

FORCE
ANNUAL PLAN
2010

Introduction¹

Strategic guidance

FORCE objectives

The corporate objectives of the Fundy Ocean Research Centre for Energy (FORCE) are:

1. To undertake the environmental assessment and application for permitting and approval of the demonstration facility for those parts of the facility which are common to all developers.
2. To own and operate a tidal energy demonstration facility in Nova Scotia to test and demonstrate in stream tidal energy devices designed to convert tidal kinetic energy to electrical energy.
3. To undertake on-going environmental monitoring as required to meet the terms and conditions of the facility lease
4. To ensure the proper controls are put in place to protect intellectual property
5. To enable the acquisition of information and knowledge necessary to assess the applications of tidal energy devices including the performance of tidal energy devices, their effect on the environment and the effect of the environment on the devices.
6. To ensure that key stakeholders and existing users of the Bay of Fundy are informed, consulted with and actively involved in activities undertaken at the facility (i.e. installation/maintenance to not conflict with active fishing season or sensitive spawning/ migration periods)
7. To be a catalyst for the creation of a new marine energy industry in the Province, including the development of value added manufacturing, and development of services for the deployment, maintenance, inspection, repair, and decommissioning of tidal energy devices.
8. As financial resources become available, to create a world class facility on tidal energy and tidal energy devices that
 - a. Supports research and development studies and works, including the development of industry standards, respecting tidal energy and tidal energy devices;

¹ FORCE's fiscal year is January 1st to December 31st. Because 2010 is an inaugural year for FORCE this plan was prepared during the first half of the year and speaks as of June 1, 2010. In subsequent years Annual Plans will be prepared in the closing months of the preceding year and speak as of January 1st. Accountability will be provided through an Annual Report issued in the first half of the subsequent fiscal year.

- b. Enables local research to be understood in the context of global research including hosting workshops and conferences to bring together world experts
- c. Educates, develops awareness, trains people and disseminates results and findings respecting tidal energy and tidal energy devices and technologies learned from operating the tidal demonstration facility.

Provincial objectives

FORCE was envisaged by the Province to pursue two mutually reinforcing provincial government goals:

1. To attract innovators, entrepreneurs, and developers by reducing risks and barriers to entry and by creating synergies between developers.
2. To earn regulator and public confidence by being a credible operator and environmental manager.

FORCE is intended as an instrument of public policy to be utilized by a variety of people in a variety of ways.² It is neutral as to the TISEC devices. It enables learning about TISECs; it does not promote TISECs in general or any of them in particular. But the creation of FORCE is premised on two beliefs:

- It can accelerate TISEC development in an environmentally responsible way; and
- TISECs have the potential to
 - Produce reliable, renewable energy in Nova Scotia on commercial terms in the next seven to ten years;
 - Provide manufacturing and service-sector opportunities for Nova Scotians in a world-wide industry.

Project objectives:³

1. **Accelerate the development and deployment of TISECs in Canada** by creating a fully permitted and grid-connected multi-user demonstration facility.
2. **Demonstrate and develop commercial TISECs** by competitive allocation of demonstration berths in the facility, and by monitoring TISEC performance and interaction with the environment.

² By providing common infrastructure such as subsea cables, a terrestrial sub-station, command and control equipment, and regulatory approvals, FORCE allows TISEC developers to advance more quickly to commercial levels of capacity, reliability, and price, because it allows them to focus their resources on innovation. FORCE's public policy objectives also provide stakeholders and the public the ability to learn about system operation, grid connection, power control, sub-sea cable laying, environmental and regulatory processes and mitigation factors, and monitoring and testing of TISECs.

³ Project elements are described in different objects by NRCan for the purposes of Clean Energy Fund. The eight CEF objects are used for planning, budgeting, and reporting purposes.

