



# The Canadian Critical Minerals Strategy

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**FROM EXPLORATION TO RECYCLING:**

Powering the Green and Digital Economy for  
Canada and the World

Canada<sup>!</sup>

*Aussi disponible en français sous le titre : Stratégie canadienne sur les minéraux critiques de l'exploration au recyclage : alimenter l'économie verte et numérique du Canada et du monde entier*

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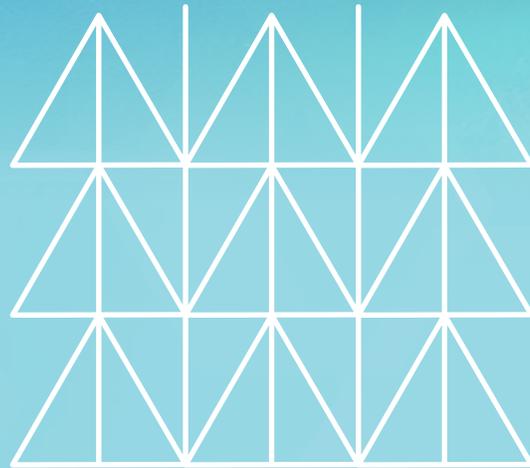
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# MINISTERS' FOREWORDS

## Foreword from the Minister of Natural Resources

Financial markets around the world are increasingly pricing climate risk into investment decisions. Smart money is flowing away from assets that are not compatible with a transition to a net-zero world and toward opportunities that are.

Just as any successful business must be capable of interpreting and reacting to changes in the business environment, countries must also be capable of thoughtful response and action to sustain and enhance their level of prosperity.

As the world moves toward a lower-carbon economy, a key question on which we must collectively focus is how to build on Canada's comparative advantages in a manner that will create jobs, economic opportunity and prosperity.

Concurrently, geopolitical dynamics and skyrocketing demand have strained value chains, which are essential to the global energy transition. Canada's European allies have recently experienced the consequences of dependence upon non-like-minded countries for strategic commodities such as oil and gas, and there is a strong desire to avoid similar vulnerabilities in emerging markets such as critical minerals.

Critical minerals present a generational opportunity for Canada in many areas: exploration, extraction, processing, downstream product manufacturing and recycling. This federal government is committed to seizing this opportunity in a way that benefits every region across the country.

Critical minerals are the building blocks for the green and digital economy. There is no energy transition without critical minerals: no batteries, no electric cars, no wind turbines and no solar panels. The sun provides raw energy, but electricity flows through copper. Wind turbines need manganese, platinum and rare earth magnets. Nuclear power requires uranium. Electric vehicles require batteries made with lithium, cobalt and nickel and magnets. Indium and tellurium are integral to solar panel manufacturing.

It is therefore paramount for countries around the world to establish and maintain resilient critical minerals value chains that adhere to the highest ESG standards. It is also important that we partner with Indigenous Peoples — including ensuring that long-term benefits flow to Indigenous communities.

Canada is in the extremely fortunate position of possessing significant amounts of many of the world's most critical minerals as well as the workers, businesses and communities that know how to scale up our exploration, extraction, processing, manufacturing and recycling of those minerals.

Canada is a world leader in environmental, social and governance standards with respect to mining, with Canadian industry advancing important initiatives such as Towards Sustainable Mining. We are also home to almost half of the world's publicly listed mining and mineral exploration companies, with a presence in more than 100 countries and a combined market capitalization of \$520 billion.

The Government of Canada has worked to build on these advantages in the past several years. We have invested in businesses and workers along the critical minerals value chain, such as [the world's most sustainable potash mine in Saskatchewan](#), [mining of rare earth elements in the Northwest Territories](#) and [electric vehicle assembly in Quebec](#).

The government has also published the list of 31 minerals that Canada considers “critical” to signal to domestic and international investors where we will focus our efforts, and we have signed cooperation agreements with allies to advance this work together.

Now, I am pleased to release Canada’s Critical Minerals Strategy. This Strategy, backed by nearly \$4 billion in Budget 2022, sets out a course for Canada to become a global supplier of choice for critical minerals and the clean digital technologies they enable.

It sets the stage across the country for job creation, economic growth, the advancement of reconciliation with Indigenous Peoples and close cooperation with Canada’s allies — all in line with Canadian and international climate and nature protection objectives.

The Critical Minerals Strategy is the roadmap to seizing a generational opportunity. A roadmap to creating significant wealth and sustainable jobs in every region of this country. And a roadmap to making Canada a clean energy and technology supplier of choice in a net-zero world.

I look forward to working with Indigenous partners, labour groups, provinces, territories, industry and stakeholders in the implementation of this Strategy in the years to come.



**The Honourable  
Jonathan Wilkinson,  
Minister of Natural Resources**

# Foreword from the Minister of Innovation, Science and Industry

The global clean energy transition is under way, and it represents the largest economic transformation since the Industrial Revolution. Canada is poised to seize this generational opportunity—particularly in the critical minerals sector, from mining to refining and from manufacturing to recycling.

Critical minerals are essential to Canada’s strategic industries. They are at the heart of key sectors that drive our economy, including agriculture, manufacturing, artificial intelligence, clean technologies, electric vehicles, energy and much more. They are vital to our everyday lives, and they are essential inputs for the global energy transition, including for wind turbines, electric vehicle batteries, solar panels and semiconductors.

As global demand for critical minerals skyrockets, Canada will be extremely well positioned to take advantage of this opportunity. Thanks to our wealth of critical minerals, our excellence in mining, our skilled labour and our innovation ecosystem, Canada will become the world’s green supplier of choice for critical minerals.

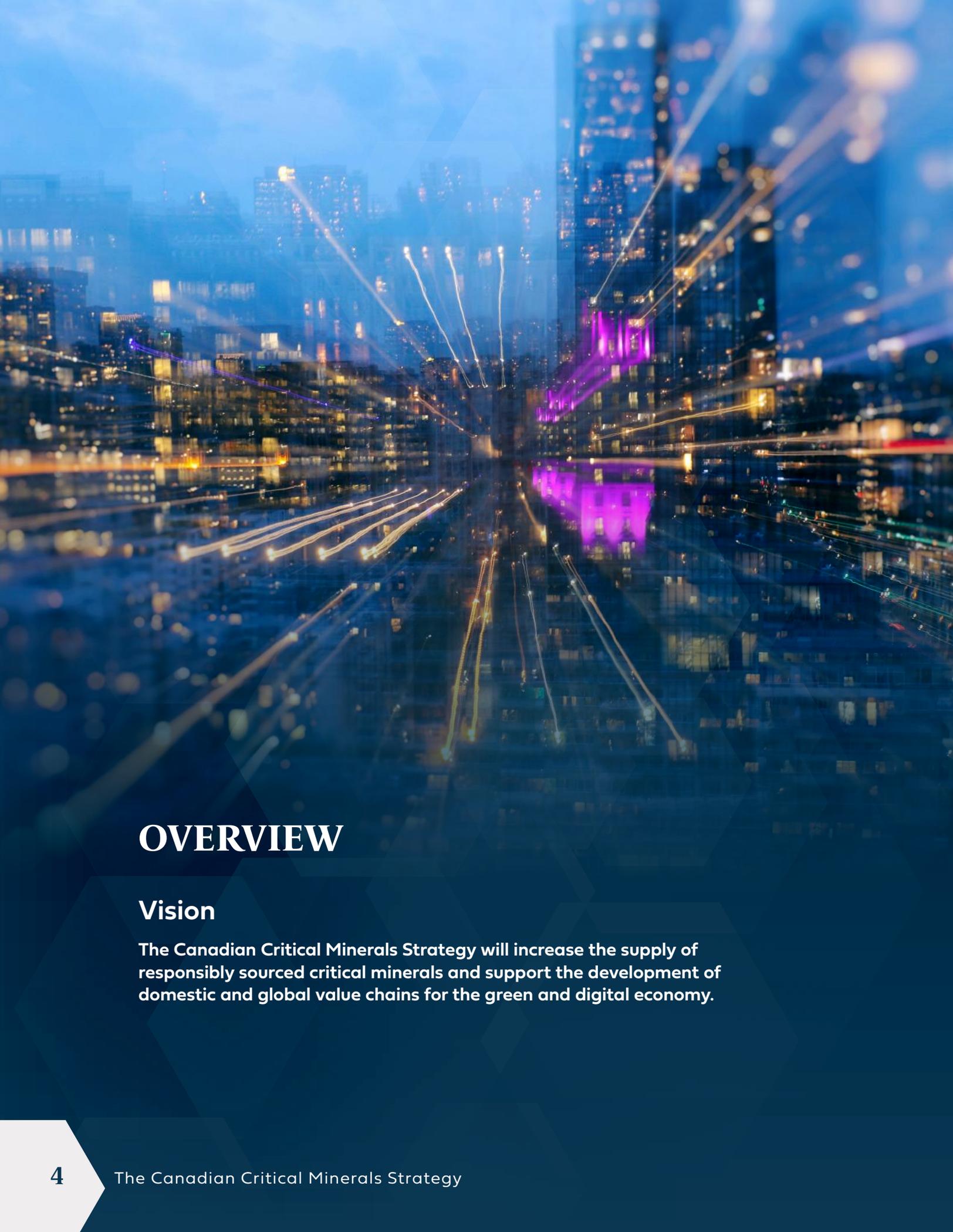
This is particularly true as we continue to strengthen critical minerals supply and promote innovation and sustainable practices across critical minerals value chains. We are doing this in a way that supports regional economic growth; creates a more inclusive and highly skilled workforce; and upholds and strengthens our leading environmental, social and governance standards.

Canada’s leadership in this space has never been more important. The fragility of global supply chains is motivating governments and companies around the world to assess their supply chain resilience for commodities and manufactured goods. It is increasingly clear that Canada can—and will—be the solution.

Through the Canadian Critical Minerals Strategy, we are putting our vision into action. We will incentivize new connections and linkages across Canada’s upstream and downstream critical minerals value chains, allowing us to build a strong critical minerals ecosystem while supporting leading-edge digital, clean technology and advanced manufacturing sectors. This strategy will help create and support hundreds of thousands of well-paying jobs across the country, and it will cement Canada’s position as a leader in the low-carbon economy. Together, we must be bold, we must be ambitious, and we must seize the moment.



**The Honourable  
François-Philippe Champagne,  
Minister of Innovation, Science and Industry**

A night cityscape with light trails and a blue overlay. The image shows a city at night with many lights and buildings. The lights are blurred into long streaks, creating a sense of motion. The overall color palette is dominated by blues and purples, with some warmer tones from the city lights. The background is a dark blue gradient with some faint geometric shapes.

# OVERVIEW

## Vision

The Canadian Critical Minerals Strategy will increase the supply of responsibly sourced critical minerals and support the development of domestic and global value chains for the green and digital economy.

## Summary

Critical minerals represent a generational opportunity for Canada’s workers, economy, and net-zero future. They are the foundation on which modern technology is built. From solar panels to semiconductors, wind turbines to advanced batteries for storage and transportation, the world needs critical minerals to build these products. Simply put, there is no energy transition without critical minerals, which is why their supply chain resilience has become an increasing priority for advanced economies. By growing Canadian expertise at every point along the critical mineral value chain — from mining to manufacturing to recycling — we will create good jobs, build a strong, globally competitive Canadian economy, and take real action to fight climate change. As a result of this strategy, we will also better position Canada as a reliable supplier of critical mineral resources to our allies.

The global demand for critical minerals and the manufactured products they go into is required to increase significantly in the coming decades to enable transition to a green and digital economy. Current forecasts [show supply deficits](#) if critical mineral production, processing and recycling are not increased. At the same time, the production and processing of many critical minerals are geographically concentrated, making supply vulnerable to economic, geopolitical, environmental, and other risks. With its vast resources and manufacturing capacity, Canada is well positioned to become a secure and reliable supplier of critical minerals and value-added products for global markets.

Growing our supply of critical minerals and the products they go into presents a generational opportunity with domestic and global benefits. To fully seize this opportunity, we must ensure that value is added to the entire supply chain, including exploration, extraction, intermediate processing, advanced manufacturing, and recycling. We must create the necessary conditions for Canadian companies to grow, scale-up, and expand globally in markets that depend on critical minerals. Our efforts must be consistent with Canada’s priorities and objectives including environmental protection and conservation, safe and responsible labour practices, and respect for the rights of Indigenous peoples.

By growing and building our expertise at each point along the critical mineral supply chain, Canada can grow its economy from coast to coast to coast, fight climate change at home and around the world, and improve the resiliency of our supply chain and those of our allies to future disruptions. Importantly, this must be done in a way that advances the Government of Canada’s commitment to reconciliation with Indigenous peoples through meaningful consultation, early and ongoing engagement, investments in capacity supports, environmental stewardship, community safety, and economic opportunities for Indigenous peoples.

In addition, critical mineral development needs to be sustainable and create nature-forward outcomes with minimal environmental footprint and leading-edge conservation and reclamation practices (i.e., mine closure). A “nature forward” approach to critical minerals development and sourcing means incorporating practices that work to prevent biodiversity loss, protect species at risk, and support nature protection. Innovative ways to capture value from alternative sources and waste streams, recycling technologies, and traditional Indigenous conservation practices are all examples of “nature forward” solutions.

The Canadian Critical Minerals Strategy will empower businesses, workers, and communities across Canada to seize this generational opportunity. Accelerating the development of Canada’s critical mineral sector, while ensuring environmental sustainability and respecting the rights of Indigenous peoples, is essential if Canada is to seize upon this generational opportunity and position itself as a stable supplier of critical minerals, both at home and abroad.

## Objectives

Canada's whole-of-government approach to critical mineral development will be collaborative, forward-looking, iterative, adaptive, and long-term. The initiatives presented in this Strategy will be implemented and refined in collaboration with provincial, territorial, Indigenous, industry, and other Canadian and international partners. They will be updated, as needed, to respond to shifts in domestic and global markets, technologies, and geopolitical considerations. As such, this Strategy will help lay the foundation for Canada's industrial transformation towards a greener, more secure, and more competitive economy.

The Canadian Critical Minerals Strategy addresses five core objectives:



These objectives will be achieved by focusing on six areas of focus:

1. driving research, innovation, and exploration;
2. accelerating project development;
3. building sustainable infrastructure;
4. advancing reconciliation with Indigenous peoples;
5. growing a diverse workforce and prosperous communities; and
6. strengthening global leadership and security.

