Request for Proposals

Valuation Method for Electric Ancillary Services

RFP Release Date: date Wednesday March 11, 2020

Proposal Due Date Extended: Wednesday April 15, 2020 (5 pm ADT)

Contract Manager

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1. Context and Objectives

The Offshore Energy Research Association of Nova Scotia (OERA) is an independent, not-for-profit research organization that funds energy research aimed at reducing risk and encouraging the sustainable development of Nova Scotia's energy resources.

Consistent with this broad mandate, the Nova Scotia Department of Energy and Mines (NSDEM) has asked OERA to solicit proposals for a project that will help define a new, enhanced power purchase agreement (PPA) for use by Independent Power Producers (IPPs) and Nova Scotia Power Inc. (NSPI). The current PPA is more than 10 years old and is no longer consistent with industry best practices. The purpose of this project is to develop the framework for a power purchase agreement that delivers more value to independent power producers and NSPI ratepayers than is currently the case. Nova Scotia Power System Operator is responsible for determining, and controlling, the ancillary services that are required to operate the Nova Scotia electrical system. This study's intent is to identify the types of ancillary services that could be procured as part of a renewable energy project and determine how providers may differentiate their bids by offering these services.

In order to meet legislated greenhouse gas emissions targets of 53% below 2005 levels by 2030 and net zero by 2050 in a cost-effective and reliable manner, and to ensure continuous progress toward these goals, OERA is seeking a consultant to:

a) Describe potential commercial arrangements that will lead to best value projects for ratepayers by minimizing integration expense and maximizing generation value, such as:
    - Grid behaviour and obligations on the generator by Non-Synchronous Generators/Inverter-Based Resources (NSG/IBR);
    - Economic dispatch;
    - Minimum guaranteed power and energy capacity;
    - Maximum available power and energy capacity;
    - Generation forecasting requirements and dispatch, including up/down regulation;
    - Up-time and maintenance windows;
    - Ability of a generator to best respond to peak demand and seasonal/daily variation of load;
    - If additional compensation mechanisms, beyond payment for energy, are necessary to provide additional services; and
    - Any other contractual terms that may influence ratepayer value.

b) Such grid/ancillary services could include but are not limited to:
    - Ramping reserve and net load following capabilities (frequency regulation);
    - System strength and shore circuit ratio;
    - Volt-Ampere-Reactive support; and
    - Fast-frequency response capabilities.

c) Identify or develop a proposed method to value any potential services which have not already been valued through existing tariffs; and

d) Describe how potential ancillary services would be captured in the interconnection process or power purchase agreement (capacity and performance payments), or other arrangement, as appropriate.

This work is intended to provide support for future procurement of renewable energy and capacity in Nova Scotia in the best interest of electricity ratepayers, allowing all resources to compete fairly to meet carbon emission reduction targets. Specifically, the procurement should offer to pay, equitably, for all services and commodities from all resources. The results of this work will be considered in the preparation of new terms and conditions in an updated PPA for renewable energy in Nova Scotia. This work should identify methods to calculate the value of the ancillary services, without the requirement to assign specific values to specific services. The exercise is not about numerically quantifying these ancillary services, but about how to relatively value services in the context of competitive procurement.

By assessing what subset of ancillary services could be provided by NSG/IBR providers, the overarching aim of the work is to determine what kind of considerations could provide value and be included in a PPA for NSG/IBR.

2. Scope of Work

The work scope includes the following general tasks:

1. Review the existing PPA, NSPI Integrated Resource Plan and related documents to understand the current and future power system in Nova Scotia, its operational parameters, constraints and opportunities.

2. Create a preliminary list of the technical issues to be addressed for review by the project management committee. The project management committee is staffed by representatives from OERA, NSDEM, Natural Resources Canada, NSPI, and Ryerson University.

3. Undertake a jurisdictional scan to identify best practices in other jurisdictions that may be applicable in Nova Scotia (e.g., Xcel Energy; EirGrid; Australia Energy Market Operator; UK National Grid; ERCOT, PJM, SPP, MISO, etc). Suggested resources are included in Appendix A, though do not capture an all-inclusive list.

4. Solicit and document input from IPP's, the Nova Scotia Power System Operator, Nova Scotia Power Inc., the Nova Scotia Utility and Review Board, NSDEM and others as needed regarding the ancillary services and the appropriate method for valuation of these services, and to assess priorities, concerns, constraints and opportunities.

