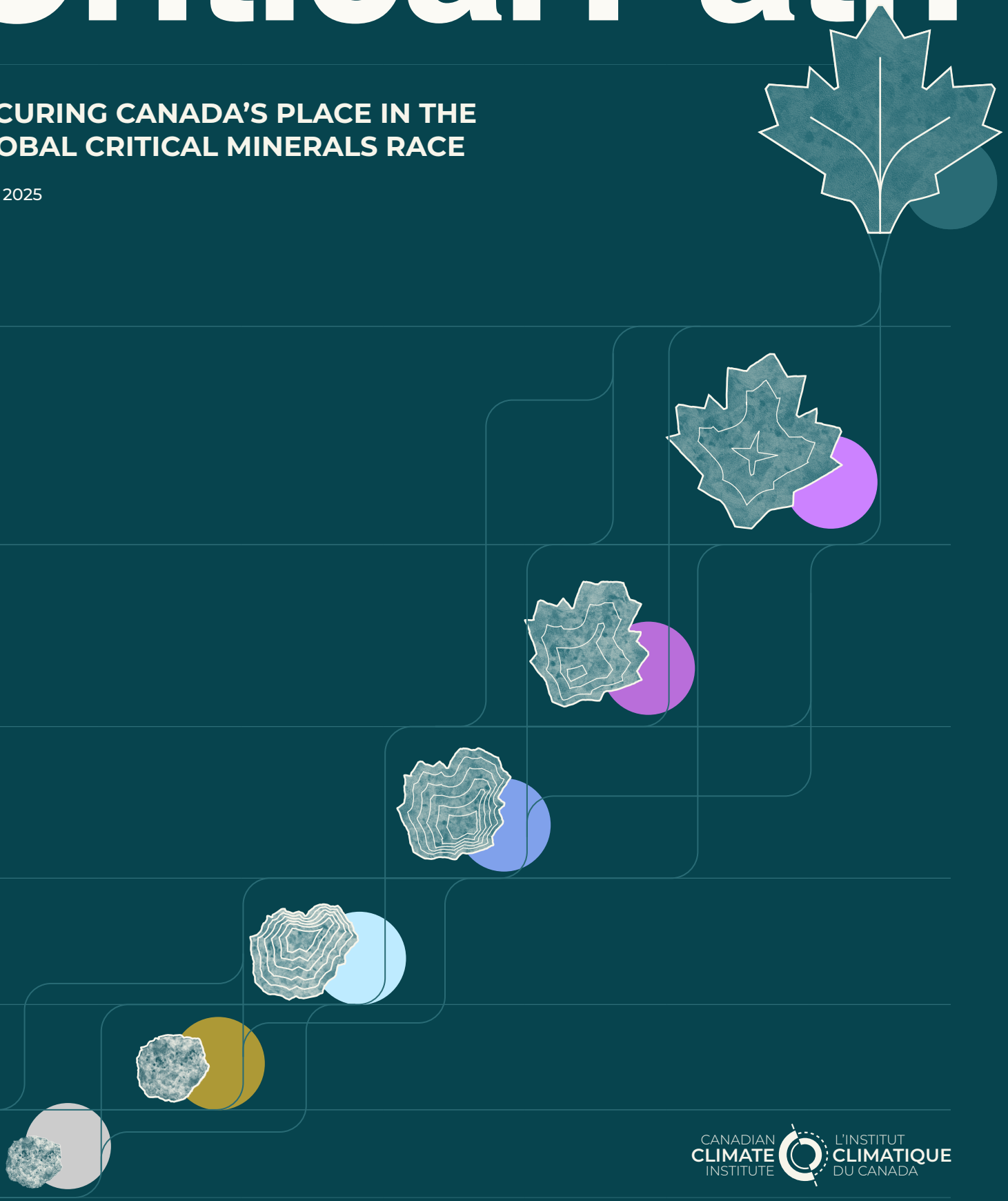
Critical Path

SECURING CANADA'S PLACE IN THE GLOBAL CRITICAL MINERALS RACE

June 2025



CANADIAN CLIMATE INSTITUTE
L'INSTITUT CLIMATIQUE DU CANADA

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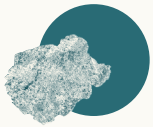
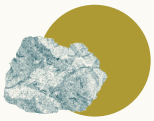
Executive Summary

