Ontario example) – including embedded/distributed generation**
- **Create a feed-in tariff system, market incentives, or other appropriate compensation package to create a market place, attract industry development and encourage participants**
- **Site development location analysis for commercial development**
- **Define the governmental strategy on ocean energy – what are the goals?**
- **Create a supply chain strategy and inventory of capabilities**
- **Define the learning requirements and opportunities from the early demonstration projects**
- **Define OREG’s role – political interests, industry alliance**
- **Define how regional development authorities and “lower” government levels fit into regulatory process and market development**
- **Define a leadership team or champions at all levels (municipal, developers, Provincial, State, National, local, First Nations)**

Utilities and System Operators Working Group

Policy-Related Issues/Challenges

- Clear indication of the value of GHG reductions
- Political will to pursue ocean renewables
- Good analysis of:
 - Cost of the new resource
 - Impact on the grid (e.g. cost of new transmission)
 - Benefits (environmental, security of supply and stable costs, wealth creation)
- Opportunity for stakeholder and expert input
- Demonstration of value relative to the value of other renewable resources that are competing for “subsidization” (e.g. through rates)

Grid Interconnection Issues/Challenges

- Grid code (technical standard for connection)
- Information on the electrical characteristics of the proposed machines (compatibility with the grid, and compatibility within the array)
- Exchange of information between developers and system operators/utilities to ensure compatibility
- Study of the incremental requirements for balancing services and the costs thereof
- Preliminary assessment of the local grid's capacity for injections at or near various locations
- A review of the experiences gained elsewhere (e.g. Scotland)
- Collaborative regional study of the regional (Eastern Canada and New England) grid's capability (transmission and balancing) to handle large amounts of ocean renewables (e.g. 300-500 MW) with stakeholder input

Priority Actions

- **Compile working group input from this conference and distribute to participants, then take to policy-makers**
- **Initiate studies to evaluate and create the value proposition for ocean renewables inclusive of the following benefits:**
 - a. Environmental (e.g. GHG reductions)
 - b. Security of supply and cost certainty
 - c. Wealth creation
- **Educate the public**
- **Government decision to pursue a goal on adequately supporting the industry**
- **Design tools to achieve the goal**
 - Subsidize the early (small) projects to kick things off, up to a relatively small level that does not put undue upward pressure on rates (e.g. a feed-in tariffs from Federal and Provincial governments)
 - Market for subsequent projects
 - Ensure ocean renewables are considered in transmission planning studies
 - Low penetrations associated with feed-in tariffs
 - Higher penetrations associated with subsequent developments

Research and Academia Working Group

Key Issues/Challenges

- “Last of the commons” requires adherence to the definition of sustainable development: economic prosperity, environment protection, social well being
- Gaps:

- We have the expertise and information on geology, ecology, hydrology, engineering, social science and other areas; however there is no coordination or focused efforts on ocean power
- 6 functions of a project: finance, HR, communications, marketing, operations, strategic positioning

Other Issues/Challenges

- No absence of technology for data collection; Absence of focus
- Information may be available but outdated
- We don't see ocean energy as a priority at the federal government level – this is a communication gap
- Some research is proprietary – this also creates a communication gap
- Current research is not “applied” and is not attracting funding
- We don't know what the realistic potential is of the Bay of Fundy resource
- We see a gap in good data to support risk management/assessments and the regulatory process is not well defined
- There is no identifiable source of funding specific to ocean energy
- Government targets are the driving force for the scale of marine and other renewables
- Rhode Island uses a levy on power bills to support the purchase of ocean power
- There is a need for a national network with respect to all of the initiatives in ocean energy; Information and data sets may be available, but not collated in one location
- Little work is being done on the social well being aspects of ocean energy development
- Need to develop specific training opportunities, such as co-op students with technology developers
- “Back-cycling” to the scientists of an original study is necessary for mitigation
- Reflection: Is marine energy really green?
 - 1 report so far confirms that it is
 - It can be carbon-neutral in the short term, perhaps in about 10 years
- No “tidal energy expert” has been identified (researchers exist with experience in areas related to tidal energy)
- There is misconception by Fundy Bay users (about the effects of the proposed development on their livelihoods)
- We need to better understand the long term impact of utility grade development in the Bay
- The direct and indirect effects on marine organisms need to be better understood
- Environmental impact on the technology that is implemented (i.e. salt water, cold and ice, biofouling) also needs to be understood
- Resource assessment – what methods and requirements are realistic?
- Socio-economic impact (positive or negative) not well defined and the Communities at large feel disengaged and not part of the development process
- Utility grade expansion of Fundy project can disrupt present day uses; better understanding in needed for scaled-up operations, not just demo projects
- Project information and knowledge need to be shared in order to reduce duplication and improve progress
 - Perhaps FORCE can take on this responsibility
 - The Province could provide this information
- Industry's time scale does not necessarily match the academic research time frame (although it is possible to get short-term work done through university researchers)
- Incorporating uncertainty
- Funding possibilities:
 - NSERC strategic grants, CRD grants

