

REQUEST FOR PROPOSALS

Date of Issue: March 1, 2022

Issued by: Patrick Bateman, Senior Vice President, WaterPower Canada (patrick@waterpowercanada.ca)

Introduction:

WaterPower Canada is accepting proposals from qualified service providers to undertake one or more of the following research study projects:

WHITE PAPERS:

1. COMPARATIVE ANALYSIS OF ELECTRICITY GENERATION COSTS BY SOURCE IN CANADA
2. WHITE PAPER ON GRID SERVICES OF HYDROPOWER GENERATION, STORAGE AND TRANSMISSION IN CANADA

TECHNICAL AND ECONOMIC POTENTIAL ASSESSMENTS:

3. PUMPED STORAGE HYDROPOWER IN CANADA
4. HYDROPOWER REFURBISHMENTS AND REDEVELOPMENTS IN CANADA

Studies 1 and 2 must be complete by May 20, 2022.

A first draft of the deliverables for Studies 3 and 4 must be complete by September 9. The final reports are due November 18, 2022.

Background

WaterPower Canada (WPC) is the national trade association for hydroelectricity producers. In response to the federal government's commitment to achieving a net-zero emissions electricity supply by 2035 and a net-zero economy by 2050, WPC is commissioning four research projects to explore opportunities to support the increase of installed capacity of hydropower in Canada from almost 85,000 MW at present to 100,000 MW by 2035, and beyond.

Project Sponsor

Patrick Bateman, Senior Vice President, WaterPower Canada (patrick@waterpowercanada.ca)

DETAILS:

1. WHITE PAPER: COMPARATIVE ANALYSIS OF ELECTRICITY GENERATION COSTS BY SOURCE IN CANADA

This White Paper will be a brief report (limited to 12 pages, excluding appendices) that presents the results and methodology of a comparative analysis of the current and future cost of electricity generation in Canada from: new and existing renewable electricity assets (including hydropower, wind, and solar); fossil fuels; nuclear; and hydrogen. Both the “Levelized Cost of Electricity” and the “Value Adjusted Levelized Cost of Electricity” must be considered. The research should include a literature review of recent relevant studies. This work should not exceed \$18,500.

2. WHITE PAPER: GRID SERVICES OF HYDROPOWER GENERATION, STORAGE AND TRANSMISSION IN CANADA

This white paper will be a brief report (limited to 16 pages, excluding appendices) that explains, at a high level, the various grid services (e.g. “operating reserves”, “blackstart capabilities”, “inertia”, “voltage support”, “frequency control”, “contingency response”, long-duration energy storage”, etc.) that hydropower provides the grid in Canada. The research will include a literature review of recent relevant studies from Canada and the United States. It will also discuss the role of hydropower in integrating wind and solar energy, and phasing out coal-fired electricity with relevant Canadian case studies. In addition, it will also discuss the optimum ratio of hydropower per MW of wind and solar power to ensure system reliability and resilience. This work should not exceed \$18,500.

3. TECHNICAL AND ECONOMIC POTENTIAL ASSESSMENTS: PUMPED STORAGE HYDROPOWER IN CANADA

There are currently more than 3,000 MW of Pumped Storage Hydro (PSH) projects in active development in Canada, and several studies have identified significant additional potential. This research project would quantify the “economic potential” of PSH in Canada by assessing the “technical potential”, and then applying “feasibility factors” against it, for all types of PSH installation identified.

Definitions:

Technical Potential is the possible power and energy capacity at a given site without considering feasibility factors.

Feasibility Factors are the factors that would impact whether or not a project could be developed, including: technical; economic; environmental; and social considerations.

Economic Potential is the possible power and energy capacity at a given site once feasibility factors have been considered.