The success of Canada's critical mineral development is tied to the active participation of Indigenous peoples, achieved by integrating diverse Indigenous perspectives through ongoing engagement, collaboration, and benefits-sharing. Indigenous peoples are the stewards, right holders and, in some cases, title holders to the land upon which mineral and industrial development takes place. The Government of Canada is renewing relationships with Indigenous peoples through the implementation of the *United Nations Declaration on the Rights of Indigenous Peoples Act (UNDA)*, which came into force on June 21, 2021. The Act provides a clear vision for the future to ensure that federal laws reflect the standards set out in the Declaration, while also respecting Aboriginal and Treaty rights recognized and affirmed in the Constitution and seeking to secure free, prior, and informed consent for natural resource projects, including critical mineral development.

The Strategy also emphasizes the conservation and protection of Canada's natural environment, as well as the promotion of climate action by supporting the transition to a greener economy at home and around the world. Mining and related activities can have significant impacts on communities and ecosystems. Canadians place great value on public health and safety, air and soil quality, and wildlife and habitat preservation. Through this Strategy, Canada will leverage its industrial expertise in environmental, social and governance (ESG) frameworks to develop critical minerals with minimal environmental footprint, in accordance with some of the world's most responsible regulations. In addition, the Strategy will help advance Canada's circular economy by aiming to keep resources in circulation, minimizing industrial waste through recycling and other means, and thus contributing to an environmentally responsible and economically competitive critical minerals sector.

The Canadian Critical Minerals Strategy complements the vision, principles, and strategic directions of the [Canadian Minerals and Metals Plan \(CMMP\)](#), developed in collaboration with provinces and territories and founded on engagement with industry, Indigenous business representatives, and other stakeholders working to build a stronger, more competitive mining sector.

## What Are Critical Minerals?

Canada and other countries have developed defined lists of critical minerals to guide investment and prioritize decision-making to support supply chains. Critical minerals can change with time based on supply and demand, technological development, and shifting societal needs. Some commonly recognized examples of critical minerals include lithium, nickel, cobalt, graphite, and zinc, among others. While these country-specific lists differ in their composition internationally, there is a shared view that critical minerals:

- have few or no substitutes;
- are strategic and somewhat limited commodities; or
- are increasingly concentrated in terms of extraction and, even more, in terms of processing location.

There is significant overlap between jurisdictions due to the nature of global supply chains and shared challenges. For example, many critical minerals on Canada's list are also included on lists by the United States, the European Union, the United Kingdom, South Korea, and Japan. A comparison of Canada's list relative to those of our partners can be found in Annex E.

## Did You Know?

Critical minerals are used in a variety of goods and products, many of which can be found in our homes and daily lives.



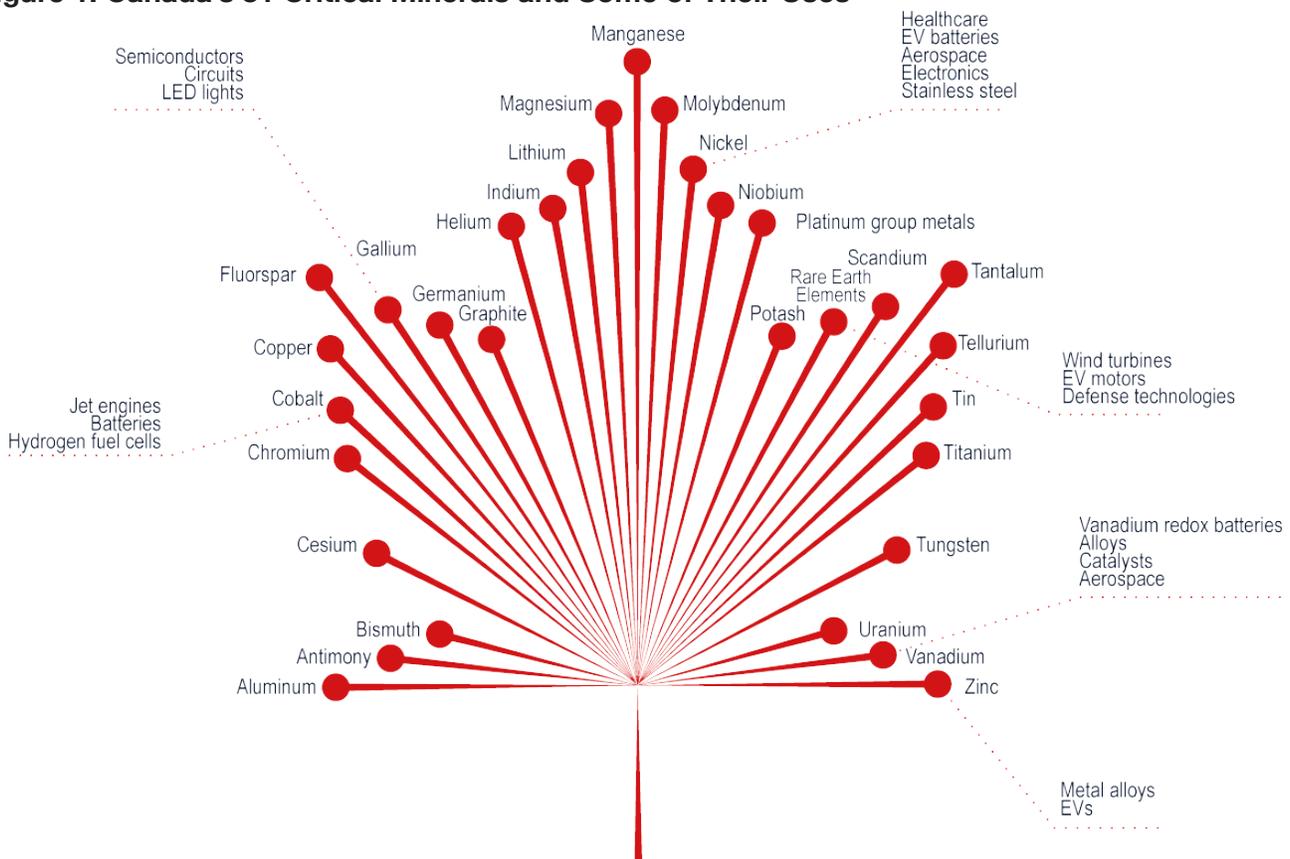
# CRITICAL MINERALS IN CANADA

Canada has a list of 31 minerals it currently considers to be “critical.” Developed in consultation with provincial, territorial, and industry experts, Canada’s Critical Minerals List provides greater certainty and predictability to investors, developers, communities, and trading partners on national priorities. To be deemed “critical” in Canada, a mineral must be

- essential to Canada’s economic security and its supply is threatened; or
- required for our national transition to a low-carbon economy; or,
- a sustainable source of highly strategic critical minerals for our partners and allies.

Canada already produces more than 60 minerals and metals and is a leading global producer of many of the critical minerals on our list, including nickel, potash, aluminum, and uranium. We have the potential to supply even more critical minerals to both domestic and international markets.

**Figure 1: Canada’s 31 Critical Minerals and Some of Their Uses**



Of Canada’s 31 critical minerals, six are initially prioritized in this Strategy for their distinct potential to spur Canadian economic growth and their necessity as inputs for priority supply chains. These six minerals are lithium, graphite, nickel, cobalt, copper, and rare earth elements (Annex B). While these minerals represent the greatest opportunity to fuel domestic manufacturing and will be the initial focus of federal investments, many other minerals present notable prospects for the future. Further, where critical minerals are not used solely for domestic manufacturing, there is value to be captured by increasing exports for allies, and expanding domestic refining, processing and components manufacturing. Examples of these minerals are vanadium, gallium, titanium, scandium, magnesium, tellurium, zinc, niobium, and germanium, along with potash, uranium and aluminum (Annex B). Canada’s list of 31 minerals, as well as the federal government’s priority value chains, will be reviewed and updated every few years.

# Foundations for a Competitive, Sustainable Economy

Critical minerals are the building blocks for the green and digital economy. They are used in a wide range of essential products, from mobile phones to solar panels, electric vehicle batteries to medical and healthcare devices, to military and national defence applications. Without critical minerals, there can be no green energy transition for Canada and the world. By investing in critical minerals today, we are building a sustainable industrial base to support emission-reducing supply chains that will address climate change for generations to come (e.g., net-zero energy and transportation systems).

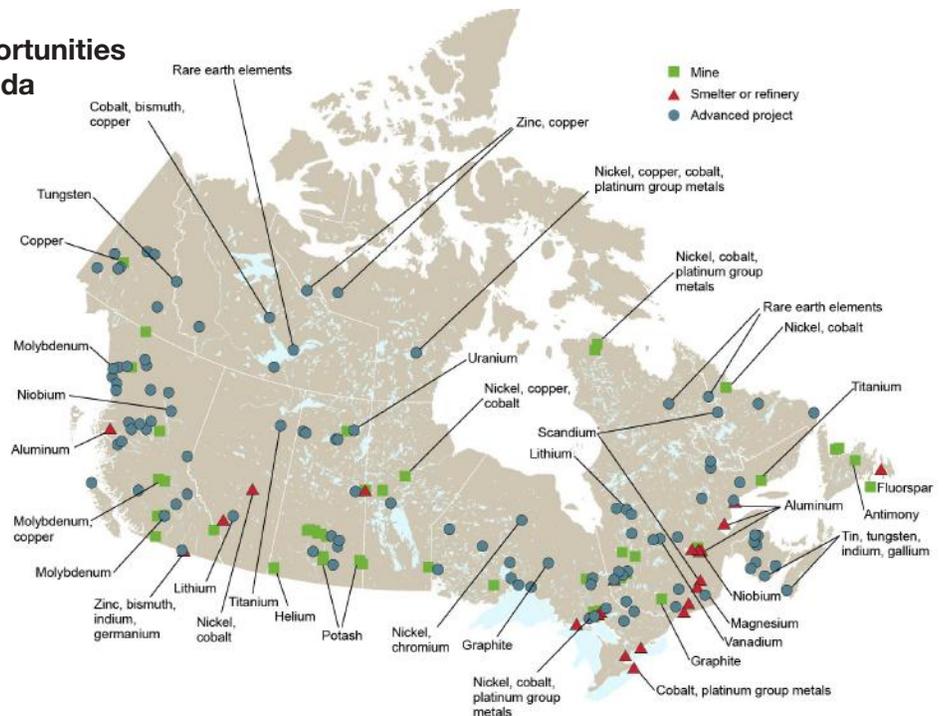
Growth in green and digital applications is expected to boost the global demand for many critical minerals. According to the International Energy Agency, the energy sector’s overall needs for critical minerals could increase by as much [as six times by 2040](#). The North American zero-emission vehicle (ZEV) market alone is estimated to reach \$174 billion by 2030, creating more than 220,000 jobs in mining, processing, and manufacturing.

Based on a report by [Clean Energy Canada](#), a battery supply chain in Canada could directly contribute between \$5.7 billion to \$24 billion in GDP by 2030 annually, supporting between 18,500 and 81,000 direct jobs, depending on how quickly and ambitiously Canadian governments act. These figures grow to between \$15 billion and \$59 billion in annual GDP contributions, and 79,000 and 333,000 jobs, when indirect and induced activities and jobs are included. Once realized, these activities would contribute between \$2.7 billion and \$11 billion annually in combined federal and provincial government revenues.

## Canada’s Critical-Mineral-Rich Regions

Canada is endowed with enormous resource wealth spread across critical-mineral-rich regions from coast to coast to coast, including rural, remote, and Indigenous communities. For example, Canada is the only Western nation that has an abundance of cobalt, graphite, lithium, and nickel – essential to creating the batteries and electric vehicles of the future. Canada is also the world’s second-largest producer of niobium, an important metal for the aerospace industry, and the fourth-largest producer of indium, a key input in semiconductors and many materials needed for advanced vehicle manufacturing.

**Figure 2: Critical Mineral Opportunities Spanning All Regions of Canada**



Our preliminary analysis has identified several Canadian regions with high potential for mineral exploration and development in the near term. Recognizing that these regions are at different stages of development, ongoing analysis and engagement with provinces, territories, Indigenous peoples, and industry experts will be needed to further evaluate their potential and suitability for mineral development, as well as their connection to value chain and consideration of environmental aspects and Indigenous perspectives.

## Defining the Value Chain: From Exploration to Recycling

Value chains differ from supply chains. A value chain is the set of activities that *add value* at each stage of the production and delivery of a product to market (e.g., a product upgrade or process innovation). Value chains tend to improve an industry’s competitive advantage. A supply chain, on the other hand, is a related concept pertaining to the organization and logistics of getting a product to market.

Building on the success of Canada’s *Mines to Mobility* approach — which has attracted major investments in the manufacturing of zero-emission vehicles — this Strategy focuses on critical mineral exploration to recycling. It goes beyond the foundation established from *Mines to Mobility* by building capacity at each stage of the value chain, from exploration to recycling, and everything in between.

The value chain for critical minerals includes five segments: geoscience and exploration; mineral extraction; intermediate processing; advanced manufacturing; and, recycling. An illustrative example of a critical mineral value chain is included below.

**Figure 3: The Value Chain of Critical Minerals Addressed in This Strategy: From Exploration to Recycling**



At present, the production and processing of many critical minerals are geographically concentrated, making global supply vulnerable to several risks. For example, recent geopolitical events, such as Russia’s invasion of Ukraine, highlight the fragility of critical mineral supply and the need for Canada’s partners and allies to diversify their sources. By ramping up critical mineral production and strengthening their affiliated value chains, Canada and its trusted international partners can reduce their dependency on high-risk imports as demand forecasts outpace mineral supply and investment plans.

# Value Chains With High Potential for National Integration

To build competitive value chains in Canada, different stages of the industrial process need to be nationally integrated. For example, instead of exporting mineral resources to be processed in foreign countries and reimported as final goods or inputs for domestic manufacturing, Canada can build industrial ecosystems where all stages of the value chain are available and integrated domestically, and with trading partners. Minerals extracted in the Territories could be processed in the Prairies to supply manufacturing operations in other regions of Canada. Industrial suppliers and consumers along the value chain could invest in Canada with greater confidence, in partnership with governments, communities and regional development organizations across the country.

The following value chains have the highest potential for such integration in Canada:



- **Clean technologies**, which include zero-emission vehicles (ZEV), wind turbines, solar panels, advanced batteries, hydrogen fuel cells, small modular reactors;



- **Information and communication technologies**, including semiconductors;



- **Advanced manufacturing inputs and materials**, such as defence applications, permanent magnets, ceramics, high value-added metals, electronic materials, composites, polymers, and biomaterials.

