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Self - Reliance of Indian Rare Earth Industry: Lessons from Canada

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Image: Bloomberg



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The need for reforms in Mineral industry got highlighted again during the recent Lok Sabha session in August, which suggested changes to be made in the Mines and Mineral (Regulation and Development) act and bring the private companies back in the mining of beach sand minerals.¹ With reported reserves of 49 major critical minerals and six percent of global rare earth, India has limited capacity to become a global supply chain leader. This is due to the absence of focused mineral strategies with the objective of advancing all the stages of the mining industry, unlike in other major reserve countries. A country requires advanced geoscience capabilities, including geological mapping, surveying, and investments in research and development, to improve its mineral industry. In its ongoing efforts to seek Aatmanirbharta (self-reliance), India needs to water the long-sown seeds of its mining and mineral potential to achieve a fruitful advantage.

In my recent interaction with J.C. M. Ganasi, CEO of Selten Metals Corp., we discussed the importance of restoring a domestic rare earth supply chain to North America and Selten's goals to provide the raw materials supporting this supply chain. Selten is a rare earth exploration company that is developing the heavy and light rare earth prospects in Nevada called THOR, which is only 26km away from the Mountain Pass, the largest- rare earth mine in the Western Hemisphere. The primary mineralisation at THOR is monazite, and recent surface samples at THOR show high grades of up to 6.4 percent total rare earth oxide, with almost a quarter related to the critical four required for Neodymium (NdFeB) permanent magnets.²

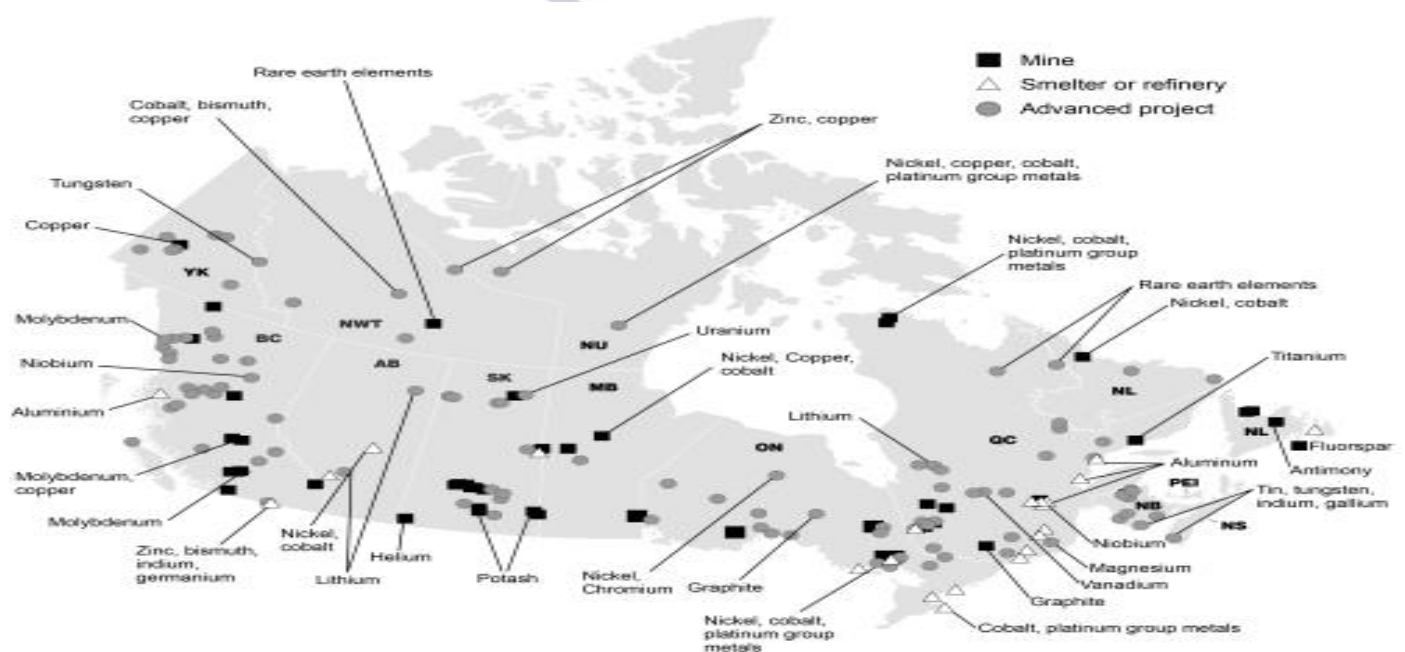
The discussion as part of the interaction intrigued me to analyse the lessons Indian minerals and rare earth industries can learn from their Canadian counterpart, thus achieving the 'Aatmanirbharta'. This article is an analysis of the policy and potential of the Canadian rare earth industry and the lessons it can bring for India to reform its mineral mining.