Increasing Canadian production of critical minerals presents a huge economic opportunity for new growth and prosperity. Seizing that opportunity, however, requires new policy to help attract investment and speed up project development while navigating an increasingly volatile and competitive trade environment. Smart policies can reduce risk for investors to deliver net economic benefits for Canada and for local communities. This report provides a map for doing so.

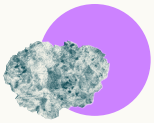


The world needs more critical minerals

Long-term global investment trends toward cleaner energy systems are clear and accelerating (IEA 2024b). And while recent actions in the United States may slow the pace of adoption in that jurisdiction, the broader transition to clean energy is expected to continue worldwide.

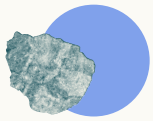


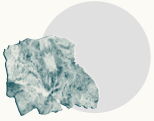
Producing clean energy technologies at the scale and pace necessary to meet the rising global demand will require a substantial new supply of minerals and metals, even after accounting for the fact that clean energy systems will require fewer material inputs overall than those based on fossil fuels.



Even in ambitious recycling scenarios, this surge in clean energy investment will require more extraction of six minerals in particular[1]: cobalt, copper, lithium, nickel, graphite, and rare earth elements. Industry worldwide will need these six critical minerals to manufacture solar photovoltaic (PV) modules, wind turbines, electric vehicles and charging stations, and batteries of all shapes and sizes.

By 2050, demand for critical minerals could increase by three to 90 times depending on the mineral and scenario. For example, demand for lithium is expected to grow between 11 and 17 times between 2023 and 2050[2] (IEA 2024b). By another estimate, the global mining sector will need an additional USD$480 billion to $750 billion in capital investment if it is to produce and process critical minerals in the quantities that decarbonization demands





1. This report focuses on six clean growth critical minerals out of the 34 listed in the federal Canadian Critical Mineral Strategy (NRCan 2022b). These six priority minerals are: cobalt, copper, graphite, lithium, nickel, and rare earth elements. Each of these minerals will be central to the global energy transition, with multiple clean growth applications. Canada has significant deposits of these six minerals, particularly cobalt, graphite, lithium, and nickel.

2. Range includes three IEA scenarios: stated policies, announced pledges, and net zero.

(Energy Transitions Commission 2023). The economic upside is enormous. In a scenario where the world meets its climate pledges, we expect that annual demand for critical minerals, including the six critical minerals, will reach a value of $770 billion by 2040[3] (Trottier-Chi 2024).

This report aims to better understand the opportunities and risks linked to a ramp-up of critical mineral mining in Canada, and what governments should do to enable development of these resources in ways that uphold Indigenous rights and maximize benefits for Canada's prosperity and energy security—without compromising environmental protections. Our analysis draws on multiple sources of data, including expert interviews, quantitative market analysis, an online survey, and extensive review of primary and secondary documents (See **Box 4**).

The opportunity for Canada is real—and large

Canada has ample reserves of these minerals, and their extraction and processing are a potential driver of significant economic growth. Canadian minerals could meet domestic demand and help others, including European Union (EU) member states and the U.S., secure their supply chains and become less reliant on minerals from a few dominant suppliers, including China, today the world's most powerful producer by far.

The continued threat of punitive tariffs from the current U.S. administration emphasizes the strategic value of bringing Canadian critical minerals to global markets—and quickly.[4] Yet despite the significant shift in policy, many of the key fundamentals have not changed for the U.S.: the nation has insufficient domestic supply of key critical minerals (e.g., cobalt and rare earth elements) and wants to diversify away from Chinese suppliers. Critical minerals exports could help Canada find a productive path through increasingly turbulent trade dynamics—but only if resource extraction is feasible within a reasonable timeframe.

