



ACTION PLAN 2020:
INTRODUCING
THE PAN-CANADIAN
INITIATIVES

March 2020 Preliminary Version



NOTE TO READERS

The final edition of Action Plan 2020 with further initiatives and refinement will be released at the 2020 Energy and Mines Ministers' Conference. The Canadian Minerals and Metals Plan (CMMP) respects the roles, responsibilities and priorities of Canada's federal, provincial and territorial governments. As part of this Plan, individual jurisdictions will undertake efforts that best suit their priorities, unique situations and needs. Specific actions can be part of jurisdictions' respective strategies collaborations with other jurisdictions, partners, or stakeholders; or pan-Canadian initiatives.

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THE COMPETITIVENESS IMPERATIVE

In 2018 and 2019, the Government of Canada and the provinces and territories hosted the most significant national conversation on mining in decades. It resulted in the **Canadian Minerals and Metals Plan (CMMP)**—a framework to guide a competitive, future looking minerals and metals industry. Launched in March 2019,¹ the pan-Canadian CMMP was the outcome of extensive engagement with Indigenous Peoples, innovation experts, private companies, industry associations, non-governmental organizations, youth and Canadians from across the country.

A FUTURE LOOKING MINERALS AND METALS SECTOR

Action Plan 2020 launches a series of collaborative measures to ensure Canada's minerals and metals sector is a key contributor to an evolving global economy for decades to come. The *first* in a series of Action Plans introduces **pan-Canadian initiatives**² to achieve the targets indicated in the CMMP's six strategic directions, and highlights commitments and investments made by governments and industry.

The next Action Plans will be released in 2021 and 2022, respectively, with subsequent ones following every three years thereafter. Together, these Action Plans pursue the vision that **Canada is the leading mining nation**.

Canada's world class minerals and metals industry is built on people and natural advantages that translate into benefits for Canadians. In 2018, mineral production totalled \$47 billion. Canada produced some 60 minerals and metals at 200 active mines and 6,500 pits and quarries. Canada's minerals and metals products accounted for 19% of total domestic exports. The broader minerals sector,³ which includes downstream processing and manufacturing, provided 626,000 direct and indirect jobs throughout the country in urban, rural and remote regions.

The world is shifting to a low carbon and digitalized economy that requires increased mineral and metal products

Canada is primed to respond to increased demand for both traditional and emerging commodities needed for flagship clean technology applications (e.g., solar panels, wind turbines, and batteries for electric vehicles) and to support digital hardware, industrial uses (e.g., agriculture) and infrastructure.

¹ On the date of its release, the CMMP had been endorsed by all of Canada's Mines Ministers with the exception of the Ministers from Ontario and Saskatchewan. See Annex A.

² Pan-Canadian initiatives were jointly developed by federal, provincial and territorial governments participating in the CMMP.

³ **Minerals sector, minerals and metals sector and minerals and metals industry** are used interchangeably in this report and comprise North American Industry Classification System codes: 212—Mining and quarrying (excluding oil and gas) 327—Non-metallic mineral product manufacturing 331—Primary metal manufacturing 332—Fabricated metal product manufacturing 213117—Contract drilling (except oil and gas) where available 213119—Other support activities for mining, including mineral exploration (where available). The last two include exploration and drilling companies, and service companies operating on a fee or contract basis. They do not include all mining industry suppliers as some entities service multiple sectors.



EXAMPLES OF CRITICAL MINERALS



NICKEL*



ALUMINUM



COPPER



URANIUM



POTASH



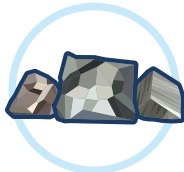
COBALT*



LITHIUM*



GRAPHITE*



RARE EARTH ELEMENTS (REE)

The U.S. has deemed these minerals and metals as critical to its economic and national security. Canada is a significant producer of all of the above, except REEs and lithium, for which it hosts advanced minerals projects and significant resources.

*Key ingredients for **lithium-ion batteries** (i.e. electric vehicles, stationary energy storage)

Critical minerals are essential ingredients that are important to economic and national security, are difficult to substitute, and/or face supply risks.⁴ Many of these key minerals are supplied by non-market economies that have the ability to restrict access. To ensure adequate supply, leading economies carefully monitor their availability and usage in industrial supply chains. Canada has mines and advanced mineral projects to offer a secure and responsible source of supply to many advanced economies.⁵

“The low-carbon future will be mineral intensive”

—WORLD BANK GROUP

The International Energy Agency forecasts that electric vehicles could reach 43 million units per year by 2030, up from two million in 2018, with production valued at more than US\$567 billion annually.⁶ By 2040, the international market for energy storage is expected to attract US\$620 billion in investment.⁷

Canada has resources of nickel, cobalt, lithium and graphite—the key minerals required for **lithium-ion batteries**. These are critical to reducing greenhouse gas (GHG) emissions in the transportation sector, supporting the transition to a renewable power system, and providing alternatives to higher emitting sources. Canada also boasts a leading battery research community, a world class automotive industry, mineral refining capacity, and an abundance of renewable and affordable energy that supports more sustainable processing, production and value chains.

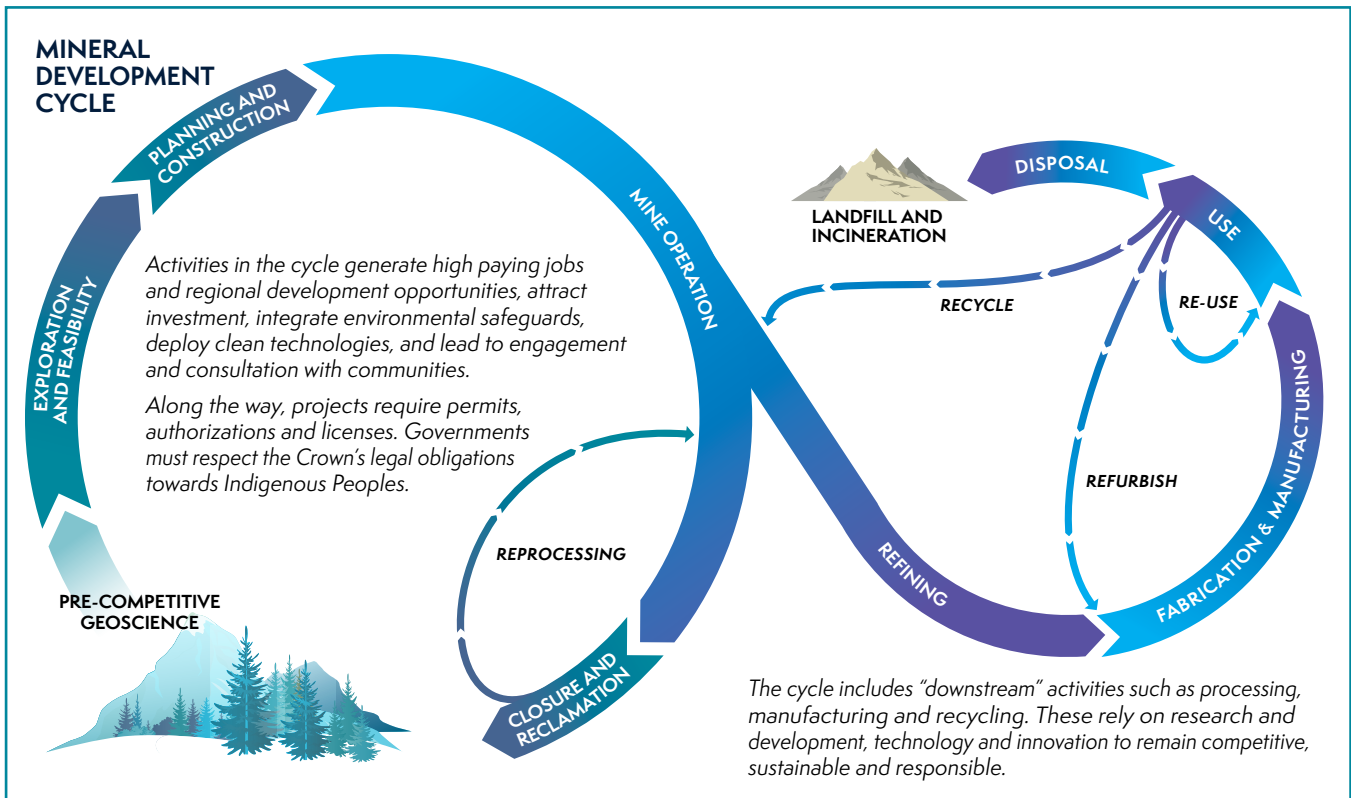
4 There is no global definition of critical minerals. Critical minerals are country-specific and their ‘criticality’ can change based on supply and demand.

5 For example: the United States, European Union, Japan, Australia, and Korea.

6 *Global EV Outlook 2019, Scaling up the transition to electric mobility*, International Energy Agency, 2019.

7 *Energy Storage is a \$620 Billion Investment Opportunity to 2040*, Bloomberg New Energy Finance, 2018.