3. **Improve integration of tidal power production** in collaboration with the provincial utility NSPI and its related entity, the Nova Scotia Power System Operator.
4. **Create national and international market opportunities in tidal energy technologies and services for Canadian companies** by attracting world-leading technologies and linking them with Canadian designers and manufacturers, researchers, suppliers, marine service industries, the investment community and project developers.
5. **Establish markets for a substantial industry in Canada** including manufacturing, deploying, retrieving, refurbishing, and maintaining TISECs and associated equipment.
6. **Improve environmental and regulatory processes** by working closely with academics, government scientists and regulatory agencies to develop, undertake, report and disseminate science-based environmental effects monitoring programs.
7. **Engage receptors, stakeholders, and the public** to ensure they have good information with which to make decisions about the project and TISECs and, in that way, advance the objective of clean, renewable electricity from tidal energy.
8. **Provide up to 5MW of renewable energy by 2013 and 15MW by 2016** to help meet Nova Scotia and Canada's renewable energy commitments.
9. **Contribute to long-term energy security** by supporting, promoting, and demonstrating clean, renewable, dependable technology that can be applied from coast to coast to coast.

Status report: 2009

Milestones in 2009 included

- Establishing FORCE.
- Completing agreements between the Province, FORCE and Minas; and the Province and berth holders
- Obtaining regulatory approvals.
- Seeking additional funding from federal sources.
- Supporting device deployment by NSPI/OH.

Federal and provincial environmental approvals were granted September 15, 2009 and the NSPI/OpenHydro device was deployed November 12th.

FORCE and NSPI have a letter of authority from the Department of Natural Resource (NS) authorizing deployment of the OpenHydro device. Negotiations to acquire a 20 year lease on a site for the operations centre are complete in all but one respect. Work on this was left until 2010.

FORCE was governed by an interim board appointed by Minas until September 23 2009 when the full board held its first meeting.

2010: a building year

Overview

This is the building year for FORCE.

As 2010 commenced its goals were:

- secure financing for its project responsibilities,
- construct its on-shore facilities,
- order submarine cables for deployment in 2011,
- develop and implement many of the systems, procedures, and corporate capacity to properly achieve its corporate objectives and responsibilities.

Governance, structure, and corporate capacity

FORCE is a not for profit “company limited by guarantee”. It has members, not shareholders. The Province of Nova Scotia is a permanent member. Berth holders that are selected competitively from time to time by the Province are members but only as long as they are berth holders. They acquire no equity or lasting property rights in FORCE or its facility.

At its April meeting the Board decided to retain an executive director responsible for operations and a capital projects manager responsible for construction projects.

The executive director was instructed to hire or contract for the services shown on the organizational chart attached as appendix 4.

Clean energy fund

FORCE entered into a funding agreement with NRCan in March 2010 for \$20M effective June 2009 until December 2012. The agreement has extensive requirements including research, information dissemination, and outcome reporting to the government of Canada.

On-shore electrical facilities

The on-shore electrical facilities consist, in the simplest terms, of a substation and power line to Nova Scotia Power’s system.

The Board considered five options for the substation and three for the power line. The substation options ranged from a 5MW substation which offered the lowest initial cost but shortest life, to a full-fledged facility capable of serving a commercial field but which was estimated to cost more than \$13 million. That is, the option with the lowest initial cost presented the greatest waste and highest long-term cost and vice versa. FORCE selected a design that could be operated at 5MW but was capable of being upgraded with the least waste should the need arise.

Similarly, after considering power line options ranging from upgrading the local distribution line (which would have inconvenienced NSPI customers throughout Parrsboro) and a transmission line capable of serving commercial production, FORCE opted for a transmission line that would meet our immediate needs but could be upgraded without significant stranded investment.

Both decisions reflect FORCE's view that technologies evolving as rapidly as in-stream tidal require a versatile demonstration facility capable of responding to options not yet foreseen while at the same time being careful with public and berth holder money.