Canada's domestic demand—expected to be valued at over $16 billion per year by 2040 (Trottier-Chi 2024)—largely comes from an emerging battery production industry, which has recently attracted billions of dollars in private and public investments.

Expanding Canada's critical mineral mining activities could capitalize on some of the economy's inherent strengths, including a well-regulated financial sector with extensive mining expertise, relatively higher environmental,

3. Based on the International Energy Agency (IEA) Announced Pledges Scenario.

4. Demand for critical minerals for defense-related applications is also rising.

social (including labour), and governance standards, proximity to buyers, and a low-carbon power grid with relatively competitive electricity rates.

Yet current investment in Canada's upstream mining of critical minerals is not keeping pace with both domestic and global demand growth (Bourassa and Arnold 2024). We estimate that Canada requires new investment between about $30 billion and $65 billion in upstream mining projects between now and 2040 to tap into its production potential (Trottier-Chi 2024). Based on average production capacities, this would mean that Canada must open more than 30 new mines over the same time period.

A package of policies can help unlock capital flows in Canada's mining sector to realize those opportunities.

Our findings and recommendations are grouped into four categories.

Providing investors certainty on commodity prices can directly de-risk mining projects

Despite strong demand projections, investors face significant financial risks. The economic viability of Canadian critical mineral mining projects will hinge on future market prices—some of which are extremely volatile. High price volatility makes it more difficult to secure financing while also delaying project development and interrupting operations (Collard et al. 2024; Jamasmie 2024).

Markets for some critical minerals (e.g., lithium and rare earth elements) are still immature and opaque. As a result, prices for these minerals are extremely volatile and at the whim of interference by a few powerful players (IEA 2023).

These findings were also a top concern identified by our interviewees and survey participants.

Recommendation 1

The federal government should give an arms-length financial institution the mandate to develop or expand financial risk-sharing agreements, such as equity investments, contracts for difference, and offtake agreements, to temporarily share the risk related to the high price volatility for some critical minerals with investors.

There is a role for governments to significantly reduce these risks and help overcome a central hurdle to investment in critical minerals in Canada.

Financial risk-sharing agreements between governments and mining companies can take various forms.

The most direct way for a public investor to share the financial risks of a mine is to take equity shares in the project. As equity holders, governments can provide patient capital that private markets won't, sharing both the downside risks and the upside potential of projects in the face of long payback periods.

Contracts-for-difference are contracts designed to protect producers from price volatility by establishing a fixed reference price or reference price range. When market prices fall below the defined threshold, a government pays the difference to the producer. When prices rise above it, the producer pays the surplus back to the government. Designed well, these risk-sharing

contracts are more fiscally conservative than direct subsidies because government support merely serves as a backstop mechanism, while also making it easier for projects to secure private capital. The reference price or price range determines the allocation of risks and revenues between the parties. These contracts should be temporary in nature while markets mature and become more predictable. Only projects that are close to economic competitiveness and a final investment decision should be eligible for support to increase the likelihood that the project will be profitable in the long run and therefore able to attract private capital.

Offtake agreements can significantly reduce demand- and price-risks for mines and help projects secure financing. An offtake agreement is a contract between a producer, such as a mining company, and a government, in which the government agrees to purchase all or a portion of the producer's output at a predetermined price or term. However, this level of public support should be reserved for mines that have particular strategic importance for Canada, especially when it comes to energy security, or in cases when Canadian governments decide to strategically stockpile certain minerals. However, the physical storage of stockpiled minerals may pose practical challenges.

Respecting Indigenous self-determination de-risks projects and enables partnerships

Canada's critical mineral mining sector will only thrive if Indigenous communities impacted by new mining projects have meaningful opportunities to participate. The principles of free, prior, and informed consent, and Indigenous self-determination, are essential to the decision-making process for mineral projects. They ensure Indigenous communities are able to participate in the economic opportunities and manage the related risks in line with their worldviews, cultures, and values.