Critical Mineral Potential of Canada

Canada has several advanced exploration projects and some of the world's largest reserves and resources (measured and indicated) of these metals. As per 2021 estimation, 14 million tons of reserves of rare earths are available in Canada. The most notable initiative in Canada is the Nechalacho Project by Vital Metals, which was started in 2021 as a small-scale demonstration mining project in the southeast of Yellow Knife, that crushes these materials and transports them to Saskatoon for processing. This made Vital Metals the first rare earth producing company in Canada in June 2021. It is the second in North America, after Mountain Pass Mine, to start ore production. This plant has a production capacity of 1,000 tons of rare earth oxide per year, excluding cerium.³

With its unique resources, Canada is the growing centre for some advanced critical mineral projects outside China, thus establishing itself as a major source of global rare earth supply chains. Of 28 ongoing advanced rare earth projects, nine projects focusing on heavy critical minerals are located in Canada. However, these projects have certain technical and financial challenges to address in order to capitalize on their resource advantage. The growth of Canada's rare earth industry is increasingly being prioritised to increase its business competitiveness and maximise opportunities and economic output. It is estimated to bring more than \$4.2 billion in business to Canada.⁴ After realizing the importance of its mineral industry, Canada implemented its first critical minerals strategy worth CAD 3.8 billion (USD 3 billion) as part of its recent budget. The strategy aims to develop the infrastructure investment, tax credit, and data sets for the exploration of critical minerals in Canada.⁵

Figure 1: Critical Minerals in Canada



Source: Budget 2022, <https://www.canada.ca/en/departement-finance/news/2022/04/government-of-canada-releases-budget-2022.html>.

Canada's list of critical minerals currently consists of 31 minerals. The list is reviewed and, if necessary, revised every three years. With more than 200 mines, Canada has the potential to produce 60 minerals and metals, and thus is increasingly becoming the home to investment by global mining and mineral exploration companies. It has the potential to supply to both domestic and international markets, bringing a market capitalisation of more than \$520 billion. The prioritisation and measures by the Canadian government have been reforming every stage of the critical minerals value chain, which is bringing multiple opportunities for Canada. In Canada's budget for 2022,

commitments focused on bringing innovation in technologies and industrial practices to develop efficiency and cost competitiveness in the critical minerals industry.⁶ The Canadian government supports the mining companies by facilitating the time to get drilling permission and even grants to companies with high potential by following a transparent procedure.

India's Mineral Reforms and Strategies

The beach sand is the primary source of heavy minerals for India, such as ilmenite, rutile, leucoxene, garnet, monazite, zircon, and sillimanite. Out of all these heavily found minerals, monazite is important for India considering it as a source of thorium ore, rare earth elements, thus significant for the nuclear and atomic industry. Due to the strategic worth of monazite, the beach sand mining was under the rule of Atomic Minerals Concession Rules (2016), which implied that the state government can permit private companies to mine only if they follow a threshold of below 0.75 percent monazite content in the mined sand. In 2017, the Ministry of Mines issued a regulation that changed the threshold from 0.75 to zero, implying a total mining prohibition on the private companies of monazite, including sand. Another notification issued by the Ministry of Mines in 2018 completely banned private entities from mining and exporting all kinds of sand minerals, claiming that all beach sand involves some monazite concentration.⁷ Although the exclusion of private companies showed growth in India's rare earth production capacity from 1800 million tons (2018) to 3,000 (2021),⁸ the exclusive mining rights are available with two government bodies: Indian Rare Earth Limited and Kerala Rare Earth & Minerals.⁹ The absence of private bodies restricts the access of India to the commercial aspect of the rare earth industry. It has been observed that India has explored only 10% of its geological potential, majorly due to financial limitations and less strategic concern over metals and minerals. The 2021 amendment to the Mines and Minerals Act (1957) reflected the growing realisation of authorities to focus on updating the mining leasing process and bringing private shareholders back into the mining business.¹⁰