5. Develop or recommend a method for determining the best value of ancillary services for ratepayers. These methods will need to seek approval from the project management committee before a final draft report is complete.

6. Assess and determine the appropriate mechanisms for the provision, management, deployment, verification of services, and enforcement including grid code, interconnection process, power purchase agreements, market structure, or others.

7. Determine where changes may be required in legislation, regulation, or other standards to enable the grid/ancillary services under consideration.
8. Host two project webex or in-person presentations – one during Task 5 above (valuation) and one upon submission of the Draft Report to present the findings prior to finalizing the report. OERA will schedule and host a project kickoff meeting via webex or in-person.

3. Deliverables

The deliverables consist of a Draft and Final Report, along with a PowerPoint presentation provided to the project management committee before the report is finalized. In addition, an interim presentation is required before the work in Task 5 is considered complete. This will allow the project management committee to provide input to the valuation task. The consultant is also expected to host project status meetings as needed via webex.

The Draft Report must contain:

1. Records of engagement and consultation with all parties, including summaries of comments received.

2. Results of the jurisdictional best practice scan and copies of any relevant documents reviewed as part of this task.

3. A description and list of recommendations for the appropriate mechanisms for the provision, management, deployment, verification of ancillary services and enforcement, including grid code, interconnection process, power purchase agreements, market structure, and others. The consultant may identify multiple mechanisms for each service. Consideration should be given to how the mechanisms could be applicable in multiple future system states, such as higher penetration of variable generation, fewer synchronous generating units operating in NS, and/or additional transmission interconnections.

4. Advice and recommendations regarding where changes may be required in legislation, regulation, or other standards to enable or improve, the delivery, efficiency, and efficacy of services.

5. Advice and recommendations on the method for determining the value of grid/ancillary services.

As noted above once the project management committee has reviewed the Draft Report, the consultant will present the findings via webex or in-person. Comments received from the project management committee will be incorporated into the Final Report.

4. Proponent Qualifications

Please see the evaluation table at the end of this RFP. The successful applicant must have proven experience and a strong background in electricity systems engineering and assessment. This includes but is not limited to:

- Distributed/NSG/IBR resources and procurement
- Energy sector economics and resource planning
- Cost of service, rate structuring and design

- Transmission planning
- Regulatory strategy and power purchase agreement design

Familiarity with the subject matter at the international level is considered an asset. This funding is open to non-Canadian entities as well as project teams consisting of Canadian and non-Canadian partners.

4.1 Conflict of Interest

The project management committee may disqualify a proponent for any conduct, situation or circumstance, determined by the project management committee, in its sole and absolute discretion, to constitute a Conflict of Interest. For the purposes of this Section, "Conflict of Interest" has the meaning ascribed to it in Appendix B.

5. Project Timelines

The following timelines outline OERA's general expectations with respect to timing. The project must be completed no later than 31 July 2020.

1. RFP release date: 11 March 2020
2. **Proposal due date:** **15 April 2020 (5 pm ADT)**
3. Project award (target): 27 April 2020 (week of)
4. Draft Report/Presentation: late June early July 2020
5. Project completion (Final Report): 31 July 2020

6. Proposal Requirements

1. The proposal should be concisely worded with clearly described objectives, methods, timelines and outcomes. Maximum 15 pages excluding appendices.

2. The proposal should include a description of the Respondent's company and its relevant experience with similar projects. The Respondent must also describe the relevant work experience of the key staff assigned to this project and their roles on the project. This material should be summarized in the body of the RFP and can be presented in more detail, if needed, in appendix.

3. Please provide a task-cost breakdown showing rates and time for project personnel.

4. Please provide an organizational chart showing how your company will organize this project, the role and reporting hierarchy of project partners (if any), and reporting lines to OERA's project management committee.

5. A single electronic document is sufficient; no hard copies are required. Please include:

   A cover letter –signed by an officer or equivalent with signing authority to bind the Respondent to the statements made in the proposal.

One proposal copy – As described in Proposal Requirements section above.

The electronic copy should be uploaded in WORD and/or PDF format to the OERA-FTP site available at https://oera.sharefile.com/r-r7a2f413013c4ba89.