Some Indigenous communities embrace the economic opportunities that come with new mining projects, entering partnerships with mining companies or acquiring equity stakes in mines. Active participation in decision-making over the entire lifecycle of a mining project—from exploration to reclamation—enables Indigenous communities to limit risks to their territories and rights, and realize opportunities.

In some cases, Indigenous communities may still decide the risks outweigh the opportunities. Mining can compromise Indigenous communities' ability to fully exercise their rights and practices that support their traditional lifestyles, even with early, meaningful engagement. Historically, both governments and the mining industry in Canada have overlooked the rights and

well-being of Indigenous Peoples, causing harm to communities, and this practice persists in some mining companies and some government decisions even today.

In interviews with Indigenous participants, we consistently heard that strengthening Indigenous self-determination and participation in mining projects can also reduce risks for investors by providing greater clarity early on about aspects of the project that Indigenous communities may oppose, thus enabling smoother, quicker regulatory assessment processes. In the long run, Indigenous partnerships can also prevent lengthy litigation.

Investing in mutual partnerships with willing Indigenous communities is therefore a necessary condition for building successful projects that help realize economic opportunities for Indigenous communities, investors, and Canada as a whole.

In contrast, going ahead with projects despite opposition from affected Indigenous communities poses significant risks—to Indigenous rights, investors, and ultimately to realizing Canada's critical mineral potential.

Recommendation 2

Canadian governments should support the ability of Indigenous communities to exercise their right to self-determination and economic participation in critical mineral mining projects by scaling up resources for capacity building and enhancing their access to capital for equity ownership in projects.

Indigenous participants also shared that many Indigenous communities do not have sufficient capacity or resources to fully engage with project opportunities in the mining sector. They lack access to the capital required to become mining project owners themselves or invest in purchasing an equity share within a project.

To enhance Indigenous communities' ability to actively participate in critical mineral projects, the federal government should provide flexible funding for capacity-building. This would ensure that Indigenous communities can give input and direction on mining projects that affect them throughout the mining lifecycle. We heard this in interviews with a wide range of Indigenous participants. Government funding could include funding for community positions, Indigenous-led programs to increase capacity for consultation and project participation, and Indigenous-led environmental assessments.

Provincial governments should create Indigenous loan-guarantee programs that can help Indigenous communities build economic partnership and equity ownership in critical mineral projects. In cases where loan-guarantee programs already exist, a dedicated stream for minerals should be created to address the unique capital expenditure and risk tolerance required for critical minerals, if one is not already available. The Alberta Indigenous Opportunities Corporation and the Saskatchewan Indigenous Investment Finance Corporation both include mineral streams.

Improving environmental protections de-risks projects for local communities and investors

Environmental risks of new mining projects equal high risks for investors—for multiple reasons.

First, it will be impossible to build new mines at the scale and pace required against local opposition (Davis and Franks 2014; Schlote 2023). Ramping up Canadian mining requires building and maintaining support from local communities and the Canadian public. In particular, inadequate storage of mining tailings and abandoned mines expose local communities (including Indigenous communities) to increased health and safety risks while also leaving the Canadian public to shoulder high clean-up costs. Recent mining disasters in Canada, such as the 2014 Mount Polley tailings dam failure in B.C. or the 2024 heap leach failure at the Eagle Gold Mine in the Yukon, illustrate how high-profile events can impact trust in the industry and confidence in the regulatory systems established to protect communities (Hunter 2014; CBC 2024).

In addition, international buyers want to diversify their critical mineral supply chains because they are primarily interested in one thing: reliability of supply. High environmental risks and incidents compromise reliability, both actual and perceived.

Recommendation 3

Provincial governments should strengthen mining regulations to reduce environmental risks and liabilities for Canadian communities and ensure reliable supply.

