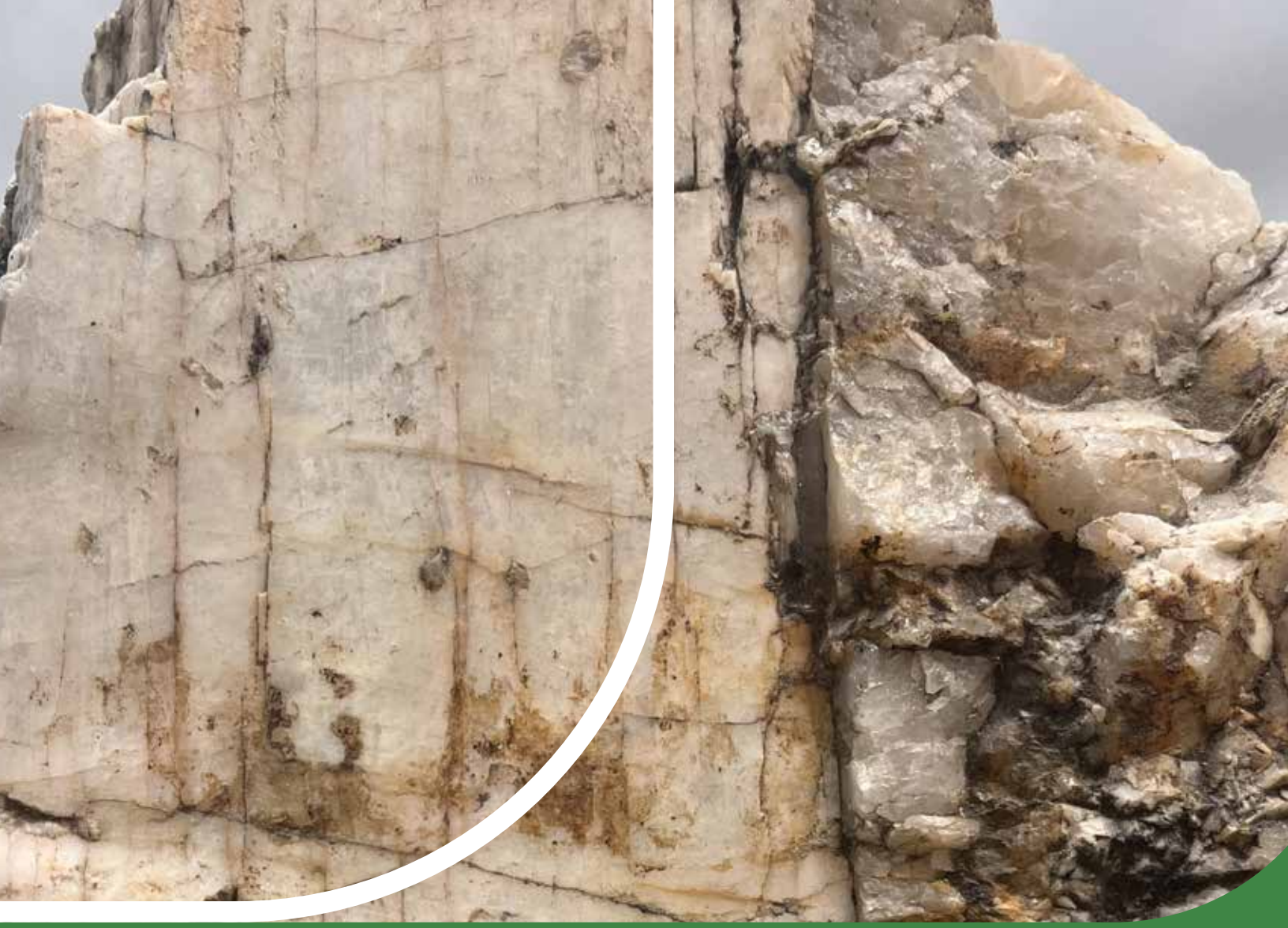

Nova Scotia's **Critical Minerals Strategy**

Natural Resources and Renewables

NOVA SCOTIA

Nova Scotia's Critical Minerals Strategy
Department of Natural Resources and Renewables
November 2023

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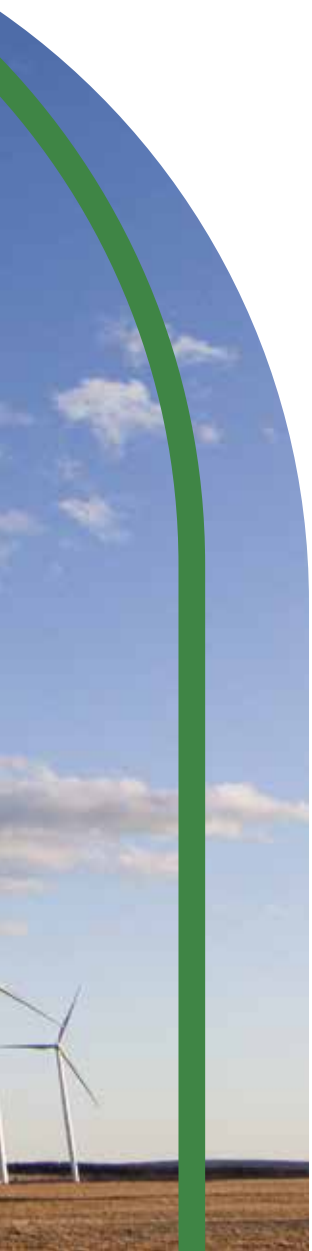
Nova Scotia's Approach to Critical Minerals