- ecoTrust
- other federal sources?
- International funds: Pew Foundation?
- Private: utilities (levy?), turbine developers (not likely)
- **Human Resources:**
 - Resident expertise exists, is there a gap?
 - To bridge the gap, grad students, PHD, co-op students, etc, can work with researchers then partner with developers
 - It's hard to get this set up
 - Technical training (community college level) to maintain equipment, etc.
 - Training is also needed so that skilled persons are available to provide year-round access to the site
 - Development of remote sensing opportunities may also be needed
- **Data Gaps:**
 - Direct effects and indirect effects on marine organisms
 - Resource assessment – what methods and requirements are realistic?
 - Long term impact of utility grade development
 - Environmental impact on the technology (i.e. salt water, cold and ice, biofouling)
 - Socio-economic knowledge not well defined
 - Baseline data is unavailable (economic, environmental, social)

Priority Actions

- **Central entity to coordinate the R&D, communications, and funding for tidal energy in the Bay of Fundy**
- **Development of regional, national and international research networks for more effective collaboration**
- **Define regulatory process**
- **Funding to move research forward**

Government Working Group

Issues/Challenges

- Jurisdiction (federal vs. provincial and inter-provincial)
- Approvals
 - Bay of Fundy – there is no line down middle; what are the cumulative effects
 - The infancy of the industry – need for an adaptive approach to regulatory process
 - Single point of contact and streamlining is important
 - Cost of permitting – can be onerous on developers
 - Deadlines/timelines for approvals (matching industry requirements while achieving what is necessary)
 - Scope – not just in-stream tidal; include wave and off-shore wind
 - Experiences from other industries; aquaculture for example
- Monitoring program

- Environment
- Technology
- Single unit vs. array
- Near field vs. far field effects
- Baseline definition; when do we have enough information?
- Government vs. company responsibility (who pays for the research/baseline data collection?)
- Prioritisation of governments
 - Agendas – what is the priority; economic development, clean energy, etc?
 - Lead agency; who should be leading the development of the industry?
 - NRCan roles
- Economic development – cost and benefits
- Local benefits and the community engagement is critical
- Distributed generation opportunities – can the industry develop to produce electricity for islands and coastal communities? Will communities support this type of development?
- National attractiveness to industry – how do we position Canada to attract the industry?
- Marine energy incentives
 - Could get 1 cent/kWh from EcoEnergy
 - Projects must be developed before the end of March 2011

Priority Actions

- **Leverage existing committees**
 - New England Governors and Eastern Canadian Premiers Oceans Working Group
 - Gulf of Maine Council
 - Ocean Energy Task Force Report in Maine
- **Create better links between the regulators, researchers and policy makers**
 - Adaptive management
 - Investment attraction
 - Proactive approach
 - Learn from early projects
 - Economic analysis
 - Moving forward
 - Roles and responsibilities – document with federal and provincial breakdown
- **Define a national champion and policy for ocean energy (NRCan)**
 - Research
 - Regulation
 - Integration with existing strategy development
- **Clearly define Provincial energy policy**
 - Renewable/ocean energy role
 - Prioritisation
 - Open electricity market
- **Clarify and define the regulatory process**
- **Create a public research/information library for the marine environment that links existing info (ex. DFO)**

- **Nationally define climate change goals and carbon pricing**
 - **Other short term actions:**
 - Ministers, Premiers, and Governors send letters to the Federal government asking for national champion, policy and support
 - Make sure that ocean energy is on the agenda for the next New England Governors and Eastern Canadian Premiers Oceans Group
 - OREG reporting – reporting out from meetings as well as back to OREG on activities
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Common Actions

Discussions across the four working groups contained many of the same themes and action areas required for the industry to move forward. This was not surprising given the current status of the industry and how many pieces of the overall puzzle need to be in place for advancement can occur. The common actions that came out of the event include:

- The coordination of government efforts at all levels to define ocean energy targets/goals, the regulatory process, energy policy, and regional development initiatives.
- The enhancement of linkages between regulators, researchers, policy maker and the industry; combined with leveraging existing committees such as the New England Governors and Eastern Canadian Premiers Oceans Working Group.
- The development of federal government leadership on ocean energy with a defined goal to support the development of the industry. This would be in conjunction with a national policy or strategy that addresses:
 - Environmental and climate change benefits such as greenhouse gas reduction potentials
 - Economic development benefits and wealth creation
 - The inclusion of ocean energy in long-term transmission and electricity planning
 - Support mechanisms for R&D and early project deployment
 - Market mechanisms for commercial energy production
 - A Canadian supply chain analysis and inventory
 - The regulatory process and adaptive management

OREG will work to communication these actions with the federal and provincial governments, utilities and regulators, and other members of the industry. The need for a Canadian ocean energy strategy and clear policy direction has been recognised for some time, and OREG is in the process of looking for commitment to move forward with this vital component of a successful ocean energy industry.