Canadian regulations of mining operations, including tailings management and mine closure, are not always aligned with leading international standards, and their enforcement is often lacking (Pollan and Al-Aini 2025).

Provincial governments should enhance existing tailings-management regulations to meet leading international standards such as Towards Sustainable Mining (TSM) or the Global Industry Standards for Tailings Management (GISTM). These standards cover the whole lifecycle of a tailings facility, from early design to planning for disaster response.

Many mining companies are already voluntarily moving towards compliance with TSM or GISTM—often in response to pressure from institutional investors—but all provinces should update regulations to make these standards mandatory.

To improve the regulation of mine closures, provincial governments should also strengthen existing financial assurance mechanisms for end-of-mine-life liabilities to ensure that clean-up costs are not shouldered by the public. These mechanisms require mining companies to set aside funding upfront to cover closure and post-closure activities. Governments should require these funds to be liquid, independently reviewed, and sufficient to cover actual costs. These measures will also incentivize mining companies to proactively mitigate post-closure risks by better managing environmental impacts throughout the mine's life.

These additional compliance measures will add costs to some producers in the short run but governments can help reduce this burden on companies by phasing in changes over time. Ultimately, these changes will help instill confidence in local communities and can lead to cost savings by preventing opposition from local communities (Indigenous or non-Indigenous), conflicts and litigation, which all contribute to long project development times.

Reducing delays in regulatory reviews is an urgent priority—for critical mineral mining projects and beyond

Respondents to an online survey[5] conducted for this study indicated that long, sometimes unpredictable review and permitting processes for mining projects are the most important barrier to investment in the sector (Bourassa and Arnold 2024).

There are no quick fixes—this is a complex, longstanding policy issue that affects projects beyond the critical mineral mining sector and requires careful analysis and smart reform (Cleland and Gattinger 2025). Developing specific policy recommendations is beyond the scope of this report, yet our analysis provides some useful insights for governments addressing this challenge.

Recommendation 4

Canadian governments should avoid cutting back environmental safeguards and Indigenous consultations to shorten regulatory approval processes for critical mineral mining projects (and other major clean growth projects), as doing so is likely to backfire.

This analysis finds that projects built on strong Indigenous partnerships and effective management of environmental risks have a higher likelihood of being profitable and contributing to the successful growth of Canada's critical mineral mining sector. Well-designed regulatory regimes for project reviews and permitting can play a central role in identifying these "winning" projects.

Given the geopolitical tensions around critical minerals, Canadian governments are facing pressure to get these resources to market as quickly as possible. However, while fast-tracking or expediting projects by scaling back environmental regulations and/or requirements for Indigenous consultations may seem like quick ways to shorten project review times, they often lead to longer development timelines overall—primarily by inviting opposition from local communities (Indigenous and non-Indigenous), which often results in lengthy and costly court proceedings.

5. We conducted an online survey (n=174), in partnership with TMX Group, investigating barriers and potential solutions to building out Canada's critical minerals value chain. The majority of the respondents (115) came from industry, representing companies active in exploration, extraction, refining, manufacturing. See **Appendix A** for more information.

Nevertheless, there are opportunities for cutting review times without compromising environmental safeguards and Indigenous rights.

Recent studies identify ways in which governments can enhance process efficiency of regulatory reviews (see, for example, Cleland and Gattinger 2025).

Also, considering new mining development at a regional level—i.e., in parallel with conservation planning—can help protect ecosystems and biodiversity while also giving investors more clarity early on about where and under what conditions new projects are possible—or not. Indigenous leadership in land-use planning and in identifying conservation areas that are off limits for new mines can safeguard Indigenous rights and speed up reviews for individual projects while also building broader support.

Finally, our findings also show that regulatory delays are not the only driver of long development timelines—and sometimes not even the most important one (Collard et al. 2024). Economic factors such as price volatility also frequently hold up progress, as do limited capacity and resources in Indigenous communities to engage with project opportunities. The recommendations in this report address these drivers of delays.