Critical Minerals – Critical for Everything from Batteries to National Security

Description

As countries weathered waves of infections owing to the pandemic, resources were stretched thin, and industries were halted due to government-mandated shutdowns. Canada urgently needs a trade and economic strategy for our own critical mineral deposits. Building our domestic production capacity by expediting projects, like the Ring of Fire, is essential to reduce our vulnerability to supply shortages in times of crises.

New technologies require base metals—for example, copper for electrification and nickel for battery EVs - resources that are critical to the transition to a net-zero economy. Canada is well positioned to support investments that amplify the development of Canada's Critical Minerals Strategy and the battery value chain.

Background

Critical minerals are the building blocks for the clean and digitized economy. Canada's critical minerals are essential to Canada's economic security, required for Canada's transition to a low-carbon economy, and a sustainable source of critical minerals for our partners.

They are essential for everything from sensors, fuel cells, electric vehicles, microwaves and magnets to smart missiles and air pollution controls. The uses of critical minerals are limitless and as we develop more sophisticated technology, they will become more essential to everyday life.

From the 1960s until around 1985, the United States was the world's largest producer of REE, with all production originating from the Mountain Pass mine in California. Starting in the mid 1980s, China began REE mining and extraction operations and became the largest contributor to global REE production. By the 2010s, China was producing nearly 85% of the world's supply of REE and supplying 95% of processed REE.[1]

There were 10 active REE mining operations in 2017 (table 1).

https://businessinsurrey.com/wp-content/uploads/2022/06/Picture@.png

On July 31, 2021, a US working group discussed the implementation of President Biden and Prime Minister Trudeau's commitment to strengthen cooperation on critical minerals supply chains[2]. To further North American relations, incentives on purchasing critical minerals from Canada must be in place.

[1] Bradley S. Van Gosen, Philip L. Verplanck, and Poul Emsbo, Rare Earth Element Mineral Deposits in the United States, U.S. Geological Survey, Circular 1454, 2019, p. 4, https://doi.org/10.3133/cir1454.
[2] https://www.state.gov/united-states-and-canada-forge-ahead-on-critical-minerals-cooperation/

While a joint action plan is important because of the level 52% of Canada's mineral and metal exports are to the United States[3], Canada must strengthen its own supply chain and ensure that it remains competitive with other nations, especially as minerals can be used as leverage in trade disputes[4].

Capturing the Battery Value-Chain

The joint venture between LG Energy Solution, Ltd. (LGES) and Stellantis N.V. will invest more than CDN $5 billion (USD $4.1 billion) to build a facility in Windsor to manufacture batteries for EVs in Canada, representing the largest automotive manufacturing investment in the history of the province. FVT Research Inc., a Vancouver area manufacturer of battery-electric drive systems vehicles that are five tons and heavier for mining equipment, garbage trucks, transport trucks, and transit buses, competes with US-based firms operating under the Biden "Buy America" policy. Peter Xavier, Vice-President of Glencore's Integrated Nickel Operations in Sudbury knows it is not just a nod toward being more environmentally tuned in, it is also something that makes good economic sense.

The importance of creating the right policy environment for investment in these opportunities is mission critical to Canada's economy and harnessing the value-added economics of natural resource development while being global leaders in environmental sustainability and leading climate change innovation.

Green technologies will need hefty amounts of rarer metals, such as lithium and cobalt for batteries, tellurium for solar panels, and neodymium for the permanent magnets used both in wind power generation and EVs. The required pace of transition means that, for some of these commodities, we will soon need ten times or more than is available today. This resource demand and Canada's abundance of supply to support decarbonization gives Canada the potential to generate significant economic opportunity and first mover competitive advantage in the battery value chain if action is taken immediately.

Battery cell manufacturing, the most important step in the battery value chain, is estimated to account for up to 40 percent of battery-industry value creation by 2030. Manufacturers are investing billions of dollars in new battery-cell plants. If demand for battery cells grows at about 30 percent per year, the equivalent of about 90 additional gigafactories, as we know them today, will be needed in the next ten years worldwide.

Challenges include securing funding, carrying out a billion-dollar project on budget, recruiting the right talent, and training hundreds of workers. Other potential issues include securing the capacity of capable machinery producers as well as qualifying and developing a supply chain.

There are already six or seven at-scale cell manufacturers with ten or more years of track record and significant volumes and plants in several countries. Customers want options for sourcing batteries, but generally, no more than three or four, so ten to 15 suppliers should suffice to supply the global market. Since more than 15 players have already announced their intention to begin cell manufacturing in Europe alone, we expect the industry to consolidate.

Companies face a variety of obstacles in the race to scale, but they can overcome those challenges using the following strategies.