Final Agenda

May 12th, 2009: Stakeholder Open House

Chair: Brenda Orchard, Municipality of Annapolis

- 19:00 – 19:15 **The Regional Electricity System and the Role of Tidal Electricity**
John Woods, Minas Basin Pulp and Power
- 19:15 – 19:30 **The Fundy Tidal Projects: Progress and Updates**
John Ferland, Ocean Renewable Power Corp.
Doug Keefe, FORCE Project Consultant
Terry Toner, Nova Scotia Power
- 19:30 – 19:45 **Fundy Tidal in the World of Ocean Energy Development**
Chris Campbell, OREG
- 19:45 – 21:00 Discussion

Bay of Fundy Tidal Energy Forum Day 1: May 13th, 2009

Introductory Remarks

- 8:45 – 9:00 Chris Campbell, OREG
- 9:00 – 9:10 Jim Thurber, Municipality of Digby
- 9:10 – 9:30 Martin Wright, Marine Current Turbines: The World of Ocean Energy
- Session 1: Tidal Energy in the Bay of Fundy**
- 9:30 – 9:50 Doug Keefe, FORCE Project Consultant: Progress in Nova Scotia
- 9:50 – 10:10 Bill Breckenridge, New Brunswick Department of Energy: Progress in New Brunswick
- 10:10 – 10:30 Jeff Landry, Irving Oil and Pat Fitzgerald, Huntsman Marine Science Centre: Site Research Update
- 10:30 – 10:50 John Ferland, Ocean Renewable Power Corp.: Progress in New England
- 10:50 – 11:00 Discussion

Session 2: Stakeholder Interests in Sustainable Success

- 11:30 – 12:10 **Stakeholder Panel Contributions**
Chair: Graham Daborn, Fundy Environmental & Educational Consultants
Panel:
Doug Robinson, Mayor of Parrsboro

	Donna Curtis, Fundy North Fisherman's Association
12:10 – 12:20	Erin Bigelow, Natural Power: Open House Summary
12:20 – 12:30	Discussion
Session 3:	Challenges for Success
14:00 – 14:40	Site Investigation Experiences Simon Melrose, Oceans Ltd. Russell Dmytriw, AECOM
14:40 – 15:00	Kim Himmelman, Nova Scotia Department of Energy: Permitting and Site Evaluation Experiences
15:00 – 15:40	Supply Chain Requirements Nick Murphy, OpenHydro Russell Stothers, Clean Current Power Systems
15:40 – 15:50	Discussion
16:10 – 16:30	James O'Hagan: Accessing the Market
16:30 – 16:50	Terry Toner, Nova Scotia Power: Challenges to Building a Successful Ocean Energy Industry
16:50 – 17:00	Discussion

Bay of Fundy Tidal Energy Forum Day 2: May 14th, 2009

Session 5: Introduction to the Day

9:00 – 9:10 Chris Campbell, OREG: The Working Group Process

Session 6: Working Groups Part I

9:15 – 11:00 Identifying Challenges, Lessons and Gaps

Academia and Research Community: Moderator Bill Robertson, Huntsman Marine Science Centre

Utilities and System Operators: Moderator Bill Marshall, WKM Energy Consultants

Industry and Supply Chain: Moderator Ken Sollows, University New Brunswick

Government Departments and Regulatory Bodies: Moderator Kim Himmelman, Nova Scotia Department of Energy

Session 7: Working Groups Part II

11:30 – 12:30 Identifying Actions and Collaboration Initiatives

Academia and Research Community: Moderator Bill Robertson, Huntsman Marine Science Centre

Utilities and System Operators: Moderator Bill Marshall, WKM Energy Consultants

Industry and Supply Chain: Moderator Ken Sollows, University New Brunswick

Government Departments and Regulatory Bodies: Moderator Kim Himmelman, Nova Scotia Department of Energy

Session 5: Working Group Results

14:00 – 14:10 Andrew Henry, Dalhousie University: Academia & Research Community

14:10 – 14:20 George Porter, New Brunswick System Operator: Utility Community

14:20 – 14:30 Terry Thibodeau, Annapolis Digby Economic Development Agency: Industry Community

14:30 – 14:40 Heather Quinn, New Brunswick Department of Energy: Government & Regulatory Community

14:40 – 15:00 Discussion

Session 6: Moving Forward

15:30 – 15:40 Mark Rogers, Natural Power: Common Actions and Challenges

15:30 – 15:50 Perspectives from Regional Leaders

Chair: Chris Campbell, OREG

Panel:

Mark Savory, Nova Scotia Power Inc.

John Richardson, Dept. of Economic & Community Development (Maine)

Mark Rogers, Natural Power

15:50 – 16:10 Discussion