The Canadian mining industry has a well-earned reputation for **sustainability and ethical** practices. This resonates with millennials—those under the age of 30 who account for 50% of the world’s population and who are the most “sustainability-conscious” generation the world has ever seen.⁸

As global demand for minerals and metals rises, so do expectations for **minimizing footprints** around industrial activities and their value chains. For Canada, this means translating the sector’s innovation and expertise into solutions that allow Canadian operations to perform more efficiently and competitively around the globe. This requires fine-tuning our innovation ecosystem to better develop, demonstrate, adopt and export Canadian technologies, processes and services related to GHG and water reduction, energy efficiency, mining value from waste and site reclamation.

This context presents a generational opportunity for Canada—a highly-regarded, global mining power with a wealth of minerals, metals, and top talent in every aspect of the industry.

Canada demonstrates excellence in earth sciences and innovation. We have experience in developing and financing mineral projects in Canada and around the world. Once the Comprehensive and Progressive Trade Agreement for Trans-Pacific Partnership is in full force, we will be the only G7 nation with free trade access to the Americas, Europe and the Asia-Pacific region. We have a reputation as a secure, sustainable and responsible supplier of best-in-class products and services. Canada must coalesce around this strategic industry to fully-seize opportunities and build on **our position as a leading exploration and mining power.**

⁸ 2018 Global Megatrends Conference, Credit Suisse, 2018.



REALIZING THE VISION

THE VISION*

CANADA IS THE LEADING MINING NATION

Canada is home to a competitive, sustainable and responsible minerals industry that benefits all Canadians. The country is a global leader in mining-related science, technology, social and environmental practices with a clear and predictable regulatory environment, innovative clean technology solutions, and best management practices. It boasts a skilled and diverse workforce, an attractive investment climate, partnerships with Indigenous Peoples, and strong relations with communities.

PRINCIPLES TO STEER THE VISION

- ▲ The mineral development sequence provides essential products for the evolving global economy and substantial socio-economic benefits for regions across Canada, including northern, remote and isolated communities, and urban centres.
- ▲ Responsible mineral development integrates the concept of sustainability—human, social, economic, and environmental.
- ▲ Canada's bold vision for the industry is responsive and adaptable to emerging global forces and new frontiers.
- ▲ Leading science, engineering and innovation advances the competitiveness of the minerals sector and fosters responsible industry practices.
- ▲ A strong national brand and global leadership advances Canadian interests at home and abroad, strengthens the economies of Canada's regions, and promotes Canadian values.
- ▲ Respect for jurisdictional authority, effective legislative and regulatory frameworks, community engagement, and partnerships are foundational.

* This vision will be achieved through collaboration between the federal, provincial and territorial governments, Indigenous Peoples, industry, advocacy groups and Canadians.



APPROACH TO ACHIEVING THE VISION

The Plan includes six strategic directions:



Canada's business and innovation environment for the minerals sector is the world's most competitive and most attractive for investment



Increased economic opportunities for Indigenous Peoples and supporting the process of reconciliation



The protection of Canada's natural environment underpins a responsible, competitive industry. Canada is a leader in building public trust, developing tomorrow's low-footprint mines and managing the legacy of past activities



A modern and innovative industry supported by world-leading science and technology—across all phases of the mineral development cycle



Communities welcome sustainable mineral development activities for the benefits they deliver



A sharpened competitive edge and increased global leadership for Canada



ECONOMIC DEVELOPMENT AND COMPETITIVENESS

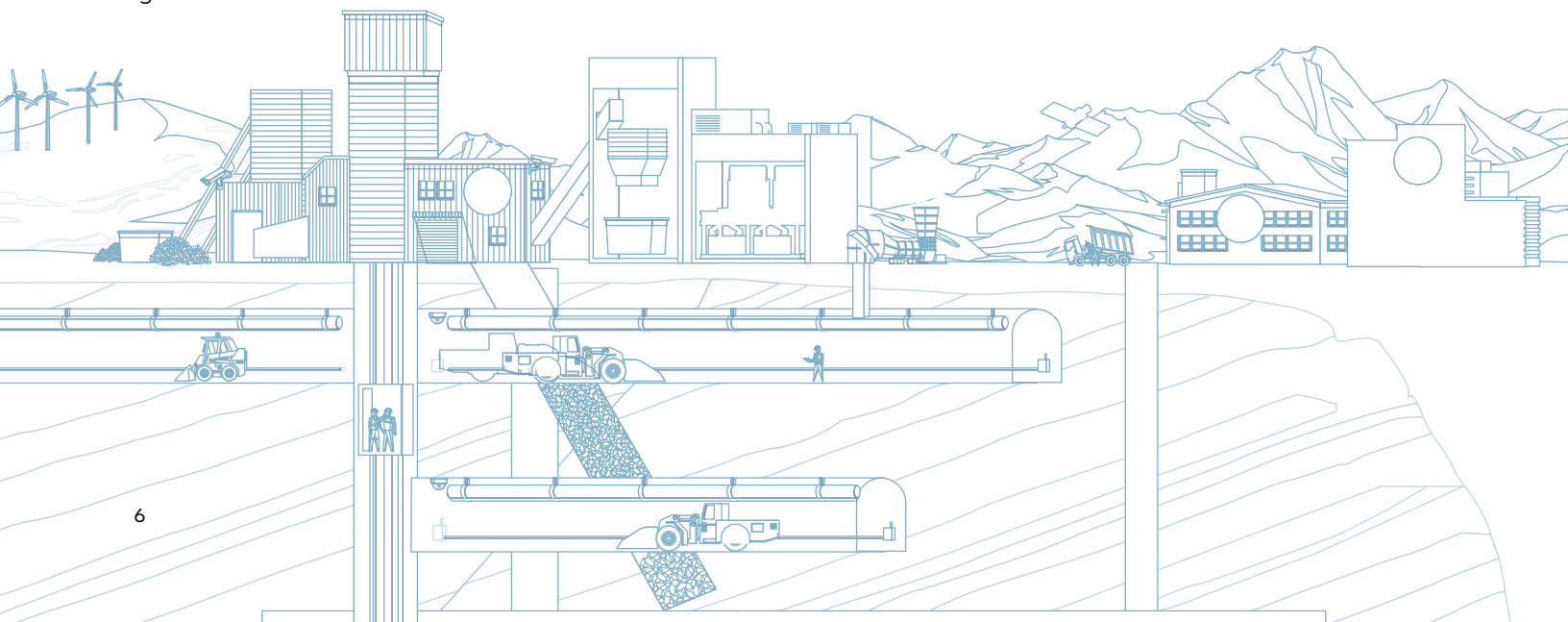
A strong Canadian minerals and metals sector depends on being competitive across all phases of the mineral development cycle, from pre-exploration to post-mine closure. To achieve this goal, Canada must seize macro-economic opportunities and set the stage for long-term success in a dynamic global economy.

Global demand for **critical minerals and metals** is increasing in tandem with the rapid expansion of the electric vehicle and energy storage market, adoption of clean energy technologies and renewable energy, and advances in defence technology. As such, **batteries** are increasingly important and should be a significant focus of new geoscience and mineral exploration activities, research and development (R&D) of mining technologies, and innovation for minerals and metals processing and transformation.

There is an opportunity to tap into the global appetite for secure sources of critical and clean tech-enabling minerals and metals, while better integrating Canada's growing battery industry into global value chains. This would enable Canada to benefit from the next wave of clean energy technologies, and enhance our mining sector's reputation as a global leader in innovation and environmental stewardship. To achieve this, the sector needs to present a detailed and accurate picture of Canada for investors that leverages advances in geoscience.

Attracting investment is essential to the future success of the industry. It brings capital for exploration activities and projects; increases innovation; helps diffuse technology, knowledge and intellectual property; and supports Canadian firms in establishing and participating in global value chains. New investments in infrastructure can further enable mining-related activities and open up Canada's northern, remote and isolated regions, much of which are underexplored and underdeveloped. Canada currently has more than 114 major minerals and metals projects planned or in construction, representing \$80 billion in potential investment.

Canada's approach to investment attraction needs to encompass the full mineral development cycle, including extracting, processing and refining. It begins with **public geoscience**, which helps exploration companies make informed decisions regarding their exploration plans and allows them to focus on areas of higher potential. Geoscience also serves a range of public and private interests beyond mineral exploration, such as civil engineering projects, land-use planning, clean water supply, environmental impact assessment, public health and safety, economic development, and national sovereignty.





PAN-CANADIAN INITIATIVE: A Pan-Canadian Geoscience Strategy (PGS)

ASSOCIATED TARGET:

BY 2022

A new, pan-Canadian collaborative public geoscience strategy for mineral exploration

WHAT:

Led by the National Geological Surveys Committee,⁹ the **pan-Canadian Geoscience Strategy (PGS)** will be a nation-wide framework that builds on current geological surveys’ strengths and leverages next generation technology, big data and other disruptive technologies to responsibly develop Canada’s geological resources, including critical minerals.