These value chains offer the greatest potential for economic growth and employment across the country. The critical mineral resources needed to build their end products tend to be underdeveloped in Canada, and thus would benefit from government funding to further strengthen the competitiveness of our mining and manufacturing sectors. Developing critical minerals for the green and digital economy is also expected to catalyze foreign direct investment (FDI), helping to create more resilient supply chains. It is in Canada's advantage to work with allies to pursue increased resiliency in our value chains, which will further enhance our country's ability to attract investment. Annex B presents more information on the critical minerals implicated in Canada's high-potential value chains.

As we build new value chains in Canada, we will continue to strengthen and consolidate our existing position as a strong, sustainable producer and global supplier of leading Canadian minerals and metals, like potash, uranium, and aluminum — all critical to the global economy. Whether they represent opportunities in low-carbon energy and electrification, healthcare, green buildings, or food security, we recognize that these minerals are central to Canada's economic well-being, trading relationships, and strategic global position. Canada's Trade Commission Services will be a key partner in helping Canadian firms find international business opportunities in these value chains across the world.

## Did you know?

Canada has a [pipeline](#) of critical mineral projects in advanced stages of development. Canada currently ranks fifth globally in the production of graphite and nickel and is an emerging supplier of many other critical minerals. In 2021, 11% of globally mined nickel and 24% of globally mined graphite were used in batteries. We are also primed to help address the world's growing demand for lithium.

Canada is the world's largest producer and exporter of potash, which is primarily used to produce fertilizer. In 2021, Canada accounted for 31% (22.5 million tonnes) of the world's total potash production and 38% (21.6 million tonnes) of the world's total potash exports. With the war in Ukraine having created uncertainty about potash supply coming out of eastern Europe, Canadian firms are increasing their production for this essential input for global food security.

## Sustainable Development and the Circular Economy

This Strategy recognizes Canadian priorities such as human rights, section 35 Aboriginal and treaty rights, climate action, inclusive trade, and the eradication of forced labour. It aims to advance and promote environmental, social, and governance (ESG) priorities across the critical mineral value chain, including support for industry-led approaches such as the Mining Association of Canada's (MAC) *Towards Sustainable Mining* initiative, and international standard-setting bodies, such as the International Standards Organization. ESG considerations are becoming increasingly prominent in business and investment decisions. For example, automotive firms have shown heightened interest in ESG frameworks as they transition away from combustion engines towards increased production of electric vehicles. Many mining companies have been implementing their own net-zero objectives, including investments in green technology and process innovations.

As we work to reduce the greenhouse gas emissions (GHGs) of end products and improve responsible business practices, markets, investors, and consumers are increasingly demanding more sustainable practices throughout the value chain. In addition, Canada is seeking to advance efforts that support human rights through collaboration on transparency and traceability in the critical mineral supply chain, as under Canada's [Extractive Sector Transparency Measures Act](#) (ESTMA), and through participation in international activities like the Extractive Industries Transparency Initiative. There has also been increased recognition that Indigenous perspectives must be better integrated into ESG standards and ratings to ensure investor certainty while advancing economic reconciliation in Canada's mining and manufacturing sectors.

The global transition to a greener future is expected to increase the volume of end-of-life clean and digital technologies. For that reason, this Strategy will advance circular solutions to close material loops, increase access to the minerals and metals contained in post-consumer goods through robust recycling infrastructure and secondary markets, and encourage their recovery from mining and industrial waste streams. Circularity will ensure that Canada retains the benefits from the extraction of its critical minerals for decades to come, capitalizing on an industrial segment with untapped potential. As such, it will further cement Canada's leadership in sustainable industrial practices and ESG frameworks.

Canada's 2030 Agenda National Strategy, [Moving Forward Together](#), aims to implement the Sustainable Development Goals (SDGs) and highlight Canada's commitments to promoting and protecting human rights, and leveraging fair and inclusive trade to raise incomes and broaden its benefits for underrepresented groups, such as women and Indigenous peoples. Promoting and encouraging responsible business conduct and proactively addressing risks provides businesses with a stronger social license to operate when facing potential legal, political, and social challenges. Canadian companies active in Indigenous lands are expected to follow established international frameworks and guidelines such as the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP), the UN Guiding Principles and the OECD Guidelines for Multinational Enterprises. Canada's expectation for responsible business conduct and due diligence can be found in Canada's strategy for [Responsible Business Conduct Abroad](#).



# CANADA'S OPPORTUNITY AND OBJECTIVES

The generational opportunity presented by critical minerals is defined by five core objectives, which, if achieved, will indicate that Canada has successfully seized the opportunity before it.

## Canada's Competitive Advantage

- **A developed industry with world class mineral resource wealth.** In 2021, the minerals sector directly and indirectly contributed \$125 billion or 5% of Canada's total nominal GDP.
- **Strong environmental, social, and governance (ESG) credentials.** The Mining Association of Canada's (MAC) *Towards Sustainable Mining initiative* (TSM) is globally recognized for supporting companies in managing environmental and social risks. TSM is mandatory for all MAC members operating in Canada.
- **Long-standing mining expertise with extensive technology and mining capabilities.** Canada has a robust network of research and development labs that continually advance science and technology in a competitive mining sector.
- **Established advanced manufacturing sector.** Canada's manufacturing sector employed approximately 1.7 million Canadians in 2019, representing about 10% of the national economy. Canada is also the 6<sup>th</sup> largest commercial vehicle manufacturer in the world.
- **Abundant clean energy resources.** According to the Canada Energy Regulator, 75% of our national electricity in 2019 was generated from hydro, nuclear, wind, and solar combined.
- **Open economy and governance structure.** Canada is one of the leading mining countries in the world and one of the largest producers of minerals and metals. Valued at \$102 billion in 2020, mineral exports accounted for 21% of Canada's total domestic exports.

# What does success look like?

## Objective 1: Support economic growth and competitiveness.

- **High-quality and paying jobs are created** in the critical minerals exploration, mining, processing, manufacturing, and recycling sectors, with Canadian SME's accounting for a significant share of the market.
- Canada's economic resiliency is improved by reducing its dependency on key sourcing countries for inputs and manufactured goods.
- Critical mineral supply chains among trusted partners are made more resilient thanks to increased Canadian supply.
- **Economic growth is sustained and enhanced** through the anticipated increase in value-added and GDP growth (e.g., global market share), as well as regional economic development initiatives, including in rural, remote, and Indigenous communities.
- **Trade is increased** through reliable exports of processed materials and value-added goods.
- **Value is added** by developing, expanding, and integrating Canadian value chains, including midstream processing and the circular economy (e.g., through recycling and extracting value from mining waste) and increasing the participation of domestic SMEs.
- **Foreign Direct Investment (FDI)** is attracted, enhancing all the factors above while also increasing capital and investment in R&D, leading to innovation, technological advancement, improved productivity, and increased exports.

## Objective 2: Promote climate action and strong environmental management.

Recognizing that sustainable critical mineral development is indivisible from our net-zero objectives, Canada wants to advance “nature forward” approaches, which seek to incorporate practices that prevent biodiversity loss, protect species at risk and support nature protection.

- **Nature and biodiversity-related commitments and standards are upheld** by limiting the environmental footprint of mining activities and advancing exemplary ESG standards, including conservation and reclamation practices that prevent the loss of biodiversity.
- **GHG emissions are reduced** through the deployment of clean technologies and low-emission industrial processes, in line with Canada's Emissions Reduction Plan.
- **Waste is reduced, end-of-life products are reused, and their mineral content recycled** by means of innovative technologies and processing techniques (e.g., mining value from tailings, recycling wastewater, reuse of chemicals).
- **Indigenous Knowledge is respectfully incorporated** into considerations for sustainable critical mineral development, in line with the new Indigenous Knowledge Policy Framework for Project Reviews and Regulatory Decisions, as well as Indigenous guardian programs.

### Objective 3: Advance reconciliation with Indigenous peoples.

While Indigenous leadership and communities across the country will determine how they view success regarding critical mineral development on or near their territories, the Government of Canada will start with the following outcomes:

- **Economic reconciliation is prioritized** by enhancing Indigenous participation in jobs, businesses, and ownership of mining and enabling infrastructure projects and sharing direct benefits from critical mineral development. Indigenous communities will directly benefit from critical mineral development through the development and implementation of a National Benefits Sharing Framework which will ensure that First Nations and Métis communities can directly benefit from major resource projects in their territories and that Inuit communities benefit from major resource projects in Inuit Nunangat.
- **Aboriginal and treaty rights are respected** through early, meaningful, and ongoing engagement with Indigenous peoples, from project conception to development and oversight, and through robust and inclusive regulatory processes. More specifically, the federal government will respect section 35 rights; honour the spirit and intent of historic and modern treaties; facilitate more opportunities for Indigenous-led planning and decision-making around land use and development; mitigate environmental impacts and address their cumulative effects; and support UNDA implementation by championing UNDA principles around working together in partnership and respect.
- **Responsible critical mineral development contributes to the socio-economic well-being of Indigenous communities** by ensuring that Indigenous women, girls and 2SLGBTQQIA+ people are safe and secure, and derive equitable benefits from critical mineral projects. The federal government will work to facilitate Indigenous access to jobs in the mining sector and will engage Indigenous peoples on decisions related to critical mineral projects.

### Objective 4: Foster diverse and inclusive workforces and communities.

- **Diversity and inclusion in the workforce are enhanced**, particularly for women, youth, 2SLGBTQQIA+, Indigenous peoples, recent immigrants, Black and racialized communities, and persons with disabilities.
- **Human rights are upheld** through Canada's commitment to the SDGs and expectations for responsible business conduct and due diligence throughout the supply chain.
- **Leading professionals are trained and upskilled** by leveraging existing government initiatives, such as the Youth Employment Strategy, the Centre on Diversity and Inclusion, and the Rural Economic Development Strategy to create and sustain high-quality jobs.

### Objective 5: Enhance global security and partnership with allies.

- **Cooperation agreements are advanced** through bilateral and multilateral forums with a view of protecting critical mineral supply chains among trading partners and like-minded nations.
- **Investment attraction is enhanced** by protecting Canadian assets while encouraging foreign direct investment under certain conditions.
- **International best practices are strengthened**, including Environmental, Social, and Governance (ESG) frameworks, as well as the protection of human rights, including Indigenous rights.



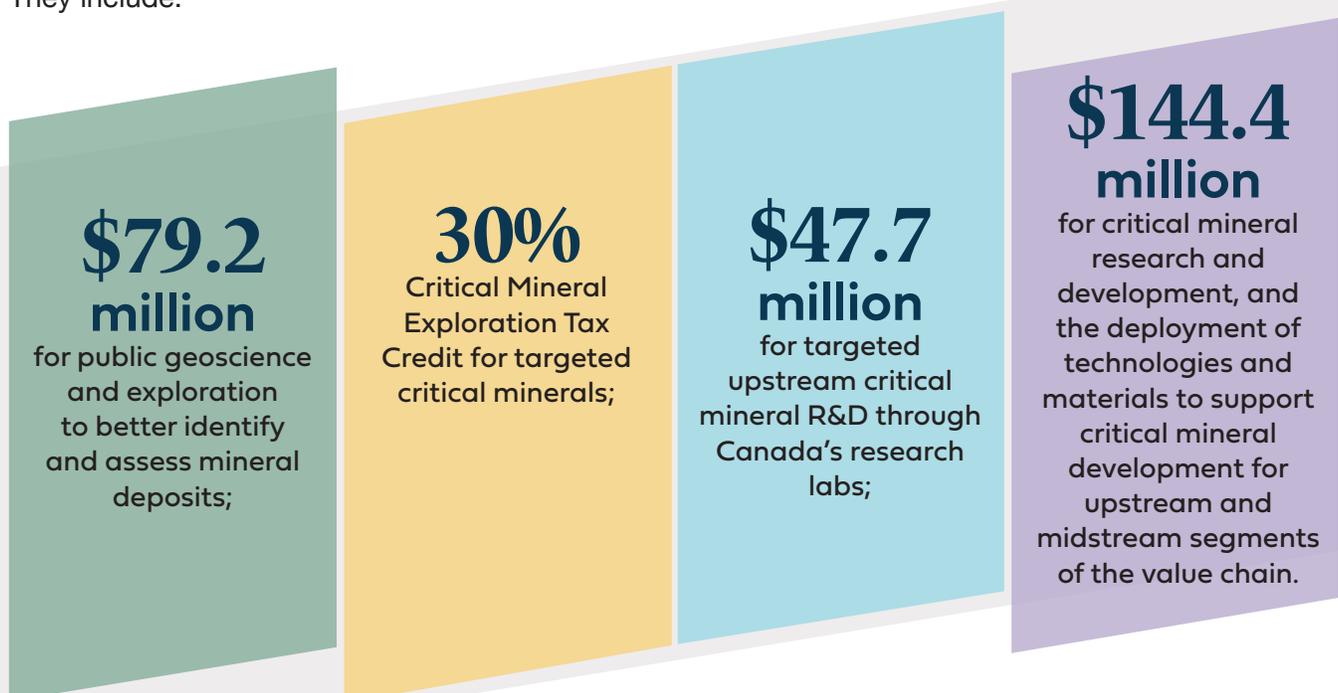
# STRATEGIC FOCUS AREAS AND INITIATIVES

The Critical Minerals Centre of Excellence (CMCE), housed at Natural Resources Canada, leads the development and coordination of Canada's policies and programs on critical minerals, in collaboration with federal, provincial, territorial, Indigenous, industry, non-governmental, and international partners. Federal initiatives and investments related to this Strategy will be advanced according to six focus areas: 1) Driving research, innovation, and exploration, 2) Accelerating responsible project development, 3) Building sustainable infrastructure, 4) Advancing reconciliation with Indigenous peoples, 5) Growing a diverse workforce and prosperous communities, and 6) Strengthening global leadership and security.

## 1. Driving Exploration, Research & Development, and Innovation

As a leading mining nation backed by a rich endowment of resources, Canada has vast opportunities when it comes to critical minerals. Exploration is the starting point if we are to make the most of this potential. To unlock these possibilities, we need to expand geoscience and exploration activities to find the deposits of the future, as locating critical minerals in Canada's vast landmass is a complex endeavour. It requires advanced geoscience capabilities, including geological mapping, geophysical surveying, and scientific assessments and data. The next step is to be able to extract and process critical minerals sustainably. Canada will need to continue developing innovative technologies (e.g., new conversion processes) and industrial practices that optimize efficiency, cost competitiveness, and environmental stewardship.

