



Request for Proposals

**Acoustic Doppler Current Profiler (ADCP) Measurements at the
Fundy Ocean Research Center for Energy Demonstration Site – Minas
Passage**

Release date: April 28, 2011

Fundy Ocean Research Center for Energy (FORCE)

fundyforce.ca

902-406-1166

1. Invitation

Full Proposals are invited from consultants or consulting firms (hereafter referred to as "consultants") to conduct Acoustic Doppler Current Profiler (ADCP) Measurements at FORCE's facility in the Minas Passage, Bay of Fundy.

2. Background

FORCE is building Canada's leading centre for tidal energy technology research and demonstration. FORCE collaborates with developers, regulators, and researchers to study the interaction between tidal turbines and the Bay of Fundy environment.

FORCE will provide a shared observation facility, submarine cables, grid connection, and environmental monitoring at its pre-approved test site. The site is well suited to testing, with water depths up to 45 meters at low tide, a sediment-free bedrock sea floor, straight flowing currents, and water speeds up to 5 meters per second.

The Province of Nova Scotia selected the three initial berth holders – Nova Scotia Power (with OpenHydro), ALSTOM (using a Clean Current design), and Minas Basin Pulp and Power (with Marine Current Turbines). In 2009, NS Power deployed the first commercial scale device in North America at the FORCE test site and successfully recovered it in December 2010. The Province recently selected a fourth berth holder, Atlantis Corporation. At the present time, all four berth holders are anticipating the deployment of their turbines sometime in 2012.

Prior to the establishment of FORCE, ADCP data was collected in the Minas Passage to help determine the location of the FORCE demonstration site. This initial ADCP data helped to establish current velocities in the Minas Passage and subsequently led to the Crown Lease area for tidal demonstration being identified. This data is useful for site selection and berth holders would now like to have a better understanding of the micro site characteristics at each of the four sites within the Crown Lease area.

More information is available at fundyforce.ca

The proposal should address the following:

Phase 1

1. Develop an ADCP measurement plan, including instrument parameters, deployment/ recovery methods, data analysis and reporting, in consultation with FORCE. The plan should also address the issue of site turbulence.
2. **Commencing in late May 2011**, begin collecting ADCP data in each of 4 berth sites to characterize the flows at each site (exact coordinates of deployments to be determined in consultation with FORCE). If you feel more or less ADCP units should be deployed please justify this in your proposal. ADCP units should be deployed using a fixed platform and between 500 kHz and 700 kHz instrument, preferably with 2 GBytes of internal memory and 1 external battery pack, to provide measurements of the currents and their variability at sites within the FORCE crown lease area. The data must be collected using an instrument deployed for at least 29 consecutive days to capture a full tidal cycle. FORCE prefers the use of between 500 kHz and 700 kHz instruments and velocity profiles at time intervals below 60 seconds (preferably 20-30 sec) to resolve the large eddy wave numbers advecting past the sensor. The data shall contain high frequency measurement ($>1\text{Hz}$) to assess eventual dynamic effects. These high frequency measurements shall occur at least twice a 6-hour tidal cycle during several minutes. Explain how the accuracy of the data collected will be ensured/verified e.g. via a third party verification or other means.
3. Wave and water height measurements must simultaneously be recorded and provided to FORCE.
4. Wave and current interactions requiring the possible deployment of a wave buoy(s) should be considered when developing your proposal to FORCE.
5. FORCE requires 0.5 m range resolution and velocity profiles over the full water profundity at the four berth sites, starting as close to the bottom as possible.
6. Must demonstrate precision in the measurements and direction 0.5 degrees° , plus (+) or minus (-) and 1% plus (+) or minus (-) in velocity calculations.
7. FORCE needs to estimate drag forces on its 34.5 kV cable. It is anticipated that this might be calculated from high frequency ($\geq 1\text{Hz}$) measurements of burst speed currents using a bottom current meter attached to an instrument platform that minimizes signal contamination. Alternative measurement strategies will be considered. Proposals are welcome to treat this item as optional or as separate.
8. Analysis of ADCP data will follow an agreed plan (see point 1). The measurements should be put into a format convenient for delivery to berth holders and the research community. This data must be provided to FORCE in an expedited manner, prior to the submission of the report. The findings will be presented to FORCE in a report due by August 2011. Once the data has been collected, analyzed and the report prepared, please provide advice as to whether FORCE should consider a modeling exercise and what would be involved.

9. FORCE would also like your advice regarding whether fine bathymetry data can be collected during this time frame. If so, please include a scope of work and costs associated with collecting this data. This data will allow FORCE to have a better understanding of site characteristics and will assist in the cable lay.
10. Identify and describe recommendations regarding any other additional data collection or analysis that should be conducted in parallel with the ADCP measurement plan, to best characterize the flows in the FORCE Demonstration area.