The scope of the study should include the following types of PSH installations:

Upper Reservoir	Integrated (“pump back” or “on stream” uses the upper reservoir upstream of an existing hydropower site)	Independent (upper reservoir not associated with existing hydropower generation station or reservoirs)
Water Conduction	Closed Loop (no natural inflow to upper reservoir, pumping and generating is isolated from natural water bodies, lower reservoir determines maximum water volume)	Open Loop (upper reservoir has significant natural inflows, hydrologic connection to a natural body of water)
Lower Reservoir	Above Grade (most common, can be Independent or integrated)	Below Grade (can include abandoned mine shafts, mining caverns, constructed tanks or constructed shafts)
Water Type	Freshwater (most common)	Seawater (not common)

The deliverable for this research project would be a comprehensive report that presents the: value, strategic advantages and role of PSH in a future decarbonized electricity supply-mix in Canada; a discussion of the feasibility factors that make potential PSH projects technically or economically feasible; and the methodology and results for the assessment and quantification of technical and economic potential. This work should not exceed \$98,500.

4. TECHNICAL AND ECONOMIC POTENTIAL ASSESSMENTS: HYDROPOWER REFURBISHMENTS AND REDEVELOPMENTS IN CANADA

In the coming decades, approximately half of Canada’s installed hydropower generation capacity will benefit from investments to either extend their operating lifetime, and/or increase efficiency and performance. At these times, there is potential to also increase their generation and storage capacity, and/or to increase their ability to contribute to reliability and resilience (i.e. including increasing flexibility to support the reliable integration of wind and solar power). The deliverable for this research project would be a comprehensive report that will describe the: types of enhancements that are available within the existing Canadian hydropower fleet; the aggregate total of MW of additional generation capacity that are technically and economically potential through both the refurbishment and or redevelopment streams, and the feasibility factors affecting their development (see above for definitions of “technical potential”, “economic potential”, and “feasibility factors”), and discussion of other additional attributes that are available; and case studies of recent or potential future examples. The consultant would also engage with major provincial and private hydroelectricity producers to discuss and assess and compile fleet-wide investment opportunities and how that would contribute to the future clean, reliable and resilient grid in Canada. This work should not exceed \$98,500.

RFP SUBMISSION RECOMMENDATIONS AND TIMELINES

- Respondents are requested to complete and return the provided Letter of Intent to submit a proposal for the identified work, either in whole or in part. The LOI shall be submitted no later than 5:00 PM Eastern Time on March 10, 2022.
- RFP submissions will be accepted with the following deadlines:
 - For White Papers: no later than March 17, 2022.
 - For Technical & Economic Assessments: no later than March 28, 2022.
- Any questions seeking clarification of the RFP requirements or deliverables should be sent via email, no later than 7 days prior to the identified RFP submission deadline, to Patrick Bateman (patrick@waterpowercanada.ca). Responses to questions received will be sent to all respondents to the LOI.

RFP Submission Requirements

RFP submissions shall include the following detail:

- A summary understanding of the project(s) under discussion.
 - An understanding of the deliverables identified.
 - Methodologies proposed for use in completing the studies.
 - An outline on availability to meet the schedule proposed. Vendors may propose an earlier completion date in their proposal.
 - A breakdown of hourly costs along with project hours.
 - A list of projects similar in nature that have been completed by the submitter.
 - A conclusion summarizing consulting services to be provided.
 - Credentials and background of the consultant/team that will carry out the work.
 - Any applicable references.
 - All submissions shall be directed via email to WaterPower Canada Patrick Bateman (patrick@waterpowercanada.ca).
- Once received, RFP submissions will be evaluated by WaterPower Canada to determine the consultant(s) of choice to carry out the identified studies.
 - Contract engagement of the successful bidder(s) will take place following selection by WaterPower Canada.
 - WaterPower Canada and the successful bidder(s) shall mutually determine the project schedule, reporting milestones, status update reporting and any payment options.
 - Submission of deliverables in draft form to WaterPower Canada is required to carry out a pre-delivery review. Dates for provision of draft deliverables is identified as follows:
 - White Papers: May 9, 2022
 - Technical & Economic Assessments: September 9, 2022
 - Dates for final submission is identified as follows:
 - White Papers: May 20, 2022
 - Technical & Economic Assessments: November 18, 2022
 - All RFP submissions and all deliverables will become the property of WaterPower Canada.