



AMENDMENT 002

The objective of Amendment 002 is to bring the following changes/additions to the Request for Proposals (RFP):

- A. RFP Changes
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A. RFP Amendments

1. Annex A – Statement of Work will be removed in its entirety and replaced with the following:

Annex A – Statement of Work

SW.1.0 TITLE

Developing Canada's Battery Manufacturing Capabilities: Assessing Battery Supply Chain Opportunities and Constraints

SW.2.0 BACKGROUND

Global markets for electric vehicles (EVs) and energy storage solutions are projected to increase demand for batteries over the coming decades. Canada has a unique opportunity to leverage its natural resources to participate in the global value chain for batteries: from resource extraction to material processing, battery and advanced manufacturing, deployment, and recycling. Canada hosts many of the minerals and metals required for developing the latest battery technologies (e.g., lithium, cobalt, nickel, manganese, graphite and vanadium). It also has a strong research and development ecosystem, and a world class automotive industry.

To fully develop this emerging battery opportunity, Canada must identify and act upon the necessary investments, challenges, and opportunities existing along the breadth of the supply chain. NRcan seeks to uncover Canada's potential as a hub for cathode manufacturing, among other opportunities that could be seized further down the battery supply chain.

Canada's minerals and metals sector has the potential to support supply chains producing advanced batteries and clean technologies. While there are some challenges with securing investments for mining and extraction projects, the projected increase in demand for these battery minerals and metals is expected to help attract greater investment in this sector. Tapping into Canada's mining infrastructure is key for establishing a fully integrated battery supply chain. Canada must also understand the downstream opportunities and the business case for developing its material processing capacity and advanced battery manufacturing capabilities in order to foster a fully developed, globally competitive battery mineral subsector.

In recent years, significant (global) investments have gone into battery R&D to improve performance and reduce production costs. Forecasts suggest EV battery demand will be the fastest-growing sector for all metals, with original equipment and parts manufacturers (OEMs) planning new manufacturing plants in the United States, Europe, and China to satisfy this expected demand. As the world transitions towards EVs and other electrically powered solutions, it is imperative that Canada understand how it may become a significant player in the global battery supply chain.

Many universities and Canadian companies are already investing, researching or developing leading-edge energy storage technologies and micro-grid solutions. These technologies are providing sustainable power for remote communities and natural resources projects, reducing greenhouse gas emissions, and decreasing reliance on diesel fuel. Canada must understand how it may support, leverage and increase its strengths in these areas to expand its role along the battery supply chain, particularly as a viable producer of advanced battery materials and components.



Previous work in this space examined projections of battery types, the lithium-ion supply chain, supply and demand trends, and the state of Canadian minerals and metals projects involving lithium, cobalt, manganese and graphite. In 2019, a comprehensive analysis of the end-of-life stage for EV batteries (concerning reuse and recycling in Canada and the US) was published by the American Petroleum Institute, so this Statement of Work shall not duplicate that work.¹

Given that the federal government is considering the merits of developing a national strategy for supporting advanced batteries and advanced battery technologies, this SOW outlines the requirements for a comprehensive analysis of Canada's battery supply chain including its strengths, weaknesses, opportunities and threats. Seven premises underpin the importance of this work:

1. The global demand for battery minerals, metals, and materials is projected to increase and possibly exceed global supply over the next decade;
2. Canada has the expertise and capacity to extract and process the minerals and metals needed to produce the next generation of advanced batteries;
3. Canada has the potential to develop a domestic and vertically integrated supply chain for advanced batteries and associated end-use products;
4. Canada needs significant domestic and foreign investment in infrastructure and R&D to stimulate the development of a national battery supply chain;
5. The long-term future of Canada's automotive industry depends on original equipment manufacturers and vehicle assembly companies making EV-related investments in Canada;
6. Canada is committed to supporting the global clean energy transition through the adoption of energy storage technologies, including EV and industrial-scale energy storage; and,
7. Other countries and regions are investing heavily in battery-tech R&D and manufacturing to develop industrial capacity, establish an economic advantage, and reduce carbon emissions.

SW.3.0 OBJECTIVES

The overall goal of this contract is two-fold:

(1) identify the opportunities and challenges particular to segments of **Canada's** battery supply chain (as noted below in the Scope of Work - section SW.4.0.); and

(2) to understand how the dynamics within and between these segments can be leveraged to develop and enhance Canada's battery materials and cell manufacturing capabilities.