Budget commitments from 2021 and 2022 cover different aspects of the critical minerals value chain, from exploration to processing and refining, to more advanced products. They include:



The federal government will invest in geological modelling and resource potential mapping for both conventional and unconventional sources, which will help define and enhance our collective knowledge of Canada's critical minerals landscape. Discoveries of future mineral wealth, particularly in rural, remote, and northern regions, will require advanced technologies at the exploration stage to identify areas of highest potential, while minimizing exploration costs, reducing the carbon footprint of exploration programs, and minimizing the environmental impact on the landscape.

Information and data will be made publicly available to inform development considerations for potential critical mineral projects and to support investment decisions across the supply chain. This includes mobilizing knowledge in a manner that is culturally relevant to Indigenous communities, thus supporting Indigenous evidence-based decision-making. Considered together with other metrics, such as economic and technical feasibility, Indigenous partnerships, and environmental, social, and governance priorities, reliable data at an early stage will help identify exploration opportunities that offer the greatest potential economic benefit and lowest risk to the natural environment.

In addition, Budget 2022 introduced a tax incentive to support exploration for certain critical minerals. The Government of Canada's proposed Critical Minerals Exploration Tax Credit, in combination with the existing flow-through share program, will provide a significant incentive to investors to support exploration for certain critical minerals in Canada.

## **Supporting Critical Mineral Exploration in Canada**

To enable the exploration of critical minerals, a new 30 percent Critical Mineral Exploration Tax Credit is being introduced that would be available to investors under certain flow-through shares agreements to support specified exploration expenditures incurred in Canada. This tax credit is applicable to specific critical minerals including nickel, lithium, cobalt, graphite, copper, rare earth elements, vanadium, and uranium, among others.

Finally, the federal government leverages national labs and catalyzes private sector investment to accelerate technological innovation in Canada's critical minerals sector and associated industries, thus enhancing competitiveness and environmental performance. Building on the momentum of the Critical Minerals Research, Development and Demonstration Program launched in 2021, we will scale up support to de-risk innovations through research, piloting, and deployment to advance sustainable technologies and processes towards commercialization in identified priority value chains. New innovation funding will focus on processing and refining technologies needed to effectively and efficiently transform minerals from primary and secondary sources into intermediate materials, including post-consumer waste (e.g., used batteries) and mining waste (e.g., tailings).

Industry partnerships will be crucial. We will support and directly work with the sector to facilitate the development and deployment of market-ready technologies and innovations (e.g., emerging mining electrification systems, processes to extract value from waste, etc.).

Through a robust network of research and development labs, Canada has the science, technologies, and tools to be a leader in the development of critical minerals. Partnerships with the provinces and territories, Indigenous governments and organizations, academia, and research institutions, as well as industry stakeholders will be key to developing a sustainable pipeline of innovative mineral development projects in Canada. Recognizing potential opportunities in the critical minerals industry, this Strategy provides a targeted commitment to geoscience, exploration, and innovation which is unprecedented in the Canadian mining sector.

## Summary and Next Steps

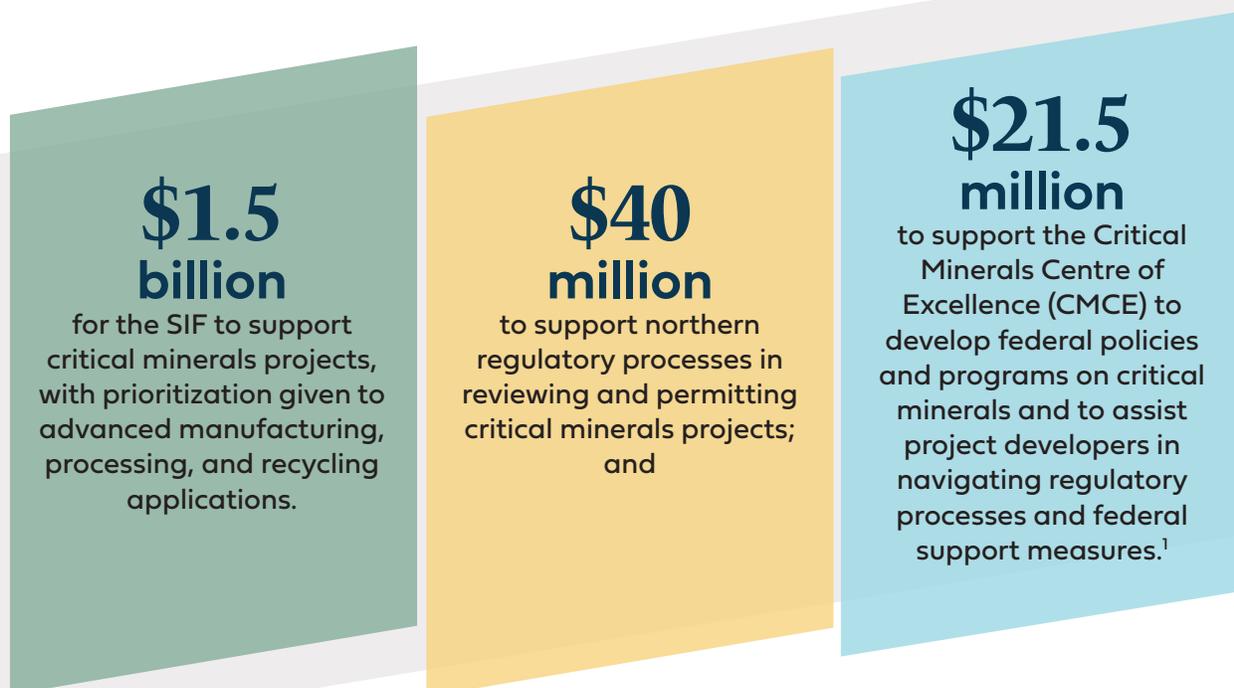
- The federal government recognizes that investing in public geoscience is a key element to identifying and assessing critical mineral resources in Canada.
- Enabling exploration via targeted financial incentives for critical mineral exploration activities in Canada will help reduce risks for proponents and help grow the sector. Supporting critical mineral innovations, particularly in areas that enhance sustainability and environmental performance, will unlock additional opportunities from the sector while protecting our environment and enhancing our competitiveness.

## 2. Accelerating Responsible Project Development

To advance our transition to a net-zero economy, the federal government is providing financial and administrative support to accelerate the development of strategic projects in critical mineral mining, processing, manufacturing, and waste reduction (e.g., through recycling and mining value from waste). This support includes strategic investments to unlock potential in critical-mineral-rich regions, leveraging the resources and expertise of federal trade and business development organizations such as the Business Development Bank of Canada, Export Development Canada, and the Canadian Commercial Corporation. It also means capitalizing on existing programs such as the Strategic Innovation Fund (SIF), which is already making significant investments in the electric vehicle battery industries.

Most critical mineral industrial projects require large upfront investments that are higher risk and may generate a slower return. For example, it can presently take anywhere from 5 to 25 years for a mining project to become operational, with no revenue until production starts. Domestic projects are also subject to rigorous federal and provincial/territorial regulatory assessments to meet Canada's high environmental and social standards.

Budgets 2021 and 2022 include multiple initiatives to help accelerate project development:



The SIF will be one of the most significant direct funding mechanisms in Canada's toolkit presented under this Strategy. The SIF will help build world-class critical mineral value chains in which prefabrication and manufacturing activities are done domestically by default. It will support projects that decrease or remove reliance on foreign critical mineral inputs across a range of priority industrial sectors or technologies. It will help grow Canada's critical mineral value chains in areas of research, development, extraction, processing, manufacturing and/or recycling. Finally, SIF investments will favour critical mineral development opportunities that aim to reduce GHG emissions in Canada's critical mineral and manufacturing sectors.

## Building on Mines to Mobility

In 2019, the federal government launched the *Mines to Mobility* initiative to build a sustainable battery innovation and industrial ecosystem in Canada. To date, the initiative has attracted more than \$7 billion in announced investments to capture opportunities in the growing global battery market. It has led to an increased interest in Canada's value proposition in the battery sector, attracting notable global players in the midstream and upstream segments of our domestic value chain. The federal government will continue to support Canada's battery ecosystem through the Canadian Critical Minerals Strategy by building value chains that position Canada as a global leader in the innovative and sustainable production of ZEV batteries.

<sup>1</sup>This amount represents \$10.9 million from Budget 2021 and \$10.6 million from Budget 2022

# Investments Across the Battery Value Chain

## Ford

Investing **\$1.8 billion** to produce VEs in Canada



## GM Canada

Investing **\$1 billion** to transform CAMI Ingersoll plant to EV commercial van plant



## THE LION ELECTRIC CO

A manufacturer of all electric medium and heavy duty vehicles invests **\$285 million** for a battery manufacturing plant and innovation centre in QC



## Electra Battery Materials

North America's first cobalt refinery for battery metals announces plans to develop a second cobalt processing facility in Canada in Quebec



## Vale

Concluded a prefeasibility study to produce nickel sulfate in Bécancour, QC



## NanoOne

NanoOne acquires Johnson Matthey Battery Materials, enters into a joint production agreement with BASF for CAM and announces **\$10 million** strategic investment agreement with Rio Tinto



## LGES and Stellantis

JV for over **\$5 billion** EV battery plant in Windsor, Ontario



## GM/POSCO

**\$500 million** joint venture to produce cathode active materials in Bécancour, QC



## BASF

purchase of land in Bécancour for a future cathode active materials production



## Stellantis

**\$3.6 billion** to retool Brampton and Windsor plants to produce EVs & fund Windsor Automotive Research and Development Centre



## Umicore

**\$1.5 billion** for cathode active material and precursor cathode active materials production in Ontario



## Honda

to invest nearly **\$1.4 billion** to retool its manufacturing operations in Alliston, Ont., to launch the next generation of hybrid-electric vehicles.



The Government of Canada recognizes that to meet our ambitious climate and economic objectives to transition to a net-zero economy, additional mechanisms must be in place to expedite and facilitate strategic critical mineral projects from investment and funding opportunities, through regulatory approvals and development, to production. We recognize that, although responsible regulations are vital, complex regulatory and permitting processes can hinder the economic competitiveness of the sector and increase investment risk for proponents. As such, the federal government remains committed to sustainable economic development and environmental protection, which go hand-in-hand, in collaborating with Indigenous peoples, as well as the provinces and territories. We are committed to collaboration on impact assessments, informed participation and decision-making, and high environmental standards for critical mineral projects.

We have heard that better coordination and harmonization is needed across all orders of governments and throughout the impact assessment and regulatory/permitting processes, to avoid duplication, streamline requirements, and ensure early Indigenous consultation and engagement in a manner that respects the parameters of the [\*United Nations Declaration on the Rights of Indigenous Peoples Act\*](#). Regulatory certainty is a prerequisite for Canada's economic competitiveness, which is why the federal government is taking the following actions:

- Mandating the Critical Minerals Centre of Excellence (CMCE) to assist project developers navigate regulatory processes and federal support measures;
- Convening Regional Energy and Resource Tables to align Canada's federal, provincial, and territorial approaches to regulatory and permitting processes for mining;
- Reviewing Canada's regulatory framework, in a working group that includes Natural Resources Canada, the Impact Assessment Agency of Canada and other federal partners, to identify opportunities for advancing clean growth projects (including critical minerals mines) in a timely and predictable manner, while safeguarding the interests of Canadians, protecting the environment, and respecting the rights of Indigenous peoples;
- Exploring regulatory harmonization opportunities with our U.S. partners.

For major development projects where both federal and provincial impact or environmental assessments are required, the Government of Canada is committed to meeting the objective of "one project, one assessment" in its review of projects by working with other jurisdictions to reduce duplication and increase efficiency and certainty in the regulatory process. The federal government also recognizes that efficient, effective, and inclusive northern co-management regulatory regimes are important to advance critical mineral projects in the distinct regulatory environment of northern Canada. The meaningful participation and leadership of Indigenous peoples, including shared and informed decision making, is integral to ensure that projects advance, and that Indigenous rights and titles are upheld.

The CMCE will continue to act as the central coordination hub for critical mineral programs within the federal government, assisting partners and stakeholders in navigating Canada's regulatory processes to advance project development. Recognizing the wealth of expertise that already exists across the Canadian critical mineral sector, the CMCE will also strive to facilitate regional engagement and connections within the sector and communicate industry information and resources to further stimulate project development.

## Summary and Next Steps

- Canada needs to act swiftly in capturing the generational opportunity presented by the growing global demand for critical minerals to support the green and digital economy. The federal government recognizes that predictable and efficient regulatory regimes are a prerequisite for Canada's economic competitiveness and is making efforts to streamline project assessments and permits. Budgets 2021 and 2022 proposed multiple initiatives to help accelerate critical mineral project development:
  - The \$1.5 billion critical mineral envelope under the SIF will support advanced manufacturing, processing, and recycling applications;
  - An allocation of \$40 million will support northern regulatory processes in reviewing and permitting critical mineral projects; and
  - The CMCE will use its \$21.5 million in extension funds to provide a broad range of programming support for the sector, in collaboration with implicated teams across the federal government.

## 3. Building Sustainable Infrastructure

Strategic infrastructure investments are key to translating Canada's critical mineral potential into reality and securing its position as a leading supplier of minerals and materials to fuel demand for clean energy technologies. Canada's critical mineral sector has tremendous opportunities that remain underdeveloped. Critical mineral deposits are often located in remote areas with challenging terrain and limited access to enabling infrastructure such as roads or grid connectivity. The cost implications of this infrastructure deficit discourage investment and hinder the socio-economic development of local communities that welcome mineral development. It also increases the risks associated with economic and logistical feasibility, particularly with rising inflationary pressures and challenges in global supply chains.

To address this, Budget 2022 includes a provision of up to \$1.5 billion for infrastructure development for critical mineral supply chains, with a focus on priority deposits. The federal government is supporting the development of Canada's critical minerals sector by investing in sustainable energy and transportation infrastructure to support industrial development, unlock priority mineral deposits, improve supply chain resiliency, and facilitate international trade. These investments will support Canadian economic development and trade by addressing gaps in enabling infrastructure to unlock priority mineral deposits. Additionally, investments would complement existing clean energy and transportation programming, including the Canada Infrastructure Bank (CIB), Transport Canada's National Trade Corridors Fund (NTCF) and NRCan's Smart Renewables and Electrification Pathways (SREPs) Program. The Strategy would align with other strategic federal investment mechanisms (e.g., the Strategic Innovation Fund), the potential for multi-user benefits to local communities, the advancement of Canada's goals related to environmental protection, climate adaptation, and reconciliation with Indigenous peoples.