Phase 2

1. Phase 2 is a study to better understand tidal harmonics and will be commissioned upon the completion of Phase 1. The purpose of this phase is to better understand the tidal harmonics in the demonstration area. This phase requires a continuous recording for a minimum of six months. The successful bidder must include a plan for deployment and equipment recovery. Data that is collected for this phase of the study should be analyzed to produce a minimum of 20-component harmonic analysis.
2. Provide advice to FORCE regarding whether Phase 2 can be done in parallel with Phase 1 of the project. Provide FORCE with advice on the sequencing of the project elements in conjunction with Phase 1 i.e. monitoring schedule for phase 2, including report delivery.
3. Provide advice to FORCE as to whether FORCE should consider a modeling exercise, what would this involve i.e. additional data collection and the potential benefits to the project.
4. Address the issue of battery life and sensor fouling. Is it possible for a deployment of six months?

This project is a turn-key project and the successful applicant will be responsible for supplying all equipment and operational requirements including ship time. It should be noted that FORCE may require a third-party observer to accompany the Consultant while executing the scope.

4. Purpose of this Full Proposal

Consultants are invited to submit to FORCE a Full Proposal that contains at a minimum the relevant information outlined in section 7.

Please note that response to this Request for Proposals should not be seen as placing any obligation on FORCE to fund or any respondent to carry out any work.

5. Conflicts of Interest

It is the responsibility of consultants to identify all possible conflicts of interest that may affect services.

6. Guidelines for Submission of Full Proposals

Format: Submissions are to be made as outlined in section 8. The document must be submitted in Word document format as follows: single spaced, single sided, font size 12-point, Times New Roman, 1" margins on all sides, and contain the contents outlined in section 7.

The submission will be evaluated according to the criteria in Schedule A.

7. Full Proposal Contents

The Full Proposal shall clearly address all of the information requested in this section.

Since the objective is to produce documents that are easily understood the Full Proposal should demonstrate exemplary communication skills, be complete, and make a convincing case that the consultant can perform high quality work. The Full Proposal shall be organized with the subject headings in the sequence indicated:

- **Introduction** including a description of your firm and its areas of concentration and expertise with ADCP studies.
- **Experience and Past Performance** in the energy and marine renewable energy sectors developing methodologies and using ADCP's for velocity studies.
- **Organization and Personnel** include a profile of the project team who and identify who be the primary contact and any personnel proposed to be involved in services to FORCE.
- **Location** of your office or offices and from which office the work will be conducted.
- **Availability:** it is essential that this work get underway no later than 1 June 2011.
- **Hourly rate(s)** and other fees associated with providing services for each person expected to be involved on behalf of the consultant.

- **Safety Record:** In the proposal please identify that you have all the safety processes and procedures in place to complete this work in a safe manner.
- **Estimate of total cost to complete the project.**
- **References.** You may provide two (2) letters of references for which similar work has been provided.
- **Signature.** The Full Proposal must be signed by an authorized official.

8. Submission

You may respond electronically or by hard copy. Please submit your Full proposal to:

<i>In writing or on disc/memory stick</i> FORCE C/O Jennifer Matthews P.O. Box 2573 Halifax, NS B3J 3N5 Attention: Jennifer Matthews Re ADCP RFP	<i>Electronically</i> Jennifer.Matthews@fundyforce.ca Re ADCP RFP
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Full Proposals must be submitted no later than **4PM AST, May 12, 2011**. Full Proposals received after that time will not be considered. All Full Proposals received by the deadline will receive an acknowledgement by email.

9. Enquiries

Enquiries regarding FORCE or the selection process should be directed to:

**Jennifer Matthews
FORCE
E-Mail: Jennifer.Matthews@fundyforce.ca**

FORCE will respond to requests for clarification as soon as is reasonably possible. FORCE will respond in writing or orally as deemed appropriate in the circumstances. FORCE reserves the right to make any or all questions and answers to enquiries available to all other proponents. Generally, only substantial answers that clarify the process will be distributed.

10. Full Proposal Modification and Withdrawal

Addenda will be accepted until the closing date. Full Proposals may be withdrawn on written request of the proponent any time.

11. Full Proposal Changes and Amendments

FORCE may issue addenda and/or clarification to the Full Proposal as necessary. FORCE, will notify all proponents in writing if any changes are made to the Full Proposal. The closing date may be extended.

12. Principal Contact

Each Full Proposal should include the name and title of one individual who may be contacted in the event that further clarification of the Full Proposal is required.

Schedule A EVALUATION CRITERIA

Evaluation Criteria for Assessment of Full Proposals

The following are mandatory requirements. Full Proposals not meeting them will receive no further consideration during the evaluation process:

- All information requested in this Full Proposal is provided;
- Demonstrated experience with the requirements identified in the Full Proposal.

Full Proposal will be evaluated according to FORCE's procurement criteria and their completeness, content, and evidence of successful implementation and management of similar programs for similar organizations, and the abilities of the Proponent and its staff.

The criteria for evaluating Full Proposals are:

- **Experience and Past Performance** in the energy and marine renewable energy sectors developing methodologies and using ADCP's for velocity studies. **40 points**
- **Full Proposal content and completeness** **30 points**
- **Budget** **30 points**