The PGS will increase the availability and accessibility of public geoscience, assess opportunities to increase funding for geoscience and examine ways to enhance national and international collaboration on geoscience innovation.

WHY:

A country’s geological potential and public geoscience database are major considerations for mineral investment attractiveness. The availability of world class geoscience knowledge reduces investment risk by allowing explorers to focus their work on areas with the highest probability of success.

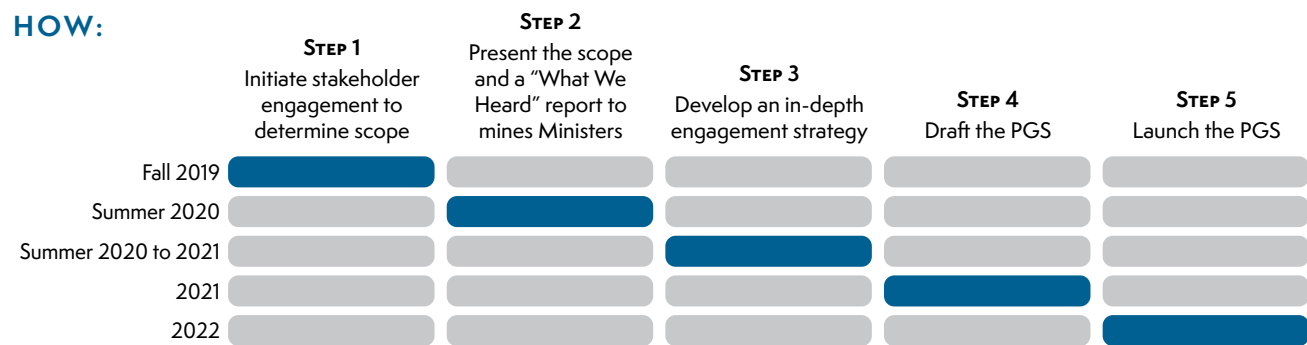
Canada’s public geoscience is delivered by national and provincial/territorial geological survey organizations,

in collaboration with academia and other partners. This is a success story that has enabled the socio-economic development of entire regions, while helping protect Canadians. It is key for governments and communities to make informed decisions on land use and resource management—including for the development of critical infrastructure needed for growth, and to respond to climate-related risks.

“Industry 4.0” is the trend towards automation and data exchange, and includes robotics, the Internet of Things, cloud and cognitive computing, artificial intelligence (AI) and virtual reality. One component of this trend is “digitalization” and the process of employing digital technologies to transform businesses and industries. This leads to increasing amounts of data, which if unlocked, can facilitate economic development and greater protection for Canadians.

Canadian geoscience must be updated to reflect this data revolution and change to the global economy. New generation public geoscience data, research and predictive tools for base metals and critical minerals are key to the global transition to a low carbon economy and national defence technologies. Leveraging new knowledge and modern technology will help Canada present modern, world-leading geoscience to support the discovery and development of future mines. At the same time, the provision of more sophisticated information increases efficiencies and reduces the footprint of exploration activities.

HOW:



⁹ Originally signed in 1998 and set for renewal in 2022, the Minister-level Intergovernmental Geoscience Accord outlines the respective roles and responsibilities of the National Geological Surveys Committee, which is comprised of representatives from Canada’s federal, provincial and territorial geological surveys.



CURRENT INITIATIVES BY FEDERAL, PROVINCIAL / TERRITORIAL GOVERNMENTS AND ASSOCIATIONS

TAX AND FINANCIAL INCENTIVES

To provide certainty for investors and stability for mineral exploration companies and to secure our position as a global hub for exploration and mine financing:

- Mining Incentive Program **(N.W.T.)**
- Making the B.C. Mining Flow-Through Share Income Tax Credit and the Mining Exploration Tax Credit permanent, and extending the New Mine Allowance **(B.C.)**
- The Targeted Mineral Exploration Incentive and extending the provincial Mineral Exploration Tax Credit (METC) **(Sask.)**
- Junior Mining Assistance Program and Prospector Assistance Program **(Nvt., N.B., N.L.)**
- Mineral Resources Development Fund **(N.S.)**
- Reviewing current mining tax regime and fee structures **(N.L.)**
- Extending the federal METC by five years **(Can.)**

EXPLORATION

To develop Canada's future mines and increase exploration activities:

- Independent Geoscience Technical Advisory Committee **(N.L.)**
- Prospectors & Developers Association of Canada's (PDAC) Student-Industry Mineral Exploration Workshop for emerging geoscientists **(Assoc.)**
- PDAC's e3 Plus: A Framework For Responsible Exploration **(Assoc.)**

MINERAL PROCESSING AND TRANSFORMATION

To position Canada, the provinces and territories as secure and responsible sources of supply and build resilient global value chains:

- Review of critical and strategic minerals **(Que.)**
- The Canada–U.S. Joint Action Plan on Critical Minerals Collaboration **(Can.)**
- Study on Canada's base metals smelting and refining in Canada **(Can.)**

REGULATIONS

To give companies and investors certainty and clarity, and ensure that good projects can move forward in a timely manner:

- Improving the development assessment process **(Y.T.)**
- Increasing support for regulatory excellence **(B.C.)**
- Reduced red tape and modernized regulatory and policy framework **(Man.)**
- Mineral Economic Development Fund **(Man.)**
- Rights Coordination Office **(Que.)**
- Modernizing the *Mineral Act* and *Mining Act* **(N.L.)**
- Harmonized and modernized regulations for regulatory cooperation priorities; implementation of the *Impact Assessment Act* **(Can.)**
- Climate-related Financial Disclosures to provide more information for investors, communities and stakeholders **(Can.)**

INFRASTRUCTURE

To strengthen communities and enable mining-related activities and regional development:

- Yukon Resource Gateway Project **(Y.T.)**
- Yukon Mining Alliance **(Y.T.)**
- Invest Canada North forum **(Can., Y.T., N.W.T., Nvt.)**
- The Look North campaign **(Man.)**
- Program for multi-resource roads in the mining sector from the Société du Plan Nord **(Que.)**
- All-season road connecting western Nvt. and a mineral rich area in N.W.T. **(Can., N.W.T.)**
- Investing in Canada Plan for hydroelectricity to a mining operation in Western Labrador and the Taltson Hydroelectric Project in N.W.T. **(Can.)**
- MAC's research on the infrastructure deficit in remote and northern regions **(Assoc.)**

OTHER

- Mining the Future 2030 mineral strategy **(N.L.)**
- Extending the Polar Continental Shelf Program **(Can.)**
- In-depth diagnostic and forward-looking analysis on Canada's minerals and metals sector **(Can.)**
- Task Force on the Canadian Minerals and Metals Plan and Critical Minerals with members from the Mining Association of Canada **(Assoc., Can.)**
- PDAC Convention **(Assoc.)**



ADVANCING THE PARTICIPATION OF INDIGENOUS PEOPLES

Indigenous Peoples play an integral role in mining in Canada, with more than 16,500 employed in the minerals sector. The majority of these jobs are in the upstream mining industry—where Indigenous Peoples account for 12% of the labour force—making it the second-largest private sector employer of Indigenous Peoples on a participation basis. The number and proportion of Indigenous Peoples involved in the industry have grown by approximately 50% since 2011.¹⁰

The mining industry is key to economic reconciliation. Exploration and mining are often the only economic drivers in remote Indigenous communities. They generate jobs and wealth that can improve health outcomes, open up new possibilities for entrepreneurship, and contribute to hope for a young and fast growing population. Indigenous participation in mining is largely driven through agreements with companies that have helped secure benefits for communities and improved certainty for exploration and mining firms. As at 2018, more than 420 active agreements between companies and communities are in place.¹¹ They typically support training, skills development, funding arrangements and other elements that contribute to socio-economic growth.

Developments in the industry and the imperative of building public trust around natural resource projects presents challenges and opportunities for increased participation by Indigenous Peoples. The digitalization of operations coupled with the need to fill tens of thousands of positions in the coming years means Indigenous workers will require increasingly technical and science-based skills to secure positions beyond those at the entry-level. At the same time, communities and companies are entering into agreements covering a broader range of opportunities for Indigenous Peoples, which has the potential to deliver longer lasting economic benefits.

¹⁰ Natural Resources Canada, 2020.

¹¹ Ibid.

¹² *Partnerships in Procurement: Aboriginal Businesses Operating in Canada's Mining Sector*, Max Skudra, Jeff Geipel, Canada Mining Journal, 2020.

Procurement is one example. With more than 600 Indigenous communities located within a 100 kilometre radius of a major minerals and metals project, Indigenous businesses are uniquely situated to provide goods and services to the industry. In fact, more than 200 Indigenous businesses supply the extractive industry in Canada today.¹² For mining, this means areas including engineering, drilling and blasting, transportation, security, catering and remediation. More can be done to further translate the knowledge and expertise that resides in Indigenous communities into procurement opportunities. This will support business development and improve the certainty and prospects for success of projects.