The Government of Canada recognizes that off-grid mining operations are heavily dependent on GHG emitting energy sources for power, such as diesel, largely due to the lack of access to energy grids in Canada's northern and remote regions. Potential strategic investments in green energy infrastructure would improve the environmental performance and sustainability of critical mineral development, by integrating renewable and alternative energy solutions throughout the mineral value chain. These potential investments would drive the industry's competitiveness by reducing energy costs, while advancing climate action by reducing the carbon footprint of industrial activities in environmentally sensitive regions. They would also support improved quality of life and energy security for primarily Indigenous communities in isolated and remote regions.

In regions with high critical mineral potential, there is a need address gaps in enabling energy infrastructure. Addressing these gaps could be achieved through a range of investments including small-scale green energy projects, leveraging, and expanding existing energy network capacity (e.g., hydroelectricity generation and transmission lines), or by enabling innovative technologies to decarbonize mineral development activities and reduce dependence on fossil fuels (e.g., wind, hydrogen, small modular reactors). Given their lack of grid connectivity, northern and remote mining operations are ideal for the integration of renewable and alternative energy sources to support the electrification of mines, including wind, solar, hydrogen, and energy storage solutions. In addition, some Canadian jurisdictions are looking into the potential of small modular reactor (SMRs) technologies to fill energy supply needs of mine sites and communities, in addition to carbon capture, utilization, and storage (CCUS) technology to reduce carbon emissions from existing energy systems. Renewable and alternative energy solutions represent a strategic opportunity to advance Canada's critical mineral resources, while improving environmental performance by cutting GHG emissions.

Finally, Canada's geography and underdeveloped land-based infrastructure across northern regions create logistical challenges for industrial development and access to domestic and international markets. Transportation infrastructure is a major catalyst for critical mineral development, particularly in northern and remote areas. New infrastructure investments aimed at unlocking new mineral projects in resource-rich regions — including roads, rail, and ports — are needed to help Canada's mining industry provide the minerals and metals required to reach net zero by 2050, in consultation with Indigenous peoples and local communities. Enhancing Canada's transportation infrastructure in northern and remote regions represents a strategic opportunity to support broader economic growth objectives, Canada's Arctic sovereignty and national security, and reconciliation with Indigenous peoples.

With critical minerals playing an integral role in supporting the global green energy transition, Canadians expect the impacts of development on the environment to be managed responsibly. Development impacts may include increased GHG emissions, loss of biodiversity and impacts to freshwater and sensitive land-based and aquatic ecosystems. One-third of global peatlands are located in Canada, spread over 1.1 million square kilometres or about 12% of Canada's land area. These wetland ecosystems have been identified as a key nature-based climate solution that act as a natural carbon sink, and maintaining their integrity is essential to meeting national climate targets. Concerns have also been raised over the long-term release of carbon resulting from disturbance of peatlands, and the estimated 20-year timeframe to rehabilitate these wetland ecosystems. The Government of Canada recognizes that there is a need to ensure that development includes measures to mitigate these potential environmental impacts and ensure that Canada's critical minerals sector is developed sustainably.

## Summary and Next Steps

- Budget 2022 proposed \$1.5 billion for infrastructure development for critical mineral supply chains, with a focus on priority deposits.
- Strategic infrastructure investments in green energy and transportation are required to unlock critical mineral regions, while also improving environmental performance and driving emissions reductions in existing operations through electrification – enabling competitive development of Canada’s critical mineral resources. Potential investments would compliment existing clean energy and transportation programming, and consider alignment with other strategic federal investment mechanisms.
- Existing federal programming, such as the CIB, NTCF and SREPS, can help complement the Strategy’s infrastructure investments.

## 4. Advancing Reconciliation with Indigenous Peoples

The Government of Canada’s efforts to advance critical mineral development will be based on respect for Aboriginal and treaty rights, as well as meaningful engagement, partnership, and collaboration with First Nations, Inuit, and Métis peoples and governments. The development of critical mineral value chains presents a significant opportunity to grow the Indigenous economy through jobs, businesses, services, and ownership opportunities. As Canada seeks to advance reconciliation with Indigenous peoples, we recognize that this Strategy will need to evolve to address key initiatives, like the implementation of UNDA, and emerging priorities from Indigenous partners.

Indigenous peoples are the stewards, rights holders, and in many cases, title holders to the land upon which mineral resources are located. Historically, Indigenous peoples have not always benefited from natural resource development on their traditional territories, and some developments have caused adverse environmental and social impacts on communities. However, over the past few decades, Indigenous participation in the mining sector has grown significantly and there has been a greater emphasis on advancing development in a socially, economically, and environmentally responsible manner. With the majority of current and future critical mineral projects located on or near Indigenous territories, the Government of Canada is dedicated to working with Indigenous peoples to invest in their leadership in critical mineral value chains and to ensure that they benefit from these projects through meaningful engagement and partnership with industry and governments. It is important that decisions related to critical mineral development not only advance and respect Aboriginal and treaty rights to lands, territories, and resources, but also embody Indigenous land stewardship principles and self-determined priorities of communities.

Indigenous peoples are important partners in Canada’s mining industry. The mining sector is the [second-largest private sector](#) employer of Indigenous peoples in Canada and provides skills and employment training, contracting opportunities, job guarantees, and community investments. Many Indigenous-owned businesses are involved in the mining supply and services sector, delivering goods and services to mining companies and generating significant economic benefits for their communities. We have heard from mining stakeholders that industry is committed to building

strong, progressive relationships with First Nations, Inuit, and Métis peoples across Canada through early engagement, collaboration, and the development of mutually beneficial partnerships. This commitment is supported by industry efforts to respond to the Truth and Reconciliation Commission's Call to Action 92 for the corporate sector by developing protocols related to engagement and relationship-building with Indigenous communities. It is also supported by the fact that more than 500 agreements between Indigenous communities and industry have been signed since the year 2000.

While the Government of Canada recognizes that critical mineral development in Canada offers an opportunity to build on successful Indigenous-industry partnerships, we know that the sector must continue to evolve and create new pathways to help advance reconciliation with Indigenous peoples. We have heard serious concerns regarding the social, environmental, and gendered risks of critical mineral development on or near Indigenous communities, the potential impacts and cumulative effects of critical mineral development on Aboriginal and treaty rights, and the health and safety of Indigenous peoples, as well as lands, waters, wildlife, and local food sources. Additionally, Indigenous peoples continue to face systemic barriers to their participation and leadership in the sector. Barriers commonly cited include economic, business, and community skills and capacity gaps; a need for more Indigenous-led research and inclusion of traditional knowledge; access to competitive capital for equity participation; and, a need for inclusion in planning, participating, and decision-making throughout the project lifecycle from exploration to reclamation. The Government of Canada will work collaboratively with Indigenous peoples to address these barriers and ensure that benefits are derived from responsible critical mineral development.

## Indigenous Engagement on this Strategy

Through submissions and discussions with First Nations, Inuit, and Métis peoples on the Critical Minerals Strategy, we heard that additional meaningful engagement is required to ensure that Indigenous peoples' priorities and concerns with respect to critical mineral value chains in Canada are reflected in the implementation of this Strategy. Canada is at an important juncture for advancing reconciliation, including in the minerals and metals sector, which must be done through ongoing dialogue and impactful, collaborative actions with Indigenous peoples. While this Strategy is a high-level frame for current critical mineral investments and principles, the Government of Canada is committed to developing specific actions in collaboration with Indigenous communities over the course of the Strategy's implementation under four broad themes:

- Facilitating meaningful Indigenous participation and partnerships in critical minerals projects;
- Respecting Aboriginal and treaty rights;
- Advancing economic reconciliation; and,
- Supporting safe and secure communities throughout the critical mineral project lifecycle.

Indigenous peoples should be able to derive equitable economic benefits throughout the critical mineral value chain — from mineral exploration and extraction to material processing, manufacturing, and recycling. Indigenous leaders across Canada have signalled that there is strong interest in seeking ownership stakes in critical mineral projects and related infrastructure (e.g., renewable energy generation, transmission options, community-focused infrastructure, and roads). However, the high borrowing costs required to obtain financial capital can make equity ownership in critical mineral projects uneconomical for many Indigenous groups.

**The Government of Canada will work with Indigenous communities and industry to address these challenges and ensure that Indigenous peoples are active partners throughout the entire value chain of responsible critical mineral development in Canada.** The government will continue to honour treaty obligations; uphold the duty to consult, with the aim of securing the free, prior, and informed consent of Indigenous peoples; and, move beyond legal obligations by strengthening Indigenous participation and leadership in the sector. In addition:

- Budget 2022 allocates \$103.4 million to advance economic reconciliation through enhanced readiness to meaningfully participate in the natural resource sector, including at least \$25 million to support Indigenous participation and early engagement in the Critical Minerals Strategy. Funding is available through the [Indigenous Natural Resource Partnerships Program](#), which funds activities that help increase the economic participation of Indigenous peoples in natural resource projects. The Program is accessible to Indigenous communities, businesses, and organizations.
- The Government of Canada is developing a National Benefits Sharing Framework to help ensure Indigenous communities directly benefit from major resource projects in their territories. Engagement on the development of the Framework is ongoing. The federal government is committed to co-developing aspects of the Framework with Indigenous peoples, communities, and businesses to ensure it reflects Indigenous priorities.
- The federal government will leverage Indigenous labour market programs to provide Indigenous skills training and employment support, such as the *Skills and Partnership Fund*, while continuing to foster mineral literacy partnerships with Indigenous communities and organizations to support greater Indigenous participation in mining through the Canadian Minerals and Metals Plan.
- Recognizing the value of Indigenous science and knowledge systems and their role in broadening our collective understanding of Canada’s natural resources, **the federal government will continue to prioritize robust, meaningful engagement with Indigenous communities for geoscientific information and research, drawing on Traditional Knowledge.**
- The Government of Canada will also update its existing guidance on Indigenous participation in mining and its map of Indigenous mining agreements to foster a mutually beneficial climate between Indigenous peoples and industry.
- In 2022-23, Natural Resources Canada will convene a roundtable on the Missing and Murdered Indigenous Women and Girls (MMIWG) five Calls for Justice with Indigenous and industry partners, including the mineral and metal sectors, to learn about the actions industry is already taking or plans to take to increase safety and security and ensure equitable benefits for Indigenous women, girls, and 2SLGBTQQIA+ people.

## Canada's Commitments and Legal Obligations to Indigenous Peoples

Aboriginal and treaty rights are recognized and affirmed in Section 35 of the Constitution Act, 1982, and recognition of these inherent rights are also a part of the *United Nations Declaration on the Rights of Indigenous Peoples Act*, which is being implemented by the Government of Canada. Treaties between the Crown (represented by the Government of Canada and/or the provincial or territorial government) and Indigenous peoples are solemn agreements that set out promises, obligations, and benefits for all parties, and serve to reconcile pre-existing Indigenous sovereignty with assumed Crown sovereignty and to define Aboriginal rights guaranteed by section 35 of the Constitution. Modern treaties (those signed since 1975) often include provisions related to resource development opportunities, such as clarity around ownership of surface and/or sub-surface rights, and participation and decision-making in land and resource management (e.g., land use planning and permitting). Most recently, Canada has affirmed respect for rights and governance arrangements set out in Inuit-Crown treaties in the Inuit Nunangat Policy.

The duty to consult is a constitutional obligation of the Crown rooted in the honour of the Crown and the protection of section 35 rights. When conducting critical mineral exploration and development activities, the potential for adverse impacts to Indigenous and treaty rights must be considered, mitigated, and where appropriate, accommodated. As this Strategy is implemented, **the Government of Canada will continue to not only uphold its duty to consult obligations for critical minerals projects but will also seek opportunities to go actively beyond this duty to ensure that Indigenous peoples are active partners in critical mineral development through early, meaningful, and ongoing engagement on projects.**

The UNDA came into force on June 21, 2021. The Declaration helps to affirm the minimum standards for the survival, dignity, and well-being of Indigenous peoples. The implementation of UNDA has the potential to make meaningful and positive change to the ways that Indigenous peoples, communities, and businesses participate in natural resource development, including critical mineral value chains in Canada. The federal government engaged with National Indigenous Organizations, Indigenous communities, Indigenous rights holders, industry, and other relevant stakeholders to help inform the development of a Draft Action Plan, which has a legislated deadline for release in 2023. These efforts will better inform the Government of Canada on what it means to meaningfully partner and engage with Indigenous peoples in natural resource development. **Actions under the Canadian Critical Minerals Strategy will comply with the Government of Canada's implementation of UNDA.**

The Government of Canada understands the importance of environmental protection and stewardship in Indigenous communities and expects mining activities to include measures to avoid and mitigate negative environmental impacts, where possible, to ensure sustainable mining development. Balancing environmental considerations while protecting Indigenous peoples' lands, water, wildlife, and resources help advance the UNDA's commitments by mitigating cumulative effects within traditional territory.

In discussions with Indigenous partners, the Government of Canada has heard serious concerns about community safety with respect to critical mineral development. These concerns are also reflected in the 2019 Final Report of the National Inquiry into Missing and Murdered Indigenous Women and Girls which includes five Calls for Justice specific to the extractive and development industries. These Calls for Justice highlight the need to ensure safety and equity for Indigenous women, girls, and 2SLGBTQQIA+ people. The transition to clean technologies presents an opportunity to ensure Indigenous women and 2SLGBTQQIA+ people are included in decision-making processes related to major natural resource projects going forward, including sustainable critical mineral development projects.

## Summary and Next Steps

- Funding is available through the *Indigenous Natural Resource Partnerships* program to support Indigenous participation and early engagement in the Critical Minerals Strategy.
- The Government of Canada will continue to engage with Indigenous governments, organizations, and communities on the implementation of the Strategy. This will include hosting critical-minerals-related roundtables and workshops in prospective regions, and meeting with Indigenous partners to address their critical mineral priorities.
- Engagement on key initiatives, such as the implementation of UNDA, the development of a National Benefits Sharing Framework, and the Federal Pathway to Address Missing and Murdered Indigenous Women, Girls and 2SLGBTQQIA+ People, will also inform the implementation of the Critical Minerals Strategy. The Government of Canada will work with Indigenous partners to revise this section of the Strategy based on feedback from these engagements.
- The Government of Canada will work with Indigenous communities to address systemic barriers and ensure that Indigenous peoples are active partners throughout the entire value chain of responsible critical mineral development in Canada.
- The Government of Canada will continue to honour treaty obligations, to uphold the duty to consult, with the aim of securing the free, prior, and informed consent of Indigenous peoples, and to move beyond legal obligations by strengthening Indigenous participation and leadership in the sector.