Submarine cables

If the submarine cables are to be installed during 2011 they must be ordered early in July of 2010. Through a competitive process conducted in 2009 FORCE identified a preferred supplier, International Telecom (IT), which submitted a turnkey bid offering to obtain and install submarine cable to FORCE's specifications. A revised cable route plan was completed in February 2010 and the cable specifications settled. Issues to be resolved include the number of cables, payment scheduling, currency risk, cable delivery, and deployment dates. Every effort will be made to avoid disruption of local lobster operations.

Provincial government RFP

The Province controls tenure on FORCE's berths. Early in 2010 the Department of Energy called for expressions of interest in demonstrating at the FORCE site. Accommodating a new berth holder may have infrastructure ramifications for FORCE. There are several options:

1. Install infrastructure, including submarine cables, for four berths;
2. Install infrastructure, including submarine cables, for three berths as planned;
3. Create a fourth berth that is not connected by electrical cable of which there are further options
 - a. Do not monitor in real time
 - b. Monitor in real time using wireless technology developed for the purpose (which is likely very expensive)
 - c. Install a data cable at the same time as the submarine electrical cables are installed to the other three berths.

FORCE is installing onshore infrastructure capable of accommodating four berths (for example the electrical systems and cable conduits) at Force expense. A decision by the Province and FORCE on a fourth berth is expected in time for the cable to be ordered in order to obtain the significant cost savings of a single production run and installation.

Research and science

FORCE has three distinct but closely related commitments:

- Environmental monitoring required under its environmental approval
- Research on subjects pertinent to tidal energy including technology, knowhow, and environmental effects required by NRCan under the CEF funding
- Research and dissemination required by corporate object #8.

Under the leadership of a Board subcommittee FORCE will develop a comprehensive research and dissemination program that addresses these commitments and also lays the ground work for anticipated environmental and regulatory permit applications by FORCE or its members.

We have approval for three devices. Regulators may be willing to amend this approval to allow a fourth device but there is a strict 5mw limit on total rated production capacity. Any increase will likely require a full panel environmental review and may take up to two years to complete.

Environmental monitoring Program

FORCE is responsible for environmental monitoring and reporting, while berth holders are responsible for monitoring the performance of their TISECs and will contribute to localized environmental effects monitoring.

A series of eight distinct environmental effects monitoring programs approved by Fisheries and Oceans Canada are or will be carried out at our site. The program includes a reference site located away from the TISECs in order to continue to establish base line data. An Environmental Monitoring Advisory Committee (EMAC) has been established to provide expert scientific and traditional ecological knowledge advice to FORCE on the adequacy of the environmental effects monitoring programs related to the project. The EMAC has met five times since its inaugural meeting November 19, 2009 and finalized its first report in late May. FORCE has committed to posting the report and its response including detailed responses to each of the recommendations on our website within sixty days of receipt.