To unlock this potential, companies need to engage at the earliest possible stage to allow Indigenous businesses to mature in lockstep with projects. As projects advance through the mineral development cycle, businesses build capacity, networks and sophistication, and are better prepared to secure contracts and grow their client-base beyond the mining industry. Building capacity among companies and communities, establishing stronger governance structures for agreements, sharing best practices and mapping the procurement landscape would help Indigenous businesses strategically plan to capitalize on opportunities.

NOTE — The perspectives of Indigenous Peoples are meant to be represented throughout the Canadian Minerals and Metals Plan. This section acknowledges a unique role for Indigenous Peoples as set out by Section 35 in the Canadian Constitution that affirms existing Aboriginal and treaty rights.





PAN-CANADIAN INITIATIVE: Indigenous Procurement Conferences

ASSOCIATED TARGETS:

BY 2020

A checklist to increase local procurement in the minerals and metals industry is available (under *Communities in the C MMP*)

BY 2021

Increased Indigenous procurement and business activity

WHAT:

Convene **conferences on Indigenous procurement** in mining across Canada, in partnership with Indigenous business leaders and organizations and provinces and territories. Individual conferences will be tailored to reflect the expertise, priorities and realities of mineral development in each host region.

These conferences will aim to increase economic opportunities for Indigenous Peoples and communities, and support Indigenous and local business development by equipping them with the expertise to secure contracts and enter into various agreements. They will facilitate mutually beneficial conversations with industry and other stakeholders and provide information

to support Indigenous business development and entrepreneurship.

Following the conferences, a **compendium of best practices, success stories and case studies** will be published.

WHY:

Fostering the relationship between industry and Indigenous businesses through procurement supports sustainable mineral development and community benefits. It allows Indigenous Peoples to capitalize on economic opportunities happening in or near their communities, and is a pathway to developing long-lasting benefits. For example, companies developed to support local activity can take the expertise they have cultivated and sell it to other clients—be they mining companies or those in different sectors.

Industry working in those communities benefit from shortened supply chains and knowledge and experience that local Indigenous businesses and suppliers can deliver. Sourcing locally also improves employee retention and reduces the costs associated with hiring and transporting of goods and services from other regions, especially for remote areas.

HOW:





CURRENT INITIATIVES BY FEDERAL, PROVINCIAL / TERRITORIAL GOVERNMENTS AND ASSOCIATIONS

MEANINGFUL ENGAGEMENT

To advance opportunities for meaningful engagement on potential projects at the earliest possible stage and in a culturally-aware manner:

- Mineral Development Strategy **(N.W.T., Y.T.)**
- A mining memorandum of understanding with First Nations **(Y.T.)**
- Collaboration with Yukon First Nations on procurement policy **(Y.T.)**
- Community Engagement Support Program **(Nvt.)**
- Manitoba-First Nations Mineral Development Protocol **(Man.)**
- Native Community Consultation Policy Specific to the Mining Sector **(Que.)**
- A mining consultation table and a consultation matrix with the Mi'kmaq (Kwilmu'kw Maw-klusuaqn Negotiation Office) **(N.S.)**
- Capacity to conduct meaningful consultations with Indigenous communities to support economic participation in natural resource sectors **(Can.)**
- MAC's Towards Sustainable Mining (TSM) Indigenous and Community Relationships Protocol **(Assoc.)**
- Mining Industry Human Resources Council's (MiHR) Mining Essentials Program, including for Indigenous youth **(Assoc.)**
- Industry-led skills development standard and training program addressing recommendations in the Truth and Reconciliation Commission report **(Assoc.)**

ECONOMIC BENEFITS

To enable Indigenous Peoples and communities to realize long-term social-economic benefits that support communities and sustainable mineral development projects:

- Socio-economic agreements **(N.W.T.)**
- The Nunavummi Nangminiqqtunik Ikajuuti Inuit Firm Registry **(Nvt.)**
- Alberta Indigenous Opportunities Corporation **(Alta.)**
- Northern Procurement Provisions Within Surface Lease Agreements in Northern Saskatchewan **(Sask.)**
- Promotional opportunities through the Business Development Office of the Société du Plan Nord **(Que.)**
- Futurpreneur Canada funding to support Indigenous entrepreneurs **(Can.)**
- Development of a new national benefits-sharing framework for major resource projects on Indigenous territory **(Can.)**

CAPACITY BUILDING

To enhance resources for capacity building to support Indigenous Peoples' participation in the mining industry:

- Regional Indigenous mineral development strategies **(N.W.T.)**
- Work Readiness Training Program **(Nvt.)**
- Alberta Indigenous Opportunities Corporation **(Alta.)**
- Partnership with Northlands College and University of Saskatchewan for geology students to complete their first year in Northern Saskatchewan **(Sask.)**
- Assistance program for Indigenous mineral exploration funds **(Que.)**
- Customized mining training programs for Indigenous candidates at N.B. Community Colleges **(N.B.)**
- Procurement Strategy for Aboriginal Business **(Can.)**
- Communities Opportunity Readiness Program and a Skills and Partnership Fund **(Can.)**
- Indigenous gender-based analysis **(Can.)**
- A First Nations Centre of Excellence in Mining with Waubetek Business Development Corp. **(Can.)**
- A Mineral Sector Certification to train Aboriginal Economic Development Officers in partnership with the Council for the Advancement of Native Development Officers **(Can.)**
- MiHR's work with Employment and Skills Development Canada's on the Student Work Placement Program **(Assoc., Can.)**
- MiHR's work with Employment and Skills Development Canada's on the Sectoral Initiatives Program **(Assoc., Can.)**
- PDAC's Capacity-Building Funding Tool for Indigenous communities **(Assoc.)**

Additional details can be found in Annex C.



THE ENVIRONMENT

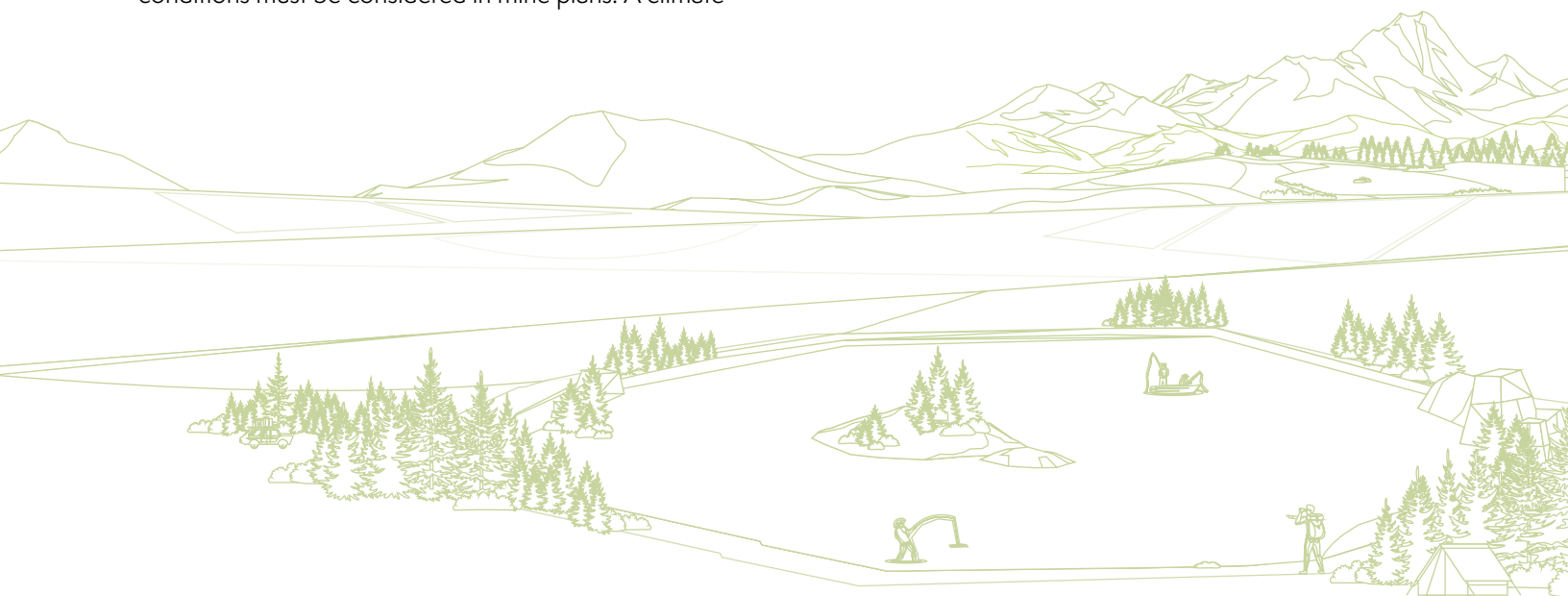
In Canada, and increasingly around the world, sustainability is at the front and centre of mining-related projects. Canadians expect that exploration, mining, processing and related activities include measures to minimize and mitigate environmental impacts. They also expect that lands once used for mining be restored to a more natural state or to a site that can be used for alternate activities. Canada's success is underscored by its strong reputation—across all stages of the mineral development cycle—in meeting stringent environmental performance goals, community expectations and market demand for sustainably-produced goods.