## 5. Growing a Diverse Workforce and Prosperous Communities

Developing Canada's critical minerals and associated value chains will create jobs and prosperity for communities across the country, including Indigenous communities. The growth of a highly skilled and more representative workforce in the minerals and metals sector will ensure that Canadians can capitalize on these opportunities. Moreover, as lower-emission industries come online, workers from other extractive sectors, like oil and gas, will be able to use their transferable skills to secure high-quality jobs in critical mineral exploration, extraction, processing, manufacturing, and recycling.

The Mining Industry Human Resources Council forecasts that up to 113,000 new workers will be needed by 2030 to meet new demand and replace those workers anticipated to exit the mining workforce. Skill requirements in the minerals and metals sector will also continue to change as the industry adopts and makes use of emerging technologies, such as AI systems, automation, and robotics, while critical minerals demand creates new opportunities midstream in processing, manufacturing, and recycling.

### Critical Mineral Jobs Are More Diverse Than You Think

Jobs in the critical minerals sector exist at each stage of the mineral development cycle, from exploration to mine closure, and along the value chain. They include, but are not limited to geoscientists, mining engineers, and metallurgists, workers skilled in computer technology, heavy equipment operation, emerging technologies like AI and automation, minerals processing, and automotive assembly. As we build the workforce for the future, it will be vital that Canadians are aware of the diverse opportunities available in the sector.

Diversity and inclusion will be a driving force in the recruitment and retention of a talented workforce, capable of providing the technical and leadership skills necessary to support critical mineral development in Canada. Research indicates that a workforce that reflects the diversity of Canada, especially in leadership roles, is linked to better business results both in terms of profitability and in the creation of long-term value. In addition, critical mineral projects provide an opportunity to increase Indigenous employment and participation in natural resource development, especially in northern, remote, and isolated communities. More than 600 Indigenous communities are located near major minerals and metals projects and over 200 Indigenous businesses supply Canada's extractive industry.

To fully realize the opportunities available in the critical minerals sector, the federal government is leveraging a wide range of actions and initiatives, including:

- **Federal skills and training initiatives to help institutions and employers train and re-skill people, and to help the workforce grow and meet the demand driven by critical minerals.** Examples of these initiatives include the *Sectoral Workforce Solutions Program*, the *Indigenous Skills and Employment Training Program*, and the *Skills and Partnership Fund*. These programs support activities that will help forecast future skills requirements; build talent for the green economy, including the development of green skills training for workers; grow the Indigenous workforce; and, increase participation of equity-deserving groups. These initiatives will be complemented by new federal investments aimed at ensuring Canadians have the skills they need to capitalize on critical minerals opportunities, including the establishment of the Sustainable Jobs Training Centre and the Sustainable Jobs Secretariat. The federal government will work with provinces, territories and industry associations to help Canadians identify and access existing training, upskilling, and re-skilling initiatives targeting the minerals and metals sector.
- **Assisting youth in developing skills and transitioning into the labour market.** Through the collaboration of multiple federal departments, the *Youth Employment and Skills Strategy (YESS)* helps young people (15–30 years old) develop their skills and transition into the labour market. For example, *Canada Summer Jobs*, a program under YESS, is responsive to national and local priorities in the labour market, which could include the critical minerals sector.
- **Actions to help mobilize a more diverse and inclusive minerals and metals sector.** For example, the federal government will continue to support efforts to attract, train, and retain women, in line with the Canadian Minerals and Metals Plans' aspirational target of achieving 30% female participation in the mining workforce by 2030. In addition, Canada will facilitate the economic immigration of talented workers to communities with critical mineral projects through mechanisms like the *Rural and Northern Immigration Pilot* program, while ensuring alignment with existing provincial and territorial initiatives and community priorities.
- **Partnership opportunities with provinces and territories, Indigenous-led organizations, and several stakeholders, including universities, colleges, and specialized training institutions, to create greater awareness and understanding of the minerals and metals sector, sometimes referred to as mineral literacy.** These partnerships would also encourage enrolment in mining curriculum, skilled trades, and training programs for youths, Indigenous peoples, women, and new and racialized Canadians by socializing the significant role critical minerals play in the green energy transition and showcasing the diversity of careers available in the sector.

- **Continued collaboration on initiatives under the Canadian Minerals and Metals Plan with Indigenous business leaders and organizations, as well as provinces and territories, to grow opportunities for Indigenous and rural SMEs through the local supply of goods and services for critical minerals development projects.**

Canada is committed to a just transition to a net-zero emissions future and supporting the creation of jobs to achieve it. We want to help workers and communities thrive in the new economy, while fostering a diverse industrial sector that includes Indigenous peoples, women, Black and racialized Canadians, people with disabilities, and members of the 2SLGBTQQIA+ community.

## Summary and Next Steps

- Federal skills and training initiatives will help the minerals and metals sector grow its workforce and meet the increased demand for critical minerals.
- Diversity and inclusion will play a central part in these efforts, with the federal government continuing to support efforts to attract, train, and retain employees, including women, youth, Indigenous peoples, and other equity-seeking groups.
- The federal government will continue to seek out partnerships and collaboration opportunities with provinces and territories, Indigenous organizations, universities, and training institutions to increase mineral literacy.

## 6. Strengthening Global Leadership and Security

The concentration of critical mineral production in a few countries overseas that use non-market-based practices raises the risk of supply chain disruptions and inflated prices of key minerals and materials for Canada and its allies. The risk inherent to this concentration of production is being accentuated by geopolitical events, which further fuels supply uncertainties. In addition, some jurisdictions have not prioritized high environmental, social, and governance (ESG) standards, including in the resource development activities they undertake in other countries. As the global economy moves towards net-zero, advanced manufacturers are seeking to ensure their supply chains are carbon competitive, environmentally sustainable, and respectful of human rights. As a trusted and reliable supplier of responsibly sourced mineral and metal products, Canada is well positioned to be a leader in the responsible, inclusive, and sustainable production of critical minerals and resilient value chains. We have a role to play in powering the green and digital economy, both at home and around the world, in a manner that avoids a race to the bottom for the lowest cost output.

Interest in pursuing collective action on critical minerals to support the global green energy transition is growing within several key multilateral organizations, including the Organisation for Economic Cooperation and Development (OECD), the G7/G20, the International Energy Agency (IEA), the World Bank, the International Renewable Energy Agency (IRENA), the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), the Extractive Industries Transparency Initiative (EITI), and the Energy Resource Governance Initiative (ERGI). Enhancing Canada's participation in these forums will help strengthen the linkage between critical minerals and the energy transition, advance Canada's commitment to responsible supply chains, and further its role as the global leader in responsible and sustainable mining.

## Bilateral Cooperation on Critical Minerals

Since January 2020, Canada has formalized bilateral cooperation agreements on critical minerals with the United States, the European Union, and Japan, and is actively engaging with additional allies such as the United Kingdom and the Republic of Korea. Canada needs to deliver on its growing number of bilateral commitments and engagements without compromising its ability to deliver on domestically focused programs and priorities.

This Strategy will work to ensure international engagement activities related to critical minerals align with the Government of Canada's strategic objectives, including Canada's Indo-Pacific Strategy. It will address broad geopolitical and industrial priorities for Canada's international engagements to advance secure critical minerals supply chains, including potential risks and regional gaps. This work will align with the Government's commitment in the 2022 Fall Economic Statement to ensure that Canada remains a first-choice destination for businesses to invest and create jobs in light of investments made by other governments, such as the United States through the *Inflation Reduction Act and Infrastructure Bill*.

There is growing interest to pursue collective action to secure critical mineral value chains across the globe with allies. To ensure enhanced sustainability practices, we will leverage our international partnerships to improve Responsible Business Conduct, ESG standards, and best practices in critical minerals-related activities, including human rights and reconciliation considerations, as a key objective under the Strategy. This includes enhancing the interoperability of systems and standards, increased recognition of ESG performances, and international collaboration on traceability technologies to prevent products from conflict, child labour, and environmentally poor operations from entering the supply chains.

Additional collective actions under existing and new partnerships can further align policies and regulatory approaches, address technical challenges through joint R&D, facilitate trade and reduce barriers, encourage new investment opportunities in Canada, and reinforce supply chain security and stability. These actions include

- an allocation of \$70 million in Budget 2022 for global partnerships to promote Canadian mining leadership, such as promoting ESG standards and supporting bilateral and multilateral critical mineral commitments;
- leveraging Canada's new *Responsible Business Conduct (RBC) Strategy*, launched in April 2022, to continue enhancing Canada's regulation abroad and strengthening the global RBC ecosystem. We are contributing to a rules-based international system that advances Canada's values, integrating RBC in bilateral and multilateral agreements and engagements, as well as fostering an enabling environment for RBC; and,
- launching an initiative and leveraging existing frameworks, such as *Towards Sustainable Mining*, to drive the global uptake of "nature-forward" mining practices that minimize and mitigate environmental impacts and work to return the land to its natural state.

## Summary and Next Steps

- Canada is well positioned to be a leader in the responsible, inclusive, and sustainable production of critical minerals. The Canadian Critical Minerals Strategy will align with the Government of Canada's strategic objectives, including Canada's Indo-Pacific Strategy, and ensure that Canada remains competitive globally.
- Canada will continue to leverage its international partnerships to improve Responsible Business Conduct; ESG standards and best practices in critical-mineral-related activities, including enhancing the interoperability of systems and standards; recognition of ESG performances; and, collaboration on traceability initiatives including studies and technologies.

## Critical Minerals and National Security

Critical minerals are strategic assets that contribute to Canada's prosperity and national security. They are essential to military and security technology supply chains for national security, as well as other value chains of critical importance to Canada's economic security and prosperity.

A key challenge is the global reliance on non-market economies for the supply of critical minerals, and for the transformation of minerals and metals through processing and production of downstream value-added products. The COVID-19 pandemic has underscored the need to secure and diversify critical mineral supply chains, given that key operations are located in only a handful of regions globally, leaving them exposed to economic disruptions and predatory actions by non-market economies. Non-market economies are taking increasingly aggressive steps to further cement their control of critical minerals markets and achieve foreign policy goals. Geopolitical events such as war and trade disputes are also increasingly affecting global mineral markets, adding to price volatility and supply uncertainty. Heightened trade barriers and weaker access to markets create bottlenecks along supply chains and result in trade disruptions.

Reliable market-based access to sustainable sources of critical minerals, especially in northern and remote locations, is a strategic and economic security consideration for Canada and its allies. We are working towards securing our supply chains by:

- **Taking steps to ensure that Canada's foreign investment review regime is positioned to respond to the evolving threat landscape.** Foreign investment fuels innovation and helps businesses develop, enabling economic growth that benefits all Canadians. At the same time, the federal government recognizes that some investments into Canada may be motivated by non-commercial imperatives that are contrary to our interests and could be injurious to our national security. To address this risk, the Government of Canada issued a new [policy](#) to clarify the treatment of foreign investment by state-owned enterprises under the *Investment Canada Act*.
- **Working with like-minded partners through bilateral and multilateral forums to align policies and promote common standards,** including strategic consideration of broader geopolitical and industrial priorities that advance supply chain resiliency and create partnerships with allied countries on global value chain development.

- ◆ **Engaging with our national security agencies and other federal government departments, provinces and territories, and industry stakeholders to examine additional measures to improve critical mineral supply chain security.** Geopolitical, technological, and competitiveness considerations are constantly evolving. Our toolkit must also evolve to make sure Canada is well positioned to seize economic opportunities in the critical minerals space while protecting our national security.



# CONCLUSION AND NEXT STEPS

The growing global demand for critical minerals represents a generational opportunity for Canada. Critical minerals are the foundation on which modern technology is built. Simply put, there is no green energy transition without critical minerals, which is why their supply chain resilience is an increasing priority for advanced economies. Every stage of the critical mineral value chain presents an opportunity for Canada, from exploration to recycling and everything in between.

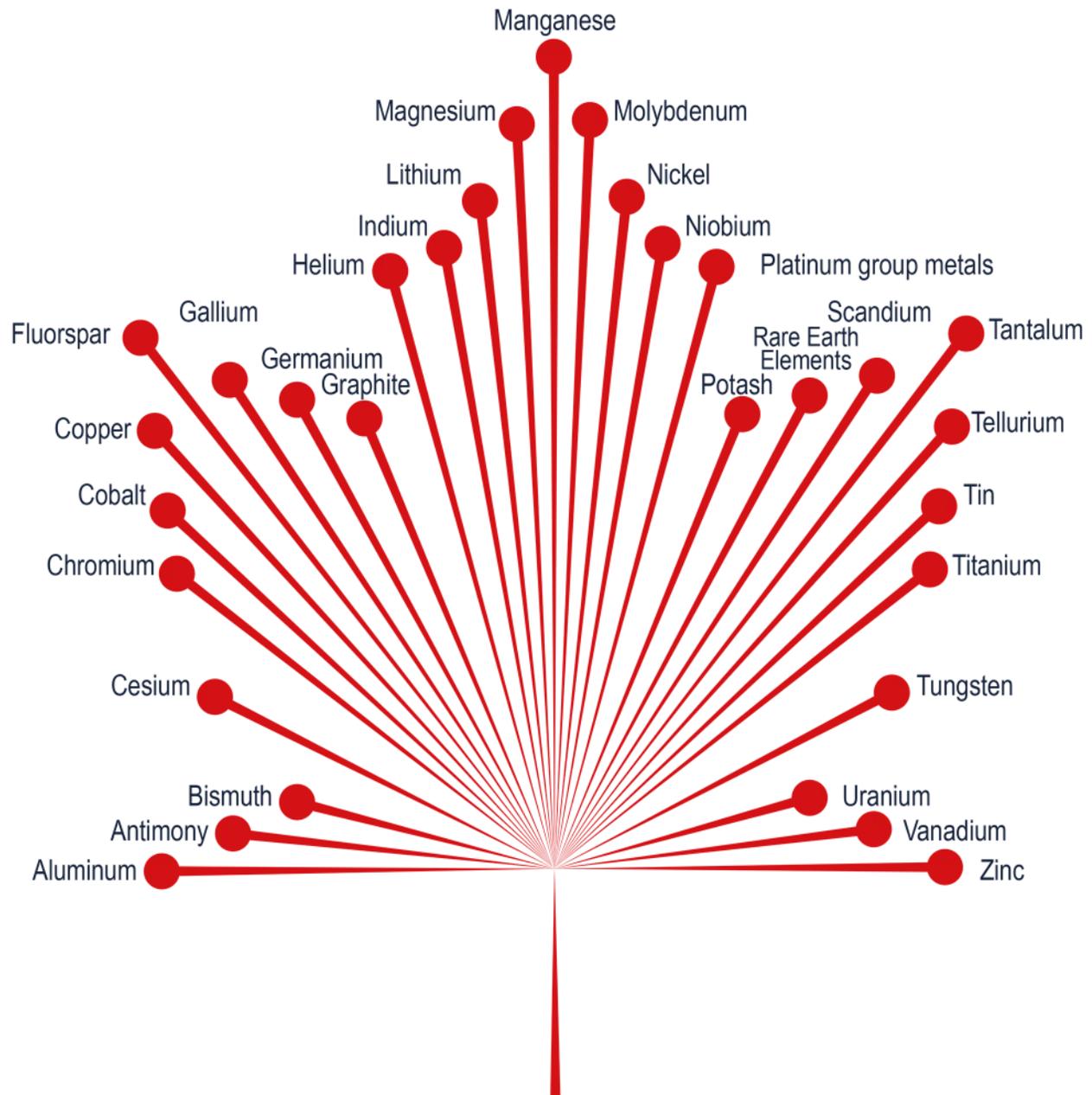
Canada's approach to critical minerals builds on extensive public and Indigenous consultations, including comments received on the Canadian Critical Minerals Strategy Discussion Paper (from June 14 to September 16, 2022), as well as consultations held for the Canadian Minerals and Metals Plan (CMMP). In addition, evidence and recommendations were considered from a series of engagements and roundtables with industry and Indigenous peoples, as well as recommendations included in the June 2021 report of the House of Commons Standing Committee on Natural Resources, [\*From Mineral Exploration to Advanced Manufacturing: Developing Value Chains for Critical Minerals in Canada\*](#), and the March 2022 report of the House of Commons Standing Committee on Industry and Technology, [\*The Neo Lithium Acquisition: Canada's National Security Review Process in Action\*](#).

