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POLICY BRIEF # 2

Canada: Rare Earths Dependence

Executive summary

Rare earth elements have recently been the subject of much discussion due to the perceived dominance of China as the producer of a disproportionate share of global output of these commodities. Rare earth elements are identified as critical in emerging high-technology sectors, including those needed for a transition to a low-carbon economy. We examine Canada's dependence on imports of these minerals to gauge the extent to which the supply of these important minerals are vulnerable to potential interruptions.

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The Policy Problem: Is Canada vulnerable to supply interruptions of critical minerals?

Rare Earth elements (REEs) have gained recent attention from policymakers worldwide due to their importance in high technology products and the dominance of China as a producer.

There are 15 true REEs (the Lanthanide series of the periodic table) though Scandium and Yttrium are often included due their similar characteristics. These elements are used in a wide range of products, including the expanding renewable energy market.[1] Other critical uses include display screens, optical devices (e.g. camera lenses), catalytic converters, magnets, hard drives, batteries, and specialized alloys.[2]

Though deposits of REEs are extensive, production is concentrated. One estimate suggests that China accounted for 97 percent of global REE production in 2022[3], though data are unclear. REE reserves are less concentrated; Russia and China are estimated to have over half the global total, and Brazil and Vietnam an additional one-third. Canada's share is estimated as less than one percent,[4] though there are new discoveries.

Even before recent events led to more contentious geopolitical rivalries, China had used its dominant market position in REEs to discriminate against foreign users.[5] China has recently used trade restrictions in other sectors to target countries such as Australia, Canada, and Lithuania, though these are typically import barriers rather than export bans.

While the U.S. and Australia are significant producers (2nd and 4th respectively), their deposits are far smaller and the U.S. consumes roughly four times more than it produces. The third largest producer (Myanmar, reserves unknown) and third largest reserve holder (Russia) are unlikely to be reliable alternative suppliers, and are already under economic sanctions by Canada and many other countries.

Being dependent on a single source for REEs with limited scope for diversification leaves economies vulnerable to both intentional and accidental interruptions. While there are alternative sources, developing capacity takes time and investment.

APPROACH & RESULTS

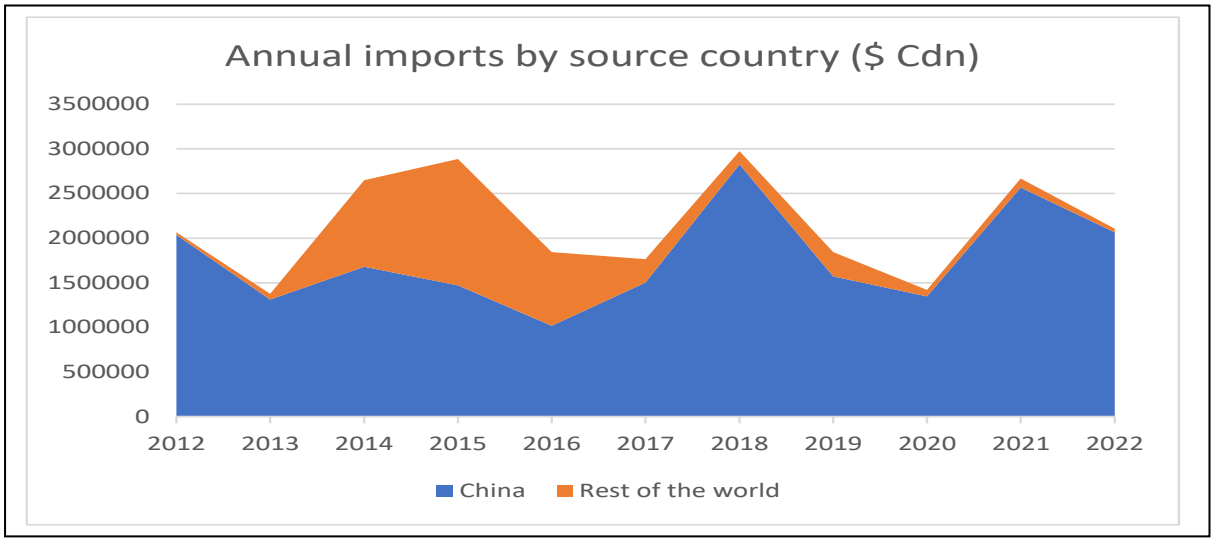
Canada's trade in REEs.

From 2018-2022, Canada's imports of REEs averaged $2.2 million. In 2022, over 98% of imported REEs came from China, with very small amounts coming from Austria, the United States, and the United Kingdom. Canada's far smaller exports go primarily to the U.S. and Europe. Tracing REE trade is complicated by re-exports and the export of products that contain them.

Canada imported over $2 million in REEs in 2022, 98% from China. Canada's exports under $0.5 million, partly re-exports, and production is low.

98% of imports from China

Low Canadian production



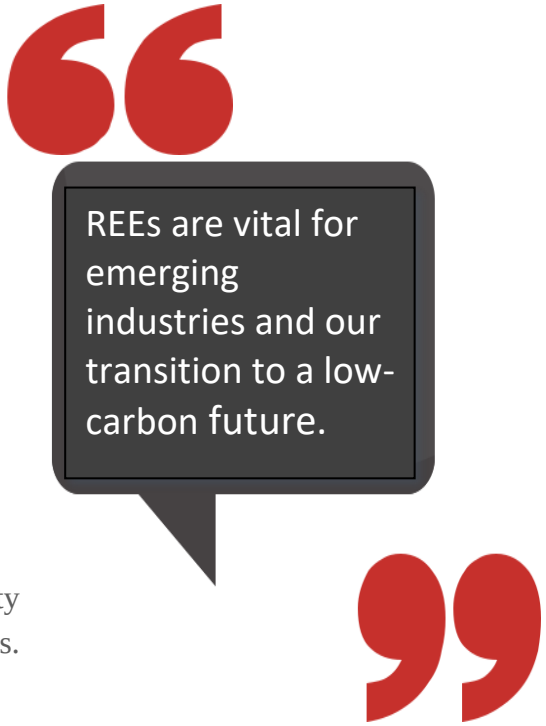
What is Canada's dependence on REEs?

Canada's REE production is currently very small, though it is growing. Recent discoveries indicate that Canada's reserves may be over 15 million tons.[4] As demand for REEs grow, especially in emerging technology sectors, price pressures and concerns about supply chain resilience will lead to more discoveries here and abroad.

Having REE deposits, however, is not a guarantee of supply. The costs associated with exploration, mining, and refining REEs can be prohibitive. Ensuring sufficient REEs for Canada's high-technology sectors, and those of our allies, will require investments in domestic and foreign capacity, and will need to trade-off reliability with cost.

CONCLUSION

The Canadian economy, including many emerging high-technology sectors, currently require REEs as critical inputs. While our imports and usage are not large in financial terms, REEs are vital for emerging industries and our transition to a low-carbon future. Our current dependence on China for almost all of our REEs is inconsistent with the principles of supply chain resilience.



IMPLICATIONS & RECOMMENDATIONS

- Encourage exploration, production and recycling capacity bearing in mind financial, social and environmental costs.
- Encourage domestic users to use REEs more efficiently, diversify sources and keep sufficient inventories.
- Collaborate with allies on possible strategic reserves and risk-sharing.
- Work with major current and potential producers, including China, to stabilize market access for all and avoid supply chain interruptions.

References

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5. Simandl, G. J. "Geology and market-dependent significance of rare earth element resources." *Mineralium Deposita* 49.8 (2014): 889-904.