Summary of key actions for 2010

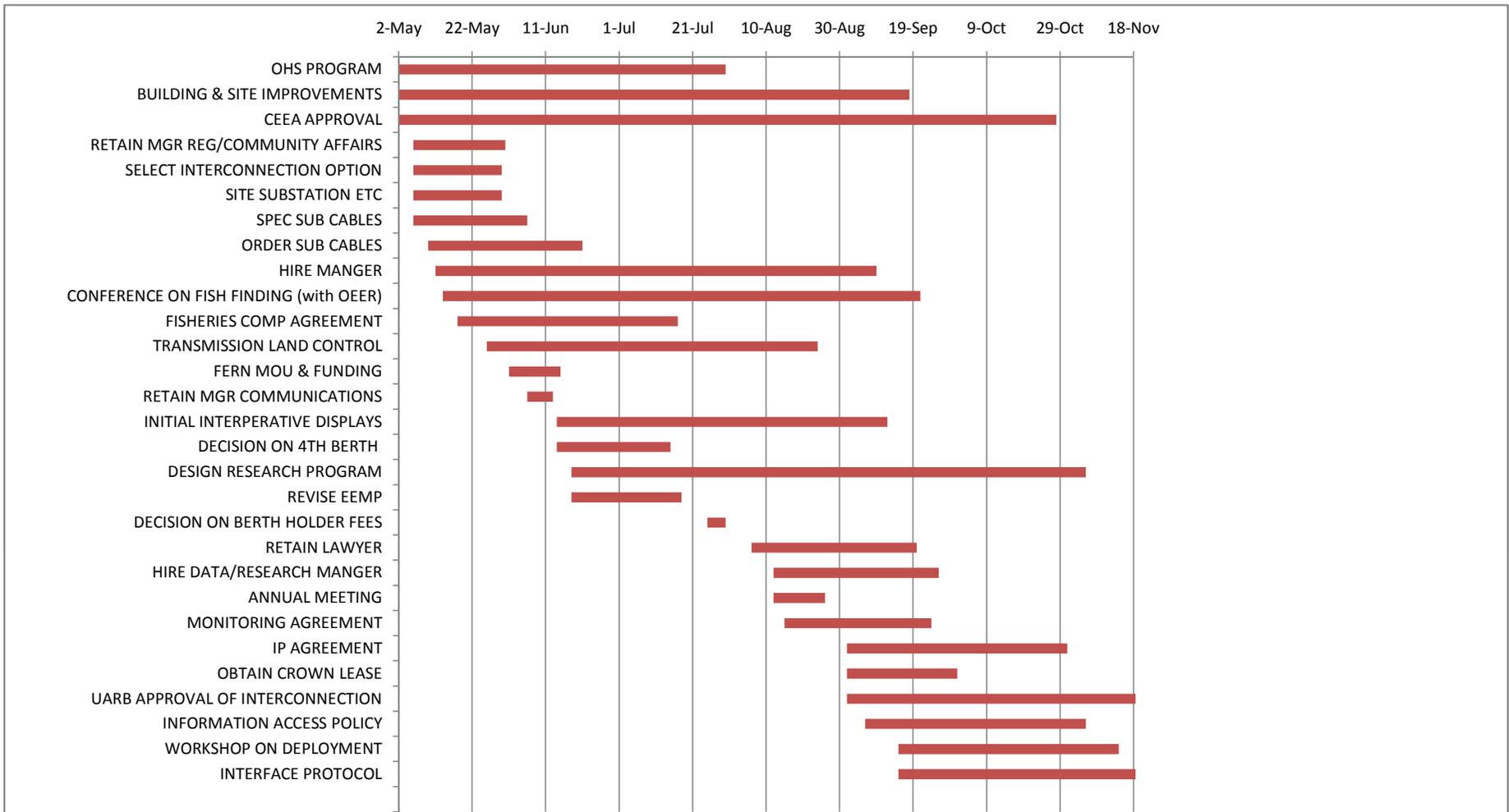
- Establishing an environmental monitoring program that is respected by regulators, stakeholders, and the public.
- Constructing the research/interpretative centre and on shore electrical works.
- Governance

- establishing an organizational structure and hiring and retaining qualified people
- developing and implementing policies and procedures including
 - workplace health and safety
 - financial controls
 - capital and operating budgets
 - an interface control document that specifies key technical responsibilities and requirements of the berth holder and FORCE includes: electrical & physical connection protocols, device deployment procedures, and monitoring requirements.
- Negotiating a contribution agreement with federal officials under the Clean Energy Fund.⁴
- Contracting for deployment of submarine cables in 2011.
- Obtaining the Crown lease and issuing sub-leases.
- Obtaining rights and approvals in time for construction of the interconnection.
- Continuing to improve the environmental monitoring program.
- Developing research strategies, relationships, and programs.
- Maintaining stakeholder relations and communications including reporting, publications, and briefing.