This Strategy is intended to be an evergreen document — forward-looking, iterative, and long-term. Its successful implementation will require a coordinated and multi-pronged approach, in collaboration with multiple partners and stakeholders. The following strategic partnerships and engagement forums will help inform implementation of the Strategy over the long term:

- Federal-Provincial-Territorial (FPT) Task Team on Critical Minerals and Battery Value Chains;
- Ongoing engagement with Indigenous peoples via roundtables, workshops, and meetings on Indigenous priorities related to critical mineral value chains and other cross-cutting topics (e.g., the National Benefit Sharing Framework);
- Northern Regulatory Initiative Engagement;
- Regional Energy and Resource Tables;
- Industry Critical Minerals Roundtables;
- Canada-U.S. Joint Action Plan on Critical Minerals Collaboration;
- Critical Minerals Working Group under the Canada-Japan Energy Policy Dialogue;
- Canada-EU Strategic Partnership on Raw Materials;
- Government of Canada FDI Working Group.

The CMCE will continue to lead Canada's whole-of-government, multi-stakeholder approach to critical mineral development, including the ongoing development and coordination of policies and initiatives under this Strategy. Ongoing engagement with partners and stakeholders will inform future iterations of this evergreen document.

# ANNEX A: Canada's Critical Minerals List



# ANNEX B: Domestic Value Chains with High Growth Potential

An Exploration to Recycling approach to critical minerals refers to building capacity at each stage of the value chain, from exploration to recycling, and everything in between. A value chain is the set of activities that add value (e.g., product or process innovation) at each stage of the production and delivery of a quality product to a customer, and that maximize a company's competitive advantage. A supply chain, which is a related concept, is concerned with the logistics and organizations involved in getting the product to market.

Due to factors like geopolitical risks, ESG, and cost considerations, many companies are increasingly prioritizing vertical integration and having as much of the value chain located in close geographic proximity to their primary operations. An EV manufacturer, for example, will benefit if all stages of battery production occur relatively close to its plant, with transparent and trusted suppliers, operating in a stable economic and political climate.

The value chain for critical minerals includes five segments:

- 1. Upstream – Exploration:** Mineral exploration is the search for materials in the earth's crust that occur in concentrations and quantities high enough to be extracted and processed for profit. Exploration covers a wide range of activities, including reconnaissance surveys (e.g., aerial photography, airborne geophysical surveys), prospecting and ground surveys, drilling and trenching, project engineering, and feasibility studies.

Companies are actively exploring for critical minerals and developing critical minerals projects in Canada. From 2010 to 2020, a total of \$66.4 billion<sup>2</sup> was invested in critical mineral exploration and development projects in Canada, accounting for 45% of total spending. However, except for base metals and uranium, critical minerals (especially battery minerals) account for a small but recently growing share of total exploration spending.

The federal, provincial, and territorial governments support mineral exploration by providing geoscience in the form of geological maps, regional geophysical surveys, and other scientific information. The Geological Survey of Canada (GSC) manages several national geoscience research initiatives that support critical mineral exploration, including the *Geo-Mapping for Energy and Minerals-GeoNorth program* and the *Targeted Geoscience Initiative*.

The Government of Canada can improve its geoscience capacity by combining and overlaying geological potential with economic feasibility, ESG priorities, and infrastructure data at an early stage to identify the exploration projects that offer the greatest benefits and lowest risks. Better data, platforms for large-scale data analysis and visualization, and predictive tools deployed as early as possible in the mining cycle would also facilitate project planning, improve investor confidence, and create efficiencies in the regulatory and permitting processes.

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<sup>2</sup> Based on Natural Resources Canada's analysis using data from the Survey of Mineral Exploration, Deposit Appraisal and Mine Complex Development

- 2. Upstream – Mining (or Extraction):** Mining is the process of extracting minerals and/or other useful materials from the earth. The two main modes of mining are surface and underground mining. The mode of mining depends on the size, shape, and ore grade or mineral richness of the deposit. While specific operations may differ, they generally involve the use of heavy machinery for drilling, blasting, excavating, loading, and hauling the minerals away for processing.

With approximately 200 active mines across the country, Canada is a major producer of critical minerals. It is the global leader in the production of potash and ranks among the top five global producers of aluminum, indium, niobium, platinum group metals, titanium concentrate, and uranium. The mining sector is also the second-largest private sector employer of Indigenous peoples in Canada and provides skills and employment training, contracting opportunities, job guarantees, and community investments.

Mining is typically very capital-intensive, and new mines can take anywhere from 5 to 25 years to become operational. Mining companies, particularly junior companies, face the challenge of raising the private investment required to conduct their operations. In rural, northern, and remote regions, infrastructure gaps also hamper mineral development. To boost or develop new mine production, and to do so in a cost-effective and environmentally responsible manner, the Government of Canada will look for opportunities to partner with the private sector in financing new projects, support building the necessary infrastructure for priority deposits, advance innovation to improve efficiency and environmental performance, strengthen Indigenous engagement, and streamline regulatory and permitting processes. The mining industry is investing in green technology to lower the environmental footprint, efficiency, and safety of new and existing mines.

- 3. Midstream – Processing, Refining and Metallurgy (e.g., semi-finished inputs and materials):** Metallurgy refers to the study of metals and alloys, and specifically, the science of turning them into forms suitable for practical use. There are three steps in extracting metals from their ores or mine waste: mineral processing, chemical extraction, and refining. The mineral processing stage treats the ore to eliminate as much of the waste portion as possible, and includes two main steps: comminution (e.g., crushing and grinding), and separation. Chemical extraction often uses high-temperature processes, such as smelting or aqueous solutions, to process these valuable metal-bearing solids and transform them into intermediate compounds that are refined to their elemental or metallic state.

Canada has a long tradition in copper, zinc, and nickel mining, smelting, and processing. Mining of these metals in Canada comes mostly from sulphide deposits, which turn concentrates (either for exports or for processing within Canada) into intermediate or refined metal products. Base metals refineries are key sources of minor metals deemed critical, including germanium, indium, and tellurium. Canada is also a producer of aluminum and refined cobalt. Cobalt is produced primarily as a co-product of nickel mining and processing.

For many critical minerals such as lithium, Canada has no domestic refined production. However, several companies are investing in innovative technologies to extract lithium from brines. Canada has significant rare earth resources and advanced projects and is developing a first-of-its-kind processing and separation facility in Saskatchewan.

The Government can focus on building Canada's midstream capacity to produce the materials and value-added products needed for clean technologies, such as lithium, graphite, nickel, cobalt, copper, and rare earth elements. This will connect upstream and downstream

components, and allow Canada to build new production capacity, capture more value, expand economic benefits and jobs in Canada, attract investment, and boost our domestic capabilities, all while helping to meet growing global demand.

Semi-manufactured products include cathodes and anodes, which are components that make their way into lithium-ion cells and battery packs that are later integrated into end-use applications like EVs. These are processed from minerals such as graphite, lithium, nickel, and cobalt. Semi-manufactured products such as these are an important growth opportunity for Canadian companies.

- 4. Downstream – Component Manufacturing and Clean, Digital, and Advanced Technology Production (e.g., ZEV manufacturing, aircraft, and semiconductors):** Once processed, the metals make their way into any number of products. Separated rare earth oxides that were converted into metals can be combined to create permanent magnets that are important components of EV motors and wind turbines.

Canada has strong automotive and aerospace manufacturing sectors. Ontario represents one of the two largest automotive manufacturing jurisdictions in North America. It has the distinction of serving as Canadian headquarters for five global original equipment manufacturers: Stellantis, Ford, General Motors, Honda, and Toyota. Together, these companies typically assemble about two million light vehicles each year at their Canadian plants. They are supplied by an ecosystem of nearly 700 parts suppliers across the country. Canada is also home to many leading aerospace companies such as CAE, Bombardier, Pratt & Whitney Canada, De Havilland Canada, Airbus Canada, Bell Textron Canada Ltd., and MHI RJ who are global leaders in their respective markets. Canada also has world-class aerospace suppliers who are well integrated into global supply chains.

The green transformation of the automotive and aerospace sectors, which is a federal priority, will depend on access to critical minerals. Working with provincial partners and the private sector, the Government of Canada has made significant investments in attracting cell, battery, and EV manufacturing. The government also made significant investments in sustainable aviation projects, working in partnership with the private sector and the Province of Quebec. These types of investments in the green technologies of the future will help encourage upstream activities such as new mines or processing facilities.

- 5. Material Recovery and Recycling:** Recycling is a keystone of the circular economy. It can relieve some pressure on primary supply and can be a more cost-effective, environmentally friendly alternative to opening new mines. For example, the recycling of end-of-life lithium-ion batteries to recover valuable minerals can also reduce primary supply requirements for these minerals.

Currently, recycled mineral volumes are relatively minimal overall (except for steel, lead, copper, and aluminum which have higher volumes), but the International Energy Agency forecasts they will become much more significant by 2040.

In Canada, critical minerals are also found in secondary and unconventional sources (e.g., mine tailings, brines in oil fields). Examples of current and emerging private sector recycling activities and R&D research include lithium-ion recycling; recovery of titanium from oil sands tailings; recycling of vanadium in the steel industry in the form of scrap steel; recovery of magnesium from asbestos tailings; and, extraction of rare earth elements from recycled permanent magnets.

Natural Resources Canada's *Mining Value from Waste Initiative* is a multifaceted program that works on reprocessing existing mine waste to remove the valuable minerals and metals important for clean technology and military applications. Mine waste includes rocks, sludge, slag, tailings, and other by-products, depending on the type of mines and operations. The program's goal is to reduce risk and environmental liability and, at the same time, create economic opportunities.

Among the critical minerals essential for priority supply chains, advanced manufacturing, clean technologies, and zero-emission vehicles, six hold the most significant potential for Canadian economic growth. These include:

Critical Mineral	Value Chains	Major Application	Examples of Specific Products
<b>Lithium</b>	Clean technologies and defence and security technologies	Batteries, glassware, ceramics	Rechargeable batteries (phones, computers, cameras, and EVs); hydrogen fuel storage; metal alloys (military ballistic armour; aircraft, bicycle, and train components); specialized glass and ceramics; drying and air conditioning systems.
<b>Graphite</b>	Clean technologies	Batteries, fuel cells for EVs	Metal foundry lubricants, vehicle brake linings, metal casting wear, crucibles, rechargeable battery anodes, EV fuel cells, electrical motor components, frictionless materials, pencils.
<b>Nickel</b>	Clean technologies and advanced manufacturing	Stainless steel, solar panels, batteries, aerospace, and defence applications	Metal alloys (steel, superalloys, non-ferrous alloys), jet and combustion engine components, rechargeable batteries (phones, computers, EVs), industrial manufacturing machines, construction beams, anti-corrosive pipes, cookware, medical implants, power plant components.
<b>Cobalt</b>	Clean technologies	Batteries	Battery electrodes; metal alloys; turbine engine components, automobile airbags; catalysts in the petroleum and chemical industries; drying agents for paints, varnishes, and inks; magnets.
<b>Copper</b>	Clean technologies and advanced manufacturing	Electrical and electronics products	Power transmission lines, electrical building wiring, vehicle wiring, telecommunication wiring, electronic components.

Critical Mineral	Value Chains	Major Application	Examples of Specific Products
<b>Rare earth elements</b>	Zero-emission vehicles	Permanent magnets for electricity generators and motors	Flat screens, touch screens, LED lights, permanent magnets, electronic components, EV drive trains, wind turbines, aircraft components, vehicle components, speakers, steel manufacturing, battery anodes, chemical catalysts, glass manufacturing, specialized glass lenses.

While these minerals represent the greatest opportunity to fuel Canadian domestic manufacturing and will be the focus of most investment, many other minerals also present significant prospects for the future. Where critical minerals are not used solely for domestic manufacturing, there is value to be captured by increasing exports to allies and expanding domestic refining, processing, and components manufacturing over the medium to long term. Examples of these minerals include:

Critical Mineral	Value Chains	Major Application	Examples of Specific Products
<b>Vanadium</b>	Clean technologies and advanced manufacturing	Alloys, batteries	Metal alloys (steel), military armour plating, vehicle axles, piston rods and crankshafts, vanadium redox flow batteries, nuclear reactor components, manufacturing of superconducting magnets, pigments for ceramics and glass.
<b>Gallium</b>	Information and communications	Semiconductors, optoelectronics	Electronic circuit boards, LED devices, semiconductors, specialized thermometers, barometric sensors, solar panels, blue-ray technology, pharmaceuticals.
<b>Titanium</b>	Clean technologies and advanced manufacturing	Aerospace and defence applications, chemicals	Colour pigments in paint, plastics, and paper; metal alloys (aluminum, steel, molybdenum); aircraft; spacecraft; missiles and rockets; non-corrosive pipes; ship and submarine hulls; medical implants; sunscreen; specialty Li-ion battery anode materials.
<b>Scandium</b>	Clean technologies and advanced manufacturing	Advanced alloys (aerospace & defence), fuel cells	Metal alloys (aluminum); commercial and military aircraft; rockets and vehicle components; high-end sports equipment; specialized light bulbs; solid oxide fuel cells; laser research.