SW.4.0 SCOPE OF WORK

The Bidder will be required to address challenges, identify opportunities, and raise potential issues (not limited to the lines of inquiry presented below) affecting the following segments of **Canada's** battery supply chain to achieve the objectives stated in SW.3.0:

- Mineral Exploration & Mining
- Battery Materials Processing
- Battery Cell and Pack Manufacturing
- Advanced Manufacturing (e.g. electric vehicles)
- Energy Storage Adoption/Deployment

The following lines of inquiry listed (non exhaustive) reflect issues the Government of Canada seeks to address:

¹ <https://www.api.org/oil-and-natural-gas/wells-to-consumer/fuels-and-refining/fuels/vehicle-technology-studies>



Government

- What regulatory or fiscal actions could federal, provincial and territorial governments take to help mining projects target the minerals and metals used to make advanced battery materials and components?
- What are the systemic knowledge gaps in Canada's battery ecosystem between its stakeholders?
- What measures could the Government of Canada take to address these gaps and to improve opportunities for collaboration between stakeholders?
- How could Canadian governments help increase the demand for and adoption of battery technologies within various contexts (e.g. use in industry, rural, remote, and northern communities)?

Industry perspective

- What actions could industry take – independently or with government and global partners – to accelerate the growth of a domestic battery industry within Canada?
- For companies already producing minerals and metals in Canada, what costs are associated with upgrading their processing capabilities to be an integrated battery metal and minerals producer?
- How could Canada use its mineral resources to best support advanced manufacturing opportunities related to energy storage systems?
- Which export opportunities represent the highest potential for the various segments of Canada's future battery industry? Why?

Investment

- Given all the advantages that Canada has to leverage in developing a domestic battery industry, why are we not seeing investments from global players in Canada?
- How could Canada encourage more investment?
- Which large global financial players are most active in this investment space?
- Where is global investment going to build battery supply chains and why is it going there?

Supply chain support

- How could Canada strengthen its battery R&D ecosystem to support developing its supply chain?
- What role(s) is/are Canada best able to play in the global supply chain for advanced battery manufacturing?
- How could Canada differentiate itself or demonstrate a competitive advantage within each segment of the value chain from other countries that already have battery supply chain strategies in place (i.e. Australia, UK, Germany, and China)?
- What are the costs associated with developing the supply chain using imported lithium appropriate for EVs between the present and 2050?

SW.5.0 TASKS/REQUIREMENTS

The Contractor is required to undertake the following tasks:

1. Provide a critical assessment of Canada's competitiveness and growth potential for a battery supply chain by:
 - a. Identifying science/technology, financial, and innovation capacity gaps;
 - b. Determining to what degree Canada's current battery value chain is networked or fragmented (include opportunities for improvement); and,
 - c. Analyzing the nature, sources and levels of risk associated with developing a battery supply chain in Canada;
2. Update projections for battery chemistries likely to prevail between now and 2050, assess the potential for material changes in global trends concerning these chemistries, and forecast how such change(s) may impact Canada's role as a supplier of battery materials and advanced batteries for global markets;
3. Update the projected market penetration of EVs in Canada and globally from the present to 2050 – under various macroeconomic scenarios;
4. Provide economic analyses of domestically produced and exported battery materials/components versus their import with reference to battery metals and minerals;



5. Determine the upgrades that companies operating within the Canadian EV ecosystem should make to support battery materials processing and component manufacturing;
6. Evaluate the business case and investment climate for developing Canada's material processing capacity, with specific attention to cathode manufacturing and the ability to integrate with Canada's mining industry;
7. Determine how Canada could leverage other regional/international battery strategies (e.g. E.U., Asia, Australia) to establish, grow, and sustain its potential battery material and cell manufacturing capabilities;
8. Identify essential stakeholders operating within each segment of the battery supply chain, their common barriers to becoming globally competitive (real or perceived), and to present options or strategies for overcoming these challenges.

B. RFP Changes

Question #2

Does the project authority have a budget limit that they are able to share?

RESPONSE:

As stated in 4.2 - Basis of Section, this RFP is based on Highest Combined Rating of Technical Merit and Price; therefore, the budget is not determined.

Question #3

The background section of the Statement of Work in Annex A notes that "NRCan seeks to uncover Canada's potential as a hub for cathode manufacturing". Later on, however, the statement of work asks for "a comprehensive analysis of Canada's battery supply chain". Could you clarify to what extent the project authority would like to anchor the value chain analysis on upstream stages (namely, extraction, materials processing and cathode manufacturing, i.e. Task 6 in the statement of work)?

RESPONSE:

NRCan expects all segments of Canada's battery supply chain to be assessed (excluding recycling). However, the analysis of each segment should focus on understanding the dynamics for supporting Canada's material processing and battery manufacturing capabilities.

Question #4

Task 8: Stakeholder analysis (page 26)

Is NRCan looking for a map of *domestic* stakeholders (and their barriers to becoming globally competitive) or a map of essential stakeholders from around the globe, for each stage of the value chain?

RESPONSE:

The focus should be on Canada's domestic battery stakeholders and the barriers impacting their global competitiveness.



ALL OTHER TERMS AND CONDITIONS REMAIN UNCHANGED