- Become a low-cost producer
- Recruit skilled workers
- Secure raw-materials supply
- Improve product sustainability

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3 https://www.wilsoncenter.org/sites/default/files/media/documents/article/our_growing_dependence_on_critical_minerals2.pdf

4 https://www.cbc.ca/news/business/china-us-rare-earths-1.5154338

- Form partnerships with customers

Regulatory Hurdles and Investment Opportunities for Mining

The Ring of Fire is a mineral resource-rich area of approximately 5,120 km2 located in the James Bay Lowlands region of Northern Ontario. Since the early 2000s, significant deposits of copper, zinc, nickel, platinum, palladium, vanadium, and gold, along with the first and largest deposit of chromite in North America, have been discovered. These critical minerals can play a key role in positioning Canada as a global supplier of choice. This project aligns with the Government of Canada's Critical Mineral Strategy.[5] Based on current projections, the Ring of Fire is estimated to hold more than $117 billion in geological riches[6], with deposits being significant enough to sustain activity for 100 years.[7]

The Ring of Fire may be a Northern Ontario or Ontario project, but it should be a Canadian priority as it will have far-reaching impacts across the nation. In the first 10 years of the Ring of Fire development, all levels of government stand to increase their tax revenues by nearly $2 billion, with the federal government projected to accrue between $870 to $940 million[8], in addition to further royalties that may be applicable with new mineral extraction. In the long term, the federal government is expected to receive $2.89 to $3.25 billion in taxes from the Ring of Fire.[9] It is estimated the Ring of Fire will sustain over 5,500 full-time equivalent jobs annually within its first 10 years, and will significantly increase the GDP and economic activity in multiple sectors.[10] While the mining and mining supply sectors will greatly benefit, the Ring of Fire will also generate economic opportunities within the manufacturing, construction, utilities, wholesale/retail, trade, and financial services sectors, among others.

The polymetallic deposits are of global significance and have the potential to enable the diversification of Canadian exports; a current goal of both the federal government and the business community.

It has been more than a decade since its discovery, but progress on infrastructure development remains slow, development timelines are uncertain, private sector investors are increasingly frustrated, and the region's peoples face significant social and economic hurdles. Currently, there is a moratorium on mining development until a "broad and deep" terms of reference for the environmental assessment has set the stage for a "robust investigation."

However, there are opportunities on which to capitalize. The Ring of Fire is in direct alignment with the federal government's objectives such as the Critical Minerals Strategy, raising the living standards of Indigenous peoples and involving them more genuinely in resource development.

Now is the time for the federal government to scale up efforts and work with the Government of Ontario, Indigenous groups, industry, and community partners to capitalize on the opportunity and advance this project forward.

Climate change policy impacts off-grid mines in a substantial way. These off-grid mines currently use diesel power because they cannot easily access or implement net-zero technology to meet climate targets due to financial or logistical constraints. The majority of Canadian nickel and cobalt is currently extracted at off-grid mines. These mines are hit first and hardest with carbon caps, which will negatively impact these mines making them uncompetitive in the global sector.

[5] https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/critical-minerals/23414
[6] https://www.thesudburystar.com/news/local-news/column-stalled-ring-of-fire-worth-more-than-117-billion
[7] "Beneath the Surface," Ontario Chamber of Commerce, 2014, pg. 1.
[8] "Beneath the Surface," Ontario Chamber of Commerce, 2014, pg. 15.
[9] Ibid.
[10] "Beneath the Surface," Ontario Chamber of Commerce, 2014, pg. 1.

Recommendations

That the Government of Canada:

1. Working with the Indigenous communities, Provinces, and Territories, develop a strategy to enable the development of critical mineral extraction projects and refining processes, including permitting, tax, and regulatory measures to support the development of this sector, specifically expediting environmental reviews and approvals related to the Ring of Fire project;

2. Actively promote the Ring of Fire, along with other mining projects, in the global arena as a trade and investment opportunity through Global Affairs Canada

3. Facilitate value-chain collaborations through industry forums, and encourage talks between the mining sector, electric vehicle producers, and cell manufacturers as it relates to the batter value-chains;

4. Invest in research and educational institutions to develop talent and advance technology;

5. Attract cell manufacturers by establishing proactive public policies and working with the provincial and municipal governments and First Nation communities, to develop a fast-track process for permitting and land leasing;

6. Reduce capital limitations in entering the battery value chain by working with all levels of government, First Nations, lending institutions, venture capital markets, and angle investors;

7. Explore with the United States the possibility for joint purchasing and stockpiling of critical minerals and create partnerships in the batter value chain; and

8. Create a level playing field for mines that cannot access electricity grids and create different climate change targets.

Submitted By: Greater Sudbury Chamber of Commerce, Sault Ste. Marie Chamber of Commerce, and Surrey Board of Trade.