Appendices

1. Appendix 1: project schedule.
2. Appendix 2: Gantt chart showing approximate scheduling of key actions.
3. Appendix 3: summary table linking key results, actions, and measures to the corporate objects.
4. Appendix 4: organizational chart

⁴ This was completed in March but has yet to be formally announced.



Appendix 2: Gantt chart showing approximate scheduling of key actions

Appendix 3: FORCE Annual Plan 2010 summary

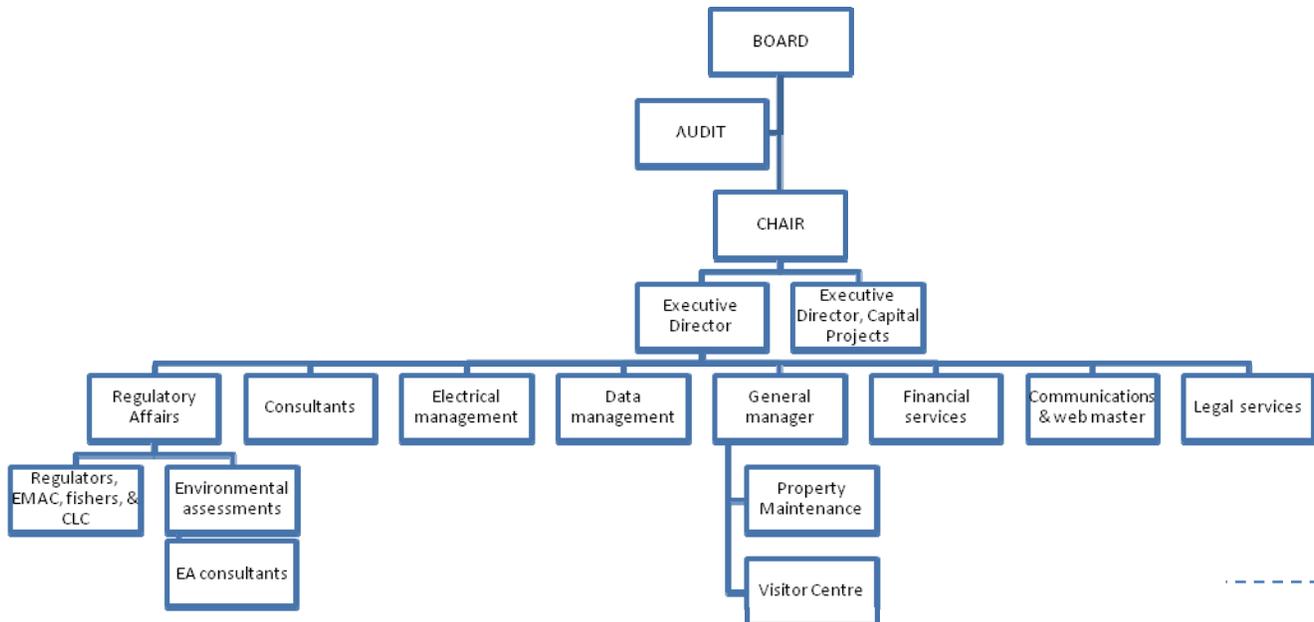
Object	Key result in 2010	Action	Measure
1. Permits for facility	<ul style="list-style-type: none"> • Required lease & authorities in good standing • Public & regulator credibility 	<ul style="list-style-type: none"> • Complete review CEAA review • Obtain Crown lease & foreshore permits 	<ul style="list-style-type: none"> • CEAA approval • Issuance of Crown lease
2. Own and operate demonstration facility	<ul style="list-style-type: none"> • Appropriate interpretive/research centre, subsea cables, electrical substation, site improvements, interconnection • Good governance, including hiring or retaining qualified people, prudent financial management, • Implement occupational health & safety program • FORCE & berth holders understand their respective roles and responsibilities and their activities are coordinated 	<ul style="list-style-type: none"> • Ops Centre and site improvements completed Sept 2010. • Develop & adopt OHS program • Order subsea cables and schedule installation in 2011 • Select transmission or distribution interconnection & acquire land access if needed • Annual meeting • Hire/retain qualified people 	<ul style="list-style-type: none"> • Ops Centre on time & budget • No environmental or safety incidents or near misses. • Suitable cable ordered for deployment in 2011 • Interconnection planned, and approvals given in time for construction in Q1 2011 • Services on Org chart being delivered by employees or long-term contractors • Interface protocol established including electrical and mechanical connection requirements, deployment procedures