7. Questions and Clarifications

The OERA will accept questions from interested applicants until 19 March 2020, 5 pm ADT. A Q&A page will be available on the OERA website https://oera.ca/opportunities/request-proposals/rfp-valuation-method-electric-ancillary-services. The names and organizations of those submitting questions will remain anonymous; only the question and OERA response will be posted, and the questioner will receive a direct emailed response. Interested parties are encouraged to check the Q&A page for updated information and/or clarifications that may help in completing their proposal.

Please submit your questions by email to Russell Dmytriw (rdmytriw@oera.ca).

8. Evaluation

This project will be administered through a project management committee established by OERA. As shown below, proposals will be quantitatively evaluated against a set of criteria by representatives from the NSDEM, OERA, Natural Resources Canada, NSPI, and Ryerson University.

Factor	Weight
Experience and Knowledge: Qualifications, experience and capabilities of the company and delivery team; demonstration of local and international knowledge relevant to this study.	55%
Project Plan, Approach and Method: Proponent demonstrates an understanding of the project service requirements and has outlined a clear and effective work plan. Proposal describes the objectives, method, milestones and deliverables, and a sound approach in undertaking this project. Communication format and frequency between the Respondent and OERA are clearly described.	30%
Cost: The project will offer very good value for the proposed budget. The budget is clear, complete and well described.	10%
Proposal Presentation Includes all RFP requirements, demonstrates attention to clarity, grammar, presentation, comprehensibility, etc.	5%
Total	100%

APPENDIX A

4. Scenario 2: Nasrolahpour, E., Houston, C., Harper, S., Rodgers, M., Zareipour, H., & Rosehart, W. (2017, August). Bidding strategy in energy and regulation markets for a wind power plant. In Proceedings of IREP'2017 Symposium (pp. 1-5). http://irep2017.inesctec.pt/conference-papers/conference-papers/paper75m6x1bwjp.pdf
5. Scenario 3: Rebello, Eldrich, David Watson, and Marianne Rodgers. "Performance analysis of a 10 MW wind farm in providing secondary frequency regulation: Experimental aspects." IEEE Transactions on Power Systems 34, no. 4 (2019): 3090-3097. https://ieeexplore.ieee.org/abstract/document/8606157
6. Scenario 3: Rebello, Eldrich, David Watson, and Marianne Rodgers. "Developing, implementing and testing up and down regulation to provide AGC from a 10 MW wind farm during varying wind conditions." In Journal of Physics: Conference Series, vol. 1102, no. 1, p. 012032. IOP Publishing, 2018. https://iopscience.iop.org/article/10.1088/1742-6596/1102/1/012032/pdf
7. Scenario 4: Rebello, Eldrich, David Watson, and Marianne Rodgers. "Ancillary services from wind turbines: automatic generation control (AGC) from a single Type 4 turbine." Wind Energy Science 5, no. 1 (2020): 225-236. https://www.wind-energ-sci.net/5/225/2020/wes-5-225-2020.pdf

APPENDIX B

For the purposes of this RFP, the term "Conflict of Interest" includes, but is not limited to, any situation or circumstance where:

1. in relation to the RFP process, the proponent has an unfair advantage or engages in conduct, directly or indirectly, that may give it an unfair advantage, including but not limited to (i) having, or having access to, confidential information of the Province, utility or IPP's in the preparation of its proposal that is not available to other proponents, (ii) communicating with any person with a view to influencing preferred treatment in the RFP process (including but not limited to the lobbying of decision makers involved in the RFP process), or (iii) engaging in conduct that compromises, or could be seen to compromise, the integrity of the open and competitive RFP process or render that process non-competitive or unfair; or

2. in relation to the performance of its contractual obligations under an agreement for the Deliverables, the proponent's other commitments, relationships or financial interests (i) could, or could be seen to, exercise an improper influence over the objective, unbiased and impartial exercise of its independent judgement, or (ii) could, or could be seen to, compromise, impair or be incompatible with the effective performance of its contractual obligations.

Proponents should disclose the names and all pertinent details of all individuals (employees, advisers, or individuals acting in any other capacity) who participated in the preparation of the proposal; **AND** were employees of the Province, utility or IPP's within six (6) months prior to the Submission Deadline.