Critical Mineral	Value Chains	Major Application	Examples of Specific Products
<b>Magnesium</b>	Clean technologies and advanced manufacturing	Aluminum alloys	Aluminum alloys (aircraft and automobile components); iron manufacturing; flares and fireworks; lightweight consumer goods (laptops, cameras, power tools); fertilizer; animal feed; pharmaceuticals.
<b>Tellurium</b>	Clean technologies	Solar power, thermoelectric devices	Metal alloys (copper and steel), solar cells, semiconductors, CDs/DVDs, vulcanized rubber, chemical catalysts in oil refining.
<b>Zinc</b>	Clean technologies and advanced manufacturing	Galvanizing	Rust proofing, manufacturing of automobiles, paints, rubber, cosmetics, pharmaceuticals, plastics, inks, soaps, batteries, textiles, electronics, baby creams, sunscreen.
<b>Niobium</b>	Clean technologies and advanced manufacturing	Construction, transportation	Metal alloys (steel), jet engines, rockets, construction beams, building girders, oil rigs and pipelines, superconducting magnets, MRI scanners, NMR equipment, eyeglasses, titanium niobium oxide anode materials.
<b>Germanium</b>	Information and communications, clean technologies, and advanced manufacturing	Optical fibres, satellites, solar cells	Fibre-optic communication networks, camera and microscope lenses, infrared night vision systems, polymerization catalysts.

It is also important that Canada maintain its position as a world leader in minerals like potash, uranium, and aluminum. These minerals are important for agriculture, nuclear energy, and diverse manufacturing sectors, respectively.

# ANNEX C: Provincial and Territorial Strategies and Policies

Provinces and territories also consider critical minerals development as strategic priority. Several jurisdictions have developed critical minerals strategies, while others are in the process of developing policies or are actively promoting this sector. The Canadian Critical Minerals Strategy will address national gaps and ensure shared benefits from core and complementary investments.



# ANNEX D: Global Cooperation on Critical Minerals

Canada is seeking to build more resilient global supply chains for critical minerals by working with international partners to align policies, raise global economic, social, and governance (ESG) standards, advance joint research and development, and encourage new investment opportunities, among other priorities.

**The Canada-U.S. Joint Action Plan on Critical Minerals** was announced on January 9, 2020, to advance bilateral interest in securing supply chains for the critical minerals needed in strategic manufacturing sectors, including communication technology, aerospace and defence, and clean technology. The Action Plan is guiding cooperation between officials in areas such as industry engagement, innovation, defence supply chains, improving information sharing on mineral resources and potential, and cooperation in multilateral forums. Canada already supplies many of the minerals deemed critical by the United States. In 2020, bilateral mineral trade was valued at \$95.6 billion, with 298 Canadian mining companies and a combined \$40 billion in Canadian mining assets south of the border.

**The Canada-EU Strategic Partnership on Raw Materials** is the primary mechanism for engaging the European Commission and European Union Member States in Canada's critical mineral and battery value chains. The overarching objective of the partnership is to advance the value, security, and sustainability of trade and investment into the critical minerals and metals needed for the transition to a green and digital economy. Agreed areas of collaboration include the integration of raw material value chains; science, technology, and innovation collaboration; and, collaboration in international forums to advance world-class ESG criteria and standards.

**The Canada-Japan Sectoral Working Group on Critical Minerals** aims to facilitate commercial engagement between Canadian and Japanese businesses across the critical mineral value chain; strengthen government-to-government information sharing; and, encourage cooperation on international standard-setting for critical minerals. It is part of the Canada-Japan Energy Policy Dialogue, where Japan is working to secure the critical mineral supply chains needed for its industrial base and broader green energy transition.

**Through other multilateral engagements**, Canada is pursuing collective action on critical minerals to support the global transition to green energy and more resilient supply chains. Notable multilateral organizations and initiatives include the G7/G20, the International Energy Agency (IEA), the World Bank, the International Renewable Energy Agency (IRENA), the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (IGF), and the Energy Resource Governance Initiative (ERGI).

# ANNEX E: Comparing Canada's Critical Mineral List

Commodity	Canada (2021)	EU (2020)	South Korea (2020)	USA (2022)	Japan (2019)	Australia (2022)	South Africa (2022)	India (2016)	UK (2021)
Aluminum	x	x		x		x			
Antimony	x	x	x	x	x	x			x
Arsenic			x	x					
Barium		x	x	x	x				
Beryllium		x	x	x	x	x		x	
Bismuth	x	x	x	x	x	x			x
Boron		x	x		x				
Cadmium			x						
Cesium	x		x	x	x				
Chromium	x		x	x	x	x	x	x	
Cobalt	x	x	x	x	x	x	x		x
Coking Coal		x					x		
Copper	x						x		
Fluorspar	x	x		x	x				
Gallium	x	x	x	x	x	x			x
Germanium	x	x	x	x	x	x		x	
Graphite	x	x		x	x	x		x	x
Hafnium		x	x	x	x	x			
Helium	x					x			
Indium	x	x	x	x	x	x			x
Iridium				x					
Iron ore							x		
Lead							x		
Limestone								x	
Lithium	x	x	x	x	x	x	x		x
Magnesium	x	x	x	x	x	x			x
Manganese	x		x	x	x	x	x		
Molybdenum	x		x		x				

Commodity	Canada (2021)	EU (2020)	South Korea (2020)	USA (2022)	Japan (2019)	Australia (2022)	South Africa (2022)	India (2016)	UK (2021)
Nickel	x		x	x	x		x		
Niobium	x	x	x	x	x	x		x	x
PGM	x	x	x	x	x	x	x		x
Phosphate		x	x						
Potash	x								
Rare earth elements group	x	x	x	x	x	x	x	x	x
Rhenium			x		x	x		x	
Rubidium				x	x				
Selenium			x		x				
Silicon		x	x		x	x		x	x
Strontium		x	x		x			x	
Tantalum	x	x	x	x	x	x		x	x
Tellurium	x		x	x	x				x
Thallium			x		x				
Tin	x		x	x					x
Titanium	x	x	x	x	x	x			
Tungsten	x	x	x	x	x	x			x
Uranium	x						x		
Vanadium	x	x	x	x	x	x	x		x
Zinc	x					x	x		
Zirconium			x	x	x	x		x	

# ANNEX F: Canadian Critical Mineral Success Stories in 2022

## NOVEMBER 2022

- **Vale Canada Limited** (a subsidiary of **Vale S.A.**) and **General Motors Co.**, announce they have signed a term sheet for the long-term supply of battery grade nickel sulfate from Vale's proposed plant at Bécancour, Que. Under the terms of the agreement, if the project goes ahead, Vale will supply battery grade nickel sulfate, equivalent to 25,000 metric tonnes per year of contained nickel, for use in GM's Ultium battery cathodes which will power several kinds of electric vehicles.

## OCTOBER 2022

- **Rio Tinto** and the **Government of Canada** announce a combined investment of \$737 million, with the Government of Canada proposed an investment of up to \$222 million through the *Strategic Innovation Fund* in Rio Tinto's Fer et Titane's operations over the next eight years. The investment will go towards decarbonizing Rio Tinto's operations in Sorel-Tracy, Quebec. The partnership will support technological innovations to reduce greenhouse gas emissions from the company's titanium dioxide, steel and metal powders businesses by up to 70%.
- **Panasonic Energy** and Quebec graphite mining company **Nouveau Monde Graphite** enter a commercial framework, which included a memorandum of understanding where Panasonic will purchase battery grade graphite materials from Nouveau Monde once it has reached commercial production. Nouveau Monde also announced a \$50 million investment from **Mitsubishi, Pallinghurst, and Investissement Québec**, to help the mining company achieve commercialization as well as the integration of its mining project and battery materials plant.
- **Mercedes-Benz** finalizes a supply agreement with Canadian-German start-up **Rock Tech Lithium Inc.**, to secure battery grade lithium hydroxide, sourced from Rock Tech Lithium's Georgia Lake lithium project in Ontario and produced from a planned lithium converter facility in Germany.
- **Vital Metals** amends its offtake agreement to increase the volume of rare earth oxide sourced from the company's Nechalacho mine in the Northwest Territories and sold to Norway-based **REEtec** by 50%. In April, REEtec reached a deal with German auto parts supplier Schaeffler to use the rare earth metals sourced from Vital Metals for magnets used in the manufacturing of electric vehicles. Det'on Cho Nahanni Construction Corporation, which is 51% owned by the Yellowknives Dene First Nation, runs operations at the Nechalacho site. The Yellowknives Dene First Nation is one of the first Indigenous communities in Canada to be responsible for mineral extraction on their traditional territory.

## SEPTEMBER 2022

- **LG Energy Solutions** signs a binding term sheet with Electrica Battery materials (the only permitted cobalt sulphate facility in North America) to supply 7,000 tonnes of cobalt sulphate for three years, starting in 2023.
- **LG Energy Solutions** signs two non-binding Memorandums of Understanding with Canadian junior mining companies **Avalon Advanced Materials Inc.** and **Snow Lake Resources Inc.** for the supply of lithium hydroxide, starting in 2025. LG Energy accounts for more than 20% of the global electric vehicle battery market and supplies automotive companies including Tesla, General Motors and Volkswagen.

## AUGUST 2022

- Canadian Junior mining company **Giga Metals** and **Mitsubishi Corporation** (Japan's largest trading company) agree to establish a joint venture to develop the Turnagain Nickel project in northern British Columbia. The joint venture involving the Hard Creek Nickel Corp., would see Mitsubishi have a 15% equity interest, while Giga Metals will have an 85% equity interest.
- **Volkswagen** and **Mercedes-Benz Group** sign memorandums of understanding with the **Government of Canada** to deepen cooperation on electric vehicles and critical mineral supply chains.

## JULY 2022

- **Umicore SA** announces it will build a \$1.5 billion cathode active material factory in Eastern Ontario to produce the precursor cathode active materials as well as cathode active materials for electric vehicle batteries. Construction is targeted to start in 2023, with operations to start at the end of 2025. The project is expected to create 1,000 jobs during construction and hundreds of permanent positions.

## JUNE 2022

- **Saskatchewan Research Council** (Canada's second-largest research and technology organization) and Korea Mine Rehabilitation and Mineral Corp. (a state-owned corporation responsible for natural resource security), sign a Memorandum of Understanding for cooperation in the area of critical minerals, including a framework to develop a secure supply chain of critical minerals (particularly potash and rare earth elements).
- **Piedmont Lithium** and **Sayona Québec** announce spodumene concentrate production has restarted at its North American Lithium project located near Val D'Or, Quebec, following a successful \$136 million institutional placement (announced in May 2022).
- Canadian mining company **Vale** completes pre-feasibility study for its proposed nickel sulphate project in Bécancour, Que., that, if developed, would help supply material used to make lithium-ion batteries.

- **The Government of Canada** says it plans to invest \$100 million to minimize the carbon footprint and improve worker safety at BHP's \$7.5 billion Jansen Stage 1 mine in Saskatchewan, the first new major potash project in Canada in more than 50 years.

## MAY 2022

- **Vale** and **Tesla** confirm a multi-year agreement that will see Vale supply Tesla with low-carbon nickel (to be used in manufacturing lithium-ion batteries) from its Long Harbour refinery in Newfoundland, while the raw material will be sourced from Vale's Voisey Bay mine in Labrador.
- Automaker **Stellantis** announces the company's assembly plants in Windsor, Ont., and Brampton, Ont., will receive \$3.6 billion (including up to \$529 million in federal funding) in retooling and modernization upgrades as the company works to transform the plants into flexible, multi-energy vehicle assembly facilities ready to produce electric vehicles.
- **Nano One** announces it has entered a binding agreement to acquire all outstanding shares of **Johnson Matthey Battery Materials**, a Canadian entity located in Quebec, for approximately \$10.25 million.
- **5N**, a leading global producer of specialty semiconductors and performance materials, reaches a commercial agreement with **Rio Tinto** to refine tellurium produced at its Kennecott copper operation in Utah. Under the agreement, the tellurium will be refined at 5N's Montréal facility in Quebec and will be primarily used for manufacturing thin-film photovoltaic modules by First Solar under an existing semiconductor supply agreement between First Solar and 5N.
- **Livent Corp.**, based in the United States, announces it has doubled its ownership interest in Nemaska Lithium Inc., to 50%. Nemaska Lithium is a fully integrated lithium hydroxide development project located in Quebec.

## APRIL 2022

- **General Motors** in Canada announces plans to invest more than \$2 billion at its Oshawa, Ont., assembly plant and its CAMI assembly plant in Ingersoll, Ont. The investment is supported by \$259 million from the federal government to advance the electrification of Canada's automotive sector.

## MARCH 2022

- **General Motors** announces plans for a \$500 million cathode facility in Quebec, in partnership with South Korea's POSCO. The facility will produce cathode active material for GM's Ultium battery manufacturing plans in the United States.
- **BASF** signs an agreement to secure land for its future cathode active materials and recycling site in Bécancour, Que., further enhancing BASF's cathode active material production footprint in North America. Project commissioning is targeted in 2025.
- **Honda** announces it plans to invest nearly \$1.4 billion to retool its manufacturing operations in Alliston, Ont., to launch the next generation of hybrid-electric vehicles, supported by \$131.6 million in federal funding.

## JANUARY 2022

- ◆ Canada's **Electra Battery Materials** announces the company has signed a battery recycling and cobalt sulphate supply agreement with **Marubeni** (one of Japan's largest trading companies). The agreement will see Electra benefit from Marubeni's extensive battery cell recyclers network to secure a stable source of recyclable materials for the company's recycling operation, slated for commissioning in 2023.
- ◆ Canadian junior mining company **Magna Mining Inc.**, enters a non-binding memorandum of understanding with **Mitsui and Co. Ltd.**, to facilitate Mitsui's potential acquirement of a 10 to 12% stake in Magna's Shakespeare Mine. The Shakespeare Mine, located in Sudbury, Ont., is a nickel, copper, and platinum group metals mine. In connection with the transaction, Magna Mining said it would sign a joint venture agreement with Mitsui to develop the Shakespeare Mine, with Magna serving as project operator.