Appendix 3: FORCE Annual Plan 2010 summary

Object	Key result in 2010	Action	Measure
3. Environmental monitoring	<ul style="list-style-type: none"> Credible monitoring and reporting to regulators, stakeholders, and public 	<ul style="list-style-type: none"> Timely post of EMAC recommendations & FORCE response EEMP producing data and reports Retain regulatory affairs manager Monitoring agreement 	<ul style="list-style-type: none"> Regulator & EMAC satisfaction with monitoring program FORCE data and analysis is credible with public, regulators, and academics Baseline data for future approvals
4. Protect IP	<ul style="list-style-type: none"> Protection of IP of members and FORCE 	<ul style="list-style-type: none"> Negotiate IP agreement Develop and adopt FORCE information policy 	<ul style="list-style-type: none"> Berth holder satisfaction with IP protection FORCE information protected and disseminated appropriately
5. Enable assessment of devices including performance, effect on environment and environment on devices.	<ul style="list-style-type: none"> System plan approved and equipment ordered in time for installation in Q1 & Q2 2011 	<ul style="list-style-type: none"> Electrical system approved Equipment ordered 	<ul style="list-style-type: none"> Installation on budget & schedule
6. Catalyst for creation of marine Energy industry	<ul style="list-style-type: none"> Research program that includes supply chain 	<ul style="list-style-type: none"> Develop draft program and consult key stakeholders 	<ul style="list-style-type: none"> Value of supplier contracts & relationships by place of business

Appendix 3: FORCE Annual Plan 2010 summary

Object	Key result in 2010	Action	Measure
7. Create a facility that			
a. Supports research and development	<ul style="list-style-type: none"> • Research plan for technology & environment 	<ul style="list-style-type: none"> • Develop research program with academic and government researchers 	<ul style="list-style-type: none"> • Research program developed that satisfied FORC E’s objectives and includes work on arrays and second phase regulatory data
b. hosts workshops and conferences			
c. Educates, develops awareness, trains people and disseminates findings.	<ul style="list-style-type: none"> • Formal relationships with academic and government researchers • Regularly speak at seminars and to industry & public groups 	<ul style="list-style-type: none"> • Develop MOUs with FERN and other researchers • Maintain CLC • Retain regulatory and community affairs manager • Retain communications manager • Co-host conferences with OEER & OREG • Maintain slide deck, speaking points, information packages website 	<ul style="list-style-type: none"> • Good working relationships with FERN, OEER, OREG, and academics generally • Community Liaison Committee meets regularly and disseminates accurate information between the community and FORCE



Appendix 4: FORCE structure

1. The Executive Director is a contractor approximately 20hrs/wk.
2. The Executive Director, Capital Projects is a consultant retained for the purpose. During capital construction the Executive Directors will coordinate activities as many of the people reporting to the Executive Director are involved in the capital projects.
3. The General Manager could be a full time employee and depending on her or his credentials and experience may take on other responsibilities. This position might be suitable for a person from the Parrsboro area. Property maintenance & visitor would presumably be part-time and seasonal positions also from the area. Financial services could continue to be contracted or a part-time person engaged.
4. A law firm would be retained to provide legal services.
5. Regulatory affairs and Communications would be provided by a part time contractors or employees – 2 to 3 days per week each as would communications which includes web content management and creation as well as monitoring the 800 number.