Climate change affects all stages of the mineral development cycle, including exploration, development, extraction, processing, and closure and reclamation activities. While the exact nature of these impacts are location-specific and dependent on regional characteristics and ecosystems, changes in average temperature, precipitation, sea level, and occurrence of extreme events may affect the business and environmental performance of the industry. For example, in the North, the reliability and capacity of critical winter ice roads will be reduced and current and future permafrost conditions must be considered in mine plans. A climate

resilient mining sector should address risks related to infrastructure, transportation systems and water supply, as well as disruptions to supply chains and global markets.

Since 2002, federal, provincial and territorial governments, industry and civil society have worked together to address challenges related to **orphaned or abandoned mines (OAMs)**. These are sites where the owner either cannot be found, or is financially unable or unwilling to remediate. These sites pose environmental, health, safety and economic problems. Given the long-term nature of mine closure, this phase in the mineral development cycle is particularly exposed to the impacts of climate change.

Building public trust and promoting a responsible, competitive industry requires Canada to address OAM problems. These include: integrating climate-related considerations in their management; developing innovative guidelines, practices and technologies to, among other things, extract value from historic mine waste; improving financial assurance measures for new mines; and considering approaches to assess the risks and liabilities for OAM sites to help bring them into environmental compliance.





PAN-CANADIAN INITIATIVE: Re-imagined National Orphaned or Abandoned Mines Initiative (NOAMI)

ASSOCIATED TARGET:

BY 2020

An expanded mandate for NOAMI

Note: A two-day workshop with the current NOAMI membership and other public and private stakeholders will further inform this pan-Canadian initiative.

WHAT:

NOAMI is a national multi-stakeholder committee established in 2002 to address issues related to OAM sites in Canada (for which respective mining jurisdictions have ultimate responsibility). New and emerging issues regarding mine reclamation and closure warrants re-consideration of its mandate.

WHY:

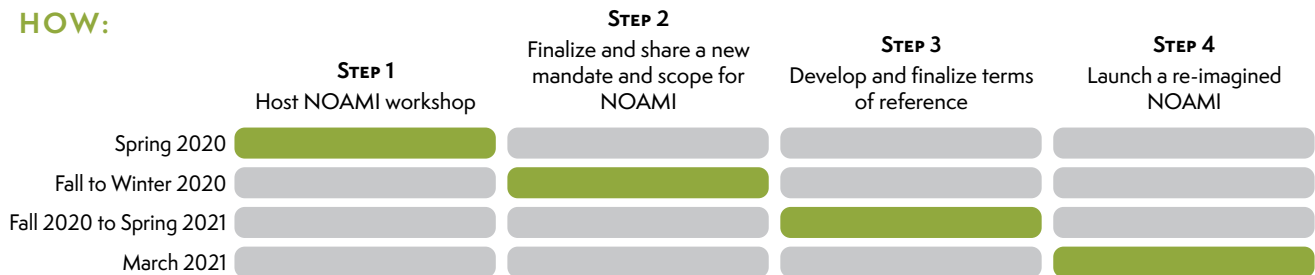
NOAMI successfully met its original objectives, including: building a national inventory of OAM sites; engaging communities; identifying funding models, ownership and

liability issues; and identifying areas where research could help jurisdictions advance remediation and prevent new occurrences.

Challenges related to remediation of OAM sites across Canada persist. The effects of changing climatic conditions on OAM sites are largely unknown and add an element of complexity to their management. A renewed NOAMI would further consider climate-related risks and focus on:

- Options for remediating legacy mines
- Planning for closure and preventing future OAM sites
- Improving financial assurances at new mines
- Tailings dams
- Relinquishment
- Legislation, regulation and/or guidelines, including risk assessments and public reporting
- Enabling innovative practices and technologies and
- Options to recover value from mine waste and offset reclamation costs

HOW:





CURRENT INITIATIVES BY FEDERAL, PROVINCIAL / TERRITORIAL GOVERNMENTS AND ASSOCIATIONS

RECLAIMING MINE SITES AND CLIMATE CHANGE ADAPTATION

To address environmental and other concerns arising from orphaned or abandoned mines:

- Assessment and reclamation of mines **(All governments)**
- Allow companies to release land back to Crown through the Institutional Control Program **(Sask.)**
- Agreements to clean up abandoned sites in Northern Quebec **(Que.)**
- Dam Safety Program to address deficiencies at OAM sites **(N.L.)**
- Create the Northern Abandoned Mine Reclamation Program **(Can.)**
- Remediate eight highest-risk abandoned mine sites in the Y.T. and the N.W.T. **(Can.)**
- Assess climate-change risks and review rehabilitation plans for OAM sites; identify how rehabilitation plans could integrate adaptation measures **(Can.)**
- National climate change adaption guidance and sustainable financing standard, being developed by MAC with the financial industry and the Canadian Standard Association **(Can., Assoc.)**
- MAC's updated TSM Energy Use and GHG Emissions Management Protocol **(Assoc.)**
- MAC's Tailings Management Protocol and TSM Biodiversity Conservation Protocol **(Assoc.)**

ALTERNATIVE AND RENEWABLE ENERGY

To accelerate efforts to develop and adopt clean energy sources, particularly for northern, remote and isolated communities that rely on diesel:

- R&D for a more energy efficient process to extract copper **(Can., B.C.)**
- Expand Nunavik's first centre for producing and storing renewable energy **(Can.)**
- R&D for carbon neutral mining at Gahcho Kué Mine **(Can.)**
- Reduce energy consumption and costs for mechanical compressors at Holloway Mine in Kirkland Lake **(Can.)**
- Research on hydrogen technology adoption **(Can.)**
- Achieve zero-footprint mining **(Can.)**

CIRCULAR ECONOMY

To support sustainability, keep resources in circulation and minimize discards:

- Clean Resources Innovation Network's "Low Emissions Value Added Products" **(Alta.)**
- Mining Value from Waste's Inventory of Mine Waste Products and Reprocessing Technologies **(Can.)**
- Preliminary Canadian Resource Recovery Report Card and Gaps Assessment **(Can.)**
- The World Circular Economy Forum hosted by Canada in fall 2020 **(Can.)**
- MAC member (Teck Resources) using electric buses for employees and solar farms to power operations **(Assoc.)**

CLIMATE CHANGE ADAPTATION

To encourage industry to plan for and adopt measures to adapt to climate change:

- Climate Change, Energy, and Green Economy Strategy **(Y.T.)**
- Guidance for assessing and managing climate change risks throughout the mine lifecycle in a northern climate **(Y.T., Can.)**

SMALL MODULAR REACTORS (SMRs)

To study the feasibility of SMRs in mining operations, as well as the potential market for this technology:

- Commitment for nuclear research **(N.B.)**
- Memorandum of Understanding between N.B., Ont., and Sask. to develop SMRs **(Ont., N.B., Sask.)**
- Studies on SMR deployment for natural resource sectors **(Can., Ont., Sask.)**
- Conference presence and workshops to strengthen links between the mining and nuclear sectors in collaboration with Canadian mining associations **(Can., Ont., Sask.)**
- Canadian Small Modular Reactor Roadmap **(Industry, N.W.T., Nvt., Alta., Sask., N.B., Can.)**
- Atomic Energy of Canada Ltd. support for the development and deployment of SMR technology at remote locations **(Can.)**



SCIENCE, TECHNOLOGY AND INNOVATION

Applying and encouraging leading science, technology and innovation are critical to the competitiveness of Canada's minerals industry. Continual advances are needed to: outline new mineral potential; expand Canada's mineral resources and ore reserves; and reduce the time between discovery and mining, mineral processing and other downstream value-added activities. Advances are also needed to research, develop and prove technologies and processes to support a productive, clean and sustainable industry capable of meeting the needs of a modern economy.

The vision for the **mine of the future** is one that produces zero waste. It will require that industry, communities and governments work together to ensure projects have the technologies, processes and regulations to enable that vision, while increasing socio-economic benefits. Leveraging the pan-Canadian Geoscience Strategy to develop next generation geoscience knowledge and tools to efficiently target higher-grade or deeper deposits should be a focus. Electrifying operations and using clean energy at mine sites, harnessing the potential

of new technology, data and AI, and creating more value in Canada for products and services that can be exported are other key elements.

Technology advances alone are not enough to establish Canada as the global leader for developing the mine of the future. Governments play a key role in ensuring the availability of a highly skilled workforce, promoting innovation, facilitating the adoption of clean technologies and sustainable practices, and delivering agile and effective regulations.

Governments can also work with stakeholders to improve our **mining innovation ecosystem**¹³ to transform Canada into a global leader in the development, adoption and export of innovative technologies and processes. Increased investment and improved coordination are crucial to ensure the ecosystem can efficiently and effectively respond to challenges and enable the adoption of transformative and green technologies at all stages of the mining cycle.