The vision of India is to increase the contribution of the mining and mineral sector, from 1.7 percent to 2.5 percent of GDP.¹¹ The recent amendment certainly carries the potential, however, the implementation of the reforms is slow. India should take inspiration from Canada and strategise its mining sector in the same way. In comparison to Canada's 0.83 million tons reserves and no reported production capacity, India has six percent of global rare earth reserves and two percent of production capacity. However, unlike the Canadian government strategising and giving strategic importance to the mining and mineral sector, India has shown limited emphasis on its mineral potential. In another interview with Pramod Kumar, former additional director of the Atomic Mineral

Directorate (Department of Atomic Energy), I came up with the analysis that if India wants to achieve all its geo-economic objectives, energy and renewable goals, mineral security, and commitment to electric vehicles to its maximum by 2030, then growth in critical mineral exploration is the key.

NOTES:

¹ The Hindu Bureau, "Parliament proceedings | PSU recruitment, changes to Mines Act discussed in Lok Sabha", August 2022, <https://www.thehindu.com/news/national/parliament-proceedings-psu-recruitment-changes-to-mines-act-discussed-in-lok-sabha/article65717852.ece>. Accessed on 5 September 2022.

² Selten Metals, "THOR: 2170 hectares in an active mining region in southern Nevada and 26 km from the Western Hemisphere's largest, rare earth mine with processing facility", <https://seltenmetal.com/thor-project/>. Accessed on 3 September 2022.

³ Bob Weber, "First Canadian rare earth mine starts shipping concentrate from N.W.T.", *CTV News*, May 22 2022, <https://www.ctvnews.ca/business/first-canadian-rare-earth-mine-starts-shipping-concentrate-from-n-w-t-1.5914368>. Accessed on 1 September 2022.

⁴ CREEN, "Canadian Rare Earth Element Network (CREEN)", October 7 2014, https://www.ourcommons.ca/Content/Committee/412/FINA/WebDoc/WD6615327/412_FINA_PBC2014_Briefs/CanadianRareEarthElementNetwork-2-e.pdf. Accessed on 2 September 2022.

⁵ Green Car Congress, "Canada's Budget 2022 calls for C\$3.8B to launch Critical Minerals Strategy", April 8, 2022. <https://www.greencarcongress.com/2022/04/20220408-canada-cm.html>. Accessed on 2 September 2022.

⁶ Government of Canada, "Canada's critical minerals strategy: Discussion paper", <https://www.canada.ca/en/campaign/critical-minerals-in-canada/canada-critical-minerals-strategy-discussion-paper.html#a3>.

⁷ Ishan Kukreti, "Environment Ministry Stops Clearance to Mining of Beach Sand Minerals", *Down-to-Earth*, April 15, 2019, <https://www.downtoearth.org.in/news/mining/environment-ministry-stops-clearance-to-mining-of-beach-sand-minerals-63999>. Accessed on 3 September 2022.

⁸ USGS Mineral Commodity Summaries, 2019 and 2022, <https://www.usgs.gov/centers/nmic/mineral-commodity-summaries>.

⁹ Ibid.

¹⁰ Ministry of Law and Justice, "The Mines and Minerals (Development and Regulation) Amendment Act, 2021", <https://mines.gov.in/writereaddata/UploadFile/mmdr28032021.pdf>. Accessed on 5 September 2022.

¹¹ Dr. Dinesh Gupta, "Mineral exploration: New India & green dreams", *The Times of India*, September 14, 2022. <https://timesofindia.indiatimes.com/blogs/voices/mineral-exploration-new-india-green-dreams/>. Accessed on 5 September 2022.