Vision

The Province of Nova Scotia has a vital role to play in Canada's critical mineral supply chain - through mining, refining, manufacturing, and recycling - as the province, through the *Environmental Goals and Climate Change Reduction Act* (EGCCRA) and *Nova Scotia's Climate Change Plan for Clean Growth*, and the country move into a low-carbon economy, and reach net-zero greenhouse gas emissions by 2050. With Nova Scotia's abundant natural resources, strong environmental principles, skilled labour, strategic location, and strong business and academic communities, the province is well positioned to engage with this emerging sector effectively and inclusively, which will also create opportunities for Nova Scotians.

Nova Scotia's Critical Minerals Strategy, in conjunction with *The Canadian Critical Minerals Strategy* and existing federal and provincial policy and legislation, is intended to provide the framework to help guide the Province of Nova Scotia in the transition toward net-zero emissions.

Objective

The objective of this strategy is to provide a framework to help guide the Province of Nova Scotia to complete the following:

- Provide a stable supply of critical minerals, for Nova Scotia and Canada, required for clean technologies and transitioning to net-zero by 2050.
- Increase our understanding of Nova Scotia's geology, as it relates to critical minerals, and provide this information to interested parties in a useful manner.
- Review the current regulatory framework and identify opportunities to help project proponents navigate regulations, incentivize critical minerals projects, and identify potential regulatory efficiencies and improvements.
- Support the Mi'kmaq of Nova Scotia involvement in opportunities related to critical minerals.
- Create and/or support sustainable economic opportunities within Nova Scotia through job creation, economic growth, and increased competition.
- Provide incentives for innovative research and development to strengthen exploration, mining, mid-stream processing, and clean technologies.
- Enhance public education and awareness regarding the environment, geoscience, critical minerals, and geoscience literacy.
- Work collaboratively with government departments and agencies, the Mi'kmaq of Nova Scotia, and other interested parties to advance the intent of this strategy.

Pillars of the Strategy

Nova Scotia's Critical Minerals Strategy is based on six pillars. These six pillars provide the foundation to advance the development of a critical mineral value chain in the province by integrating and aligning key aspects of the critical minerals strategy required to support the strategic directions and overall vision for critical minerals.

Pillar One: Critical Minerals Geoscience

Nova Scotia has historically been a producer of several critical minerals and has the potential to participate in the current critical minerals sector. Through targeted geoscience research, we can increase our understanding of the greenfield[1] and brownfield[2] critical mineral opportunities in Nova Scotia, and support recovery and remediation from brownfield critical mineral sites.

Capitalizing on research led by the Department of Natural Resources and Renewables, collaborative research with external partners, the Critical Minerals Geoscience Pillar aims to increase the understanding of critical mineral potential in Nova Scotia and enhance the dissemination of high-quality geoscience data to inform critical mineral exploration and development. The geoscience activities will include work to:

- Conduct and support research focused on increasing our understanding of Nova Scotia's 16 targeted critical minerals.
- Assess the potential for critical mineral recovery from brownfield sites, reprocessing of tailings, and alternative sources of critical minerals.
- Enhance the availability of geoscience data to better support critical mineral industry members and other interested parties.
- Support the exploration community to advance critical mineral projects.

[1]Greenfield projects are those with minimal to no previous development.
[2]Brownfield projects include former producing and advanced development projects and sites with prior industrial activity.

Pillar Two: Review of Regulatory Framework

Mineral resource projects move through a regulatory process that begins with exploration, followed by advanced exploration, mine development, production, and mine site reclamation. The Province of Nova Scotia is committed to supporting an efficient regulatory framework that advances critical minerals projects, while ensuring environmental and labour regulations are followed, as well as other legal requirements including the Crown's Duty to Consult.

A robust and efficient regulatory framework that provides clear requirements and predictable timelines will help attract investment and drive economic development. The Province of Nova Scotia will seek opportunities within the current regulatory framework to:

- Improve collaboration and communication through a critical minerals project facilitator to help proponents navigate the regulatory process.
- Review financial tools to find incentives for critical minerals projects.
- Review processes used by other jurisdictions to achieve regulatory efficiencies.

As the Province of Nova Scotia advances toward a greener economy, mineral extraction from historical mine sites may be an opportunity for critical mineral recovery from waste. The Province of Nova Scotia will work with provincial and