¹³ **An innovation ecosystem** is set for the co-creation of value. It is composed of interconnected and interdependent actors, which includes a focal firm, customers, suppliers, complementary innovators and regulators. Members face cooperation and competition in the innovation ecosystem. **Source:** *Unpacking the innovation ecosystem construct: Evolution, gaps and trends*, Leonardo Augusto de Vasconcelos Gomes, Ana Lucia Figueiredo Facin, Mario Sergio Salerno, Rodrigo Kazuo Ikenami, Technological Forecasting and Social Change, 2018.

PAN-CANADIAN INITIATIVE: Innovation Challenges

ASSOCIATED TARGETS:

BY 2022

Incentives to tackle large innovation challenges

BY 2025

Significant gains in the commercialization of mining-related technologies and processes

WHAT:

Innovation challenges to leverage the nature of competition, inspire creative thinking, focus research and development, and result in meaningful efficiency gains using new and emerging technologies in the mining sector.

For example, the challenges could focus on water treatment, critical minerals, mining value from waste, tailings treatment and Indigenous knowledge.

WHY:

Innovation challenges are an opportunity to help overcome barriers to innovation, such as:

- Diverse needs that impede the identification of R&D sector-wide goals
- High upfront capital costs
- Risk aversion in the implementation of unproven technologies

By setting ambitious but achievable goals, this approach can lead to breakthrough solutions, including new disruptive technologies that create new market

pathways, alternative business models that generate better outcomes, and capacity building activities that accelerate the rate of adoption.

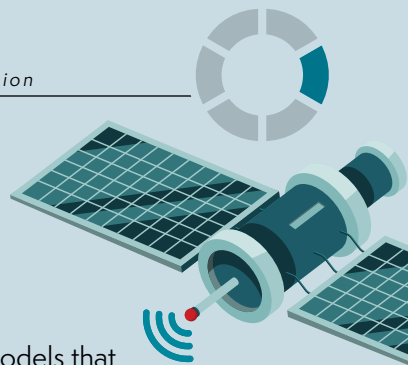
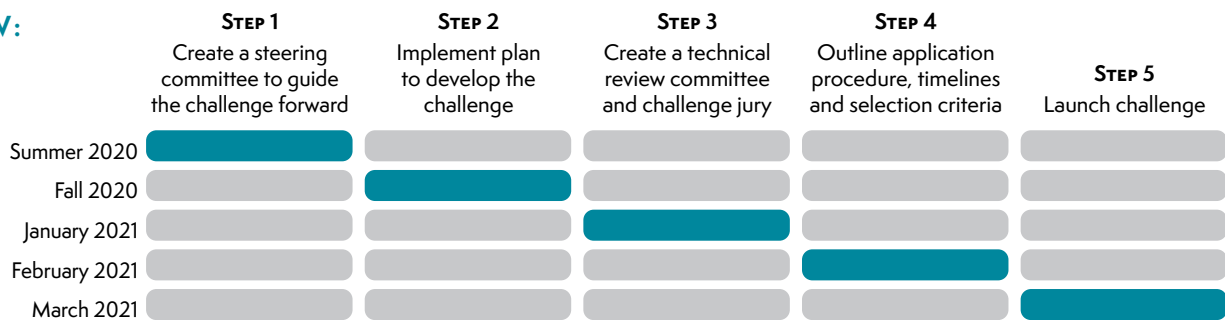
Example: Zero Fresh Water Challenge

Where water is a shared resource, the use of fresh water and contaminated liquid discharge are major concerns for companies and communities. High volumes of fresh water are employed in extraction, processing, and transport, and water is the primary storage vehicle for mine waste. Before water used in mining or processing is returned to the environment, it must be treated to meet regulatory requirements. By decreasing fresh water intake and minimizing the release of contaminants, Canada can lower operating costs, improve the environmental performance of mines, and reduce the impact of operations on local water resources and aquatic habitats. This challenge could advance research, development and demonstration of technologies to treat, recycle and reuse water, while reducing waste in the processing phase.

Example: Critical Minerals Challenge

Canada is a secure, reliable, and sustainable source of critical minerals that are essential to the global transition to a low carbon and digitalized economy. To accelerate the development of critical mineral value chains and downstream processes and technologies, challenges related to mining, processing and transformation processes, as well as battery innovation, could be issued. Such challenges would help reduce technical barriers to establishing value chains and clusters and position Canada as a key supplier of products for an evolving economy.

HOW:





CURRENT INITIATIVES BY FEDERAL, PROVINCIAL / TERRITORIAL GOVERNMENTS AND ASSOCIATIONS



CANADA'S INNOVATION ECOSYSTEM

To ensure Canada's mining innovation ecosystem meets major innovation challenges across all phases of the mineral development cycle:

- The Centre for Northern Innovation and Mining **(Y.T.)**
- Mining Innovation Roadmap **(B.C.)**
- Joint academic/industry research for innovation for sustainable mineral development **(Que.)**
- Mining Research and Innovation Support Program **(Que.)**
- \$10-million Crush It! Challenge; \$4.5-million Charging the Future Challenge **(Can.)**
- Investments in Canada's first all battery electric underground mine at Borden Mine **(Can.)**
- Centre for Regulatory Innovation **(Can.)**
- The Government-Industry Mining Innovation Steering Committee **(Can.)**

NEW FRONTIERS

To advance Canada's approach to mining new frontiers (e.g., extreme climates, deep mining, offshore, space) and create opportunities to drive innovation:

- A "Moon and asteroids: The next exploration and mining frontier" panel on the margins of the PDAC 2020 **(Can.)**
- Co-host a Planetary and Terrestrial Mining Sciences Symposium with Deltion Innovations in June 2020 **(Can.)**
- Develop national and international networks to further research, policy, science and innovation for mining at depth **(Can.)**

ADOPTING TECHNOLOGY AND INNOVATIVE PRACTICES

To accelerate the research, development and deployment of technologies to boost industry competitiveness:

- Project that digitizes provincial core samples to new advanced data at College of the North Atlantic and Memorial University **(N.L., Can.)**
- Test and validate more efficient mining operations at Royal Institution for Advancement of Learning at McGill University **(Can.)**
- Support FVT Research to design, develop and test a battery-electric vehicle for underground mining activities **(Can.)**
- Support to the Mining Innovation, Rehabilitation & Applied Research Corporation (MIRARCO) to develop "Natural Heat Exchange Engineering Technology" to improve air delivery in deep underground mines **(Can.)**
- MiHR's research on the impact of new technology and innovation on the mining labour market **(Assoc.)**

MINING INFRASTRUCTURE SECURITY AND RESILIENCE

To protect against the risks and vulnerabilities introduced by new and emerging technologies and processes:

- The Minerals and Metals Sector Network **(Can.)**
- Canadian Resources Infrastructure Resilience Nexus **(Can.)**
- Share security information, analysis and advice with industry stakeholders **(Can.)**

Additional details can be found in Annex E.



COMMUNITIES

Mining-related activities have a significant presence in all Canadian communities—be they large urban centres or remote communities. Meeting the demands for more clean technology applications, high tech electronics and other products and services that are essential to the day-to-day lives of Canadians will require greater awareness and understanding about mining. Increased **mineral literacy** can facilitate community support and readiness for exploration and mining projects, attract talent for mining-related jobs and attract investment.

The success of mining projects largely depends on ensuring that communities can participate in the mineral development cycle, from pre-exploration to post-mine closure. Supporting communities with the knowledge and educational tools to make informed decisions and to prepare for mining-related activities is critical. Fostering a balanced relationship between communities and companies that builds trust mitigates risks to industry associated with costs, project certainty and reputation.

The sustainability and growth of Canada's minerals sector depends on its ability to attract and retain skilled and diverse workers for the digital mines of the future. Today, the Canadian mining sector is facing several human resource and diversity challenges. Workers in the natural resource sector are increasingly older, younger workers tend to seek opportunities elsewhere, and women and visible minorities are underrepresented.

Mineral literacy is also key to attracting talent for mining-related jobs. Up to 135,000 workers will need to be hired over the next decade.¹⁴ An aging workforce dominates current mining operations and gaps exist in key occupational categories, such as trades and production, technicians and technologists, and supervisory and managerial positions. In the last three years, enrolment in undergraduate mining engineering programs dipped by 12%, the largest decrease compared to all other engineering programs.¹⁵

Many Indigenous communities are situated near mineral deposits where exploration and mining take place. As Canada's fastest growing demographic, Indigenous youth has the potential to help fill this labour gap.¹⁶

¹⁴ *Canadian Mining Labour Market Outlook 2019*, Mining Industry Human Resources Council, 2019.

¹⁵ *Ibid.*

¹⁶ Statistics Canada, 2016 and 2006 Census.





PAN-CANADIAN INITIATIVE: Improve Mineral Literacy

ASSOCIATED TARGETS:

BY 2025

Education-based initiatives to help attract and retain highly qualified personnel and develop a pipeline of future talent

BY 2030

Canada’s mining workforce is more diverse and includes 30% women

WHAT:

A **pan-Canadian mineral literacy hub** will provide a centralized point of access for new and existing resources on Canada’s mining sector, and host the **Canadians of Mining** campaign. The hub will facilitate knowledge sharing across jurisdictions, publicize traditional Indigenous knowledge, and link academic and professional programs that lead to careers in the mining industry. Social media platforms, such as LinkedIn, Instagram, YouTube, Twitter and Facebook will also be used to broadcast this campaign across the country.

The **Canadians of Mining** campaign will present portraits and personal testimonies of individuals involved in the industry (directly or indirectly) from

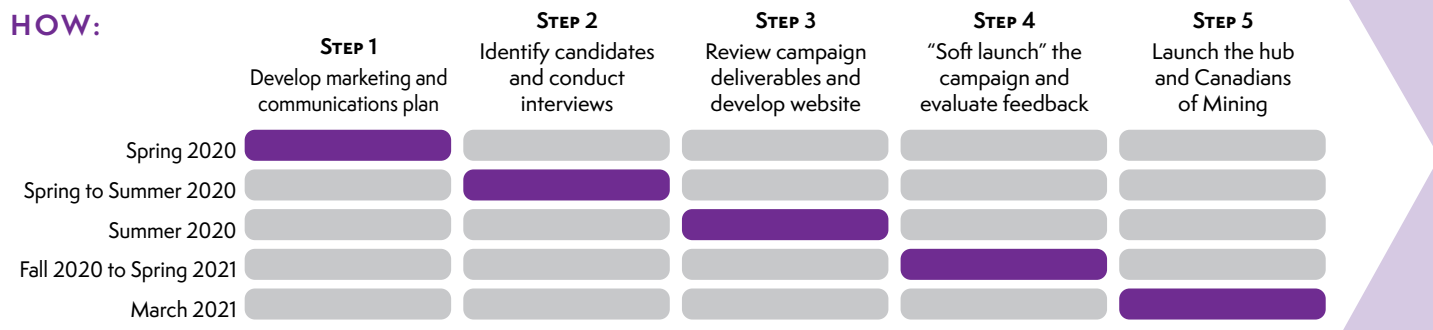
across the country.¹⁷ To reach an audience beyond those already involved in the sector, the campaign will highlight the diversity of careers available—such as those in the high tech and innovation spaces—and encourage more women, Indigenous Peoples and visible minorities to join the mining workforce. It will also dispel commonly held misconceptions, and increase awareness of the socio-economic benefits of mining.

WHY:

Research shows that Canadians across the country believe that mining is good for the economy and provides opportunities for remote communities and young Canadians.¹⁸ However, there is a knowledge gap regarding the critical role that minerals and metals play in our everyday lives, and the diversity of careers available across the sector.

Maintaining an open dialogue among mining companies and post-secondary educational institutions will be critical to meeting labour market demands and ensuring growth in the sector. By showcasing mining as a high-tech industry that is key to a clean, global economy, the campaign aims to connect with individuals in science, technology, engineering and mathematics (STEM) fields and encourage them to consider pursuing a career in mining.

HOW:



¹⁷ Based on Brandon Stanton’s viral *Humans of New York* campaign on Instagram.

¹⁸ *Perceptions of Mining in Canada*, Bruce Anderson, Abacus Data, 2016.



CURRENT INITIATIVES BY FEDERAL, PROVINCIAL / TERRITORIAL GOVERNMENTS AND ASSOCIATIONS

HUMAN RESOURCES

To address structural human resources challenges and increase the diversity of the mining labour force to include more Indigenous Peoples, women and immigrants:

- Support for Women in Mining **(Y.T., Sask., Man.)**
- Mine Training Society partnership **(N.W.T.)**
- Mines Training Strategy **(Nvt.)**
- Mining Jobs Task Force **(B.C.)**
- Customized mining training programs at New Brunswick Community College **(N.B.)**
- Labrador Aboriginal Training Partnership **(N.L., Can.)**
- MiHR's Gender Equity in Mining Works **(Can., Assoc.)**
- MiHR's Mining Career Awareness Strategy **(Can., Assoc.)**
- PDAC's Gender and Diversity Inclusion: A Guide for Explorers **(Assoc.)**

COMMUNITY READINESS

To incorporate planning and engagement with communities at the early stages of project development:

- Ministerial Guidelines on Social Acceptability **(Que.)**

MINERAL LITERACY

To highlight Canada's sustainable, high-technology minerals industry, build community support for sustainable projects and showcase mining as an excellent career choice:

- Resources and Energy Development Information Program **(N.W.T.)**
- Prospector training courses **(Nvt., N.B., N.L.)**
- Hackathons on mining issues in partnership with MiHR and stakeholders to engage post-secondary students **(Can.)**
- Educational campaigns including "Minerals of Mining," infographics with Visual Capitalist, expert interviews with TheFutureEconomy.ca and workshops for youth and teachers in remote communities with Mining Matters **(Can.)**
- Study on community perceptions of mining-related activities in Canada **(Can.)**
- Science North and the Canadian Institute of Mining, Metallurgy and Petroleum's "Our Earth's Riches," exhibit to showcase a high-tech industry and its contribution to society **(Assoc.)**
- MAC's "Facts and Figures," "30 Things" and other publications to build mineral literacy **(Assoc.)**

Additional details can be found in Annex F.



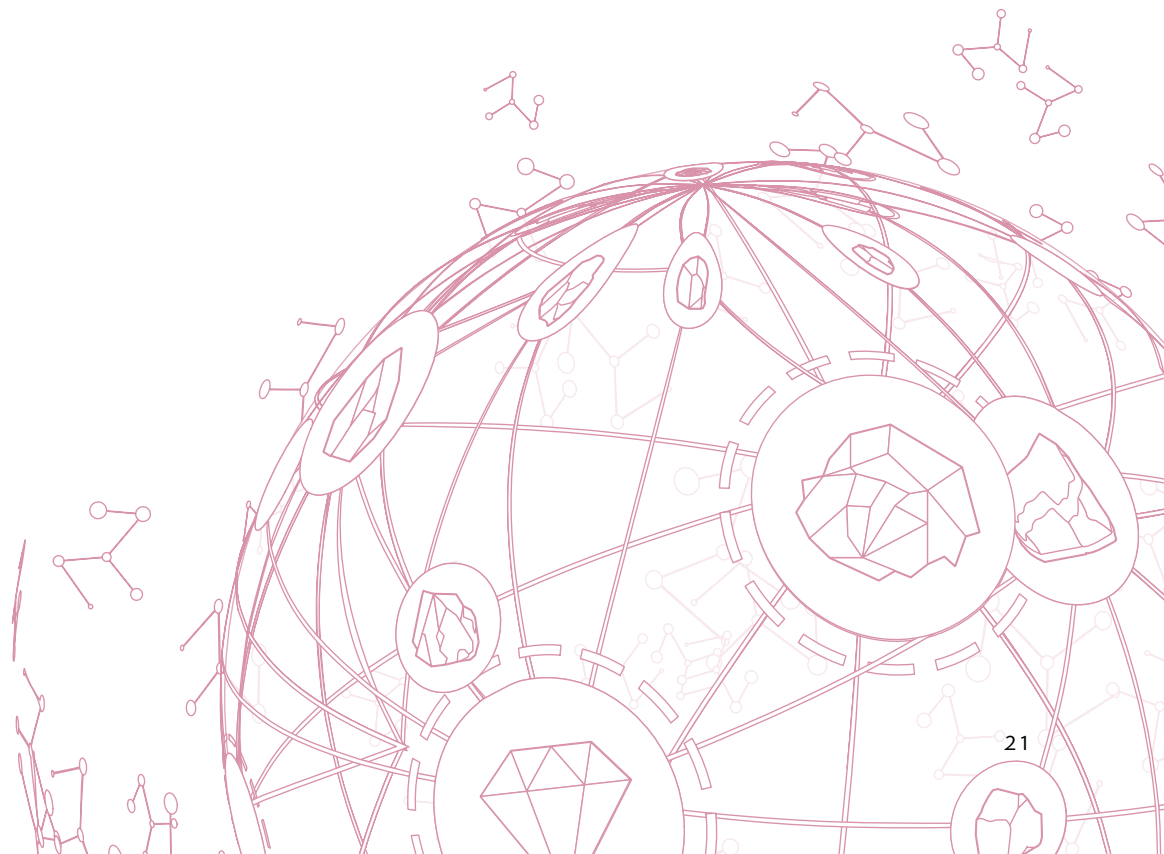
GLOBAL LEADERSHIP

Canada's reputation for good governance and sustainable mineral development practices is a competitive advantage for the sector. Other countries look to Canada and Canadian companies for the way we build relationships with Indigenous Peoples, build partnerships with communities, and protect the environment. The way our explorers, project developers, mine operators and mining supply and services (MSS) companies work and interact with communities gives us the competitive edge to enter markets and to develop projects. Other benefits include our industry's specialized knowledge in underground mining, operating in harsh climates, automation and other areas.

Globally, consumers are becoming increasingly aware of the interrelationship between the supply chains for minerals and metals and the products they consume. Major international corporations are establishing supply chain transparency standards that suppliers must meet if they want to access global markets. Responsible sourcing requires that Canadian exports—including products and services from Canadian companies operating abroad—adhere to best-in-class environmental, social and labour standards.

To grow our reputation as a global leader, Canada needs to communicate our domestic and international efforts in responsible business conduct and sustainable mining. This includes presenting our value proposition to investors in an organized and compelling manner and building on our success as a model of good governance and transparency.

The need to define and champion a **Canada Brand for Mining** is a theme that emerged through the CMMP's cross-country engagement. A unified, leading national brand would bolster Canada's standing as an exploration and mining power, increase foreign direct investment in Canada's minerals sector, and promote the unparalleled strengths of the world's most innovative MSS industry.





PAN-CANADIAN INITIATIVE: Canada Brand for Mining

ASSOCIATED TARGET:

BY 2020

Canada’s minerals and metals brand is unveiled

WHAT:

A Canada Brand for Mining will drive home the advantages of investing in and exporting from Canada and demonstrate the benefits of Canadian minerals and metals, in one clear, strong and unified voice.

A sophisticated brand strategy will enhance Canada’s reputation, improve the sector’s competitiveness, grow exports and attract foreign direct investment. This comprehensive approach will also:

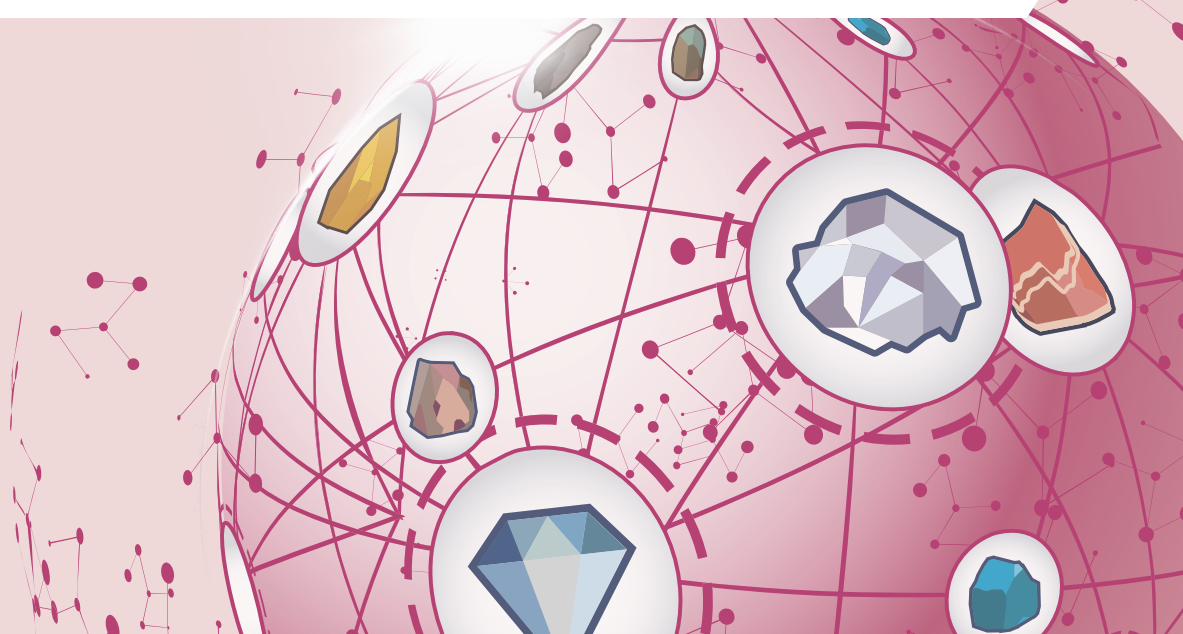
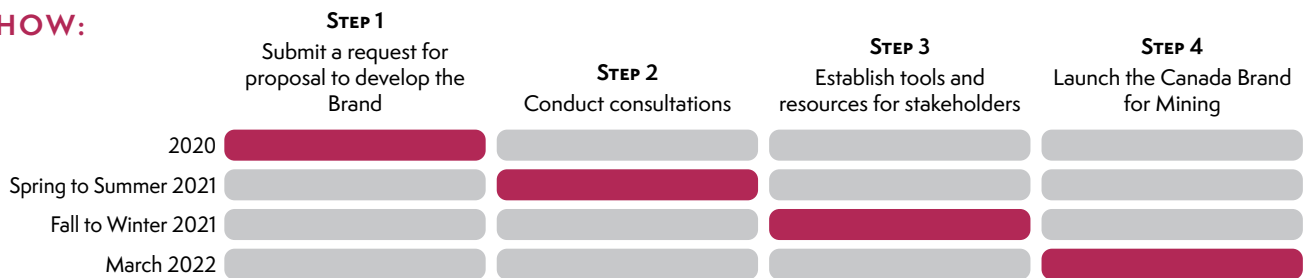
1. Support the advanced manufacturing industries
2. Increase MSS sector exports
3. Provide stakeholders and partners with a suite of tools and resources to leverage the brand

WHY:

A strong, coordinated brand will send a consistent message to global audiences that advances the sector’s interests. This unified approach will reinforce Canada’s strengths as a leading mining nation and support shared goals to attract investment, promote exports, and secure community support for projects.

Responsibility and sustainability lie at the heart of a competitive mining industry. A clear Canada Brand for Mining would consistently communicate these Canadian advantages. It would also reflect regional ingenuity and be flexible to apply to domestic and international audiences. The brand would serve as a vital instrument to share the sector’s strengths and translate it into more benefits for Canadians. This will support Canada’s socio-economic development, while maintaining and expanding Canada’s place as a global leader in mining and mineral exploration.

HOW:





CURRENT INITIATIVES BY FEDERAL, PROVINCIAL / TERRITORIAL GOVERNMENTS AND ASSOCIATIONS

INCREASING MINERALS TRADE AND INVESTMENT

To support sector-wide minerals trade and investment and increase the impact of promotional efforts:

- Invest Canada North forum **(Can., Y.T., N.W.T., Nvt.)**
- Alberta Export Expansion Program **(Alta.)**
- Invest in Canada's Foreign Direct Investment Interdepartmental Network **(Can.)**
- CanExport Program to provide companies with support to reach international markets **(Can.)**
- Trade Diversification Strategy to secure more opportunities for Canadian exporters and investors **(Can.)**
- Investments in Canada's Trade Commissioner Service **(Can.)**

RESPONSIBLE BUSINESS CONDUCT

To advance responsible business conduct and export Canada's values abroad:

- A Canadian Ombudsperson for Responsible Enterprise **(Can.)**
- PDAC's e3 Plus: A Framework For Responsible Exploration **(Assoc.)**
- MAC's TSM to help mining companies do business in a socially, economically and environmentally sustainable way **(Assoc.)**
- MiHR, Colleges and Institutes Canada and College Boreal's work with Pacific Alliance Education for Employment Program for sustainable development and skills for employment in the extractive sector **(Assoc.)**

SUPPORTING THE SUCCESS OF THE MSS SECTOR

To further promote innovative Canadian companies and their global solutions:

- Study on Canadian mining supply and services **(Can.)**
- Dedicated resources to support Canadian clean technology solutions for mining **(Can.)**

OTHER

- Memorandum of Understanding on the Sustainable Development of Natural Resources with Argentina **(Can.)**
- Memorandum of Understanding on the Sustainable Development of Natural Resources with Chile **(Can.)**
- Memorandum of Understanding on the Sustainable Development of Natural Resources with Mexico **(Can.)**
- PDAC Convention **(Assoc.)**

Additional details can be found in Annex G.



ANNEX A: MANDATE TO DEVELOP THE CANADIAN MINERALS AND METALS PLAN

In August 2017, Canada's federal, provincial and territorial Ministers responsible for mining called for a Canadian Minerals and Metals Plan to support industry competitiveness, solidify Canada's position as a global mining leader, and lay the foundation for lasting success at home and abroad.

On March 3, 2019, federal, provincial and territorial Ministers responsible for mining, along with industry and Indigenous business representatives, launched the Plan at the PDAC Convention.

The CMMP is a visionary and unifying plan that is the result of close collaboration between federal, provincial and territorial governments, and was informed by extensive engagement with Indigenous peoples, innovation experts, private companies, industry

associations, non-governmental organizations, academia and youth. This includes **146** in-person engagement activities (e.g., stakeholder workshops/expert meetings, bilateral meetings, presentations and expert report submissions) and **2,070** online activities (e.g., quizzes, surveys, and ideas submitted through social media).

The Energy and Mines Ministers' Conference is an annual gathering of federal, provincial and territorial Ministers responsible for energy and mining portfolios. At these meetings, Ministers discuss shared priorities for collaborative action to advance energy and mining development across the country. Ministers may choose to use the Conference to review the Plan's progress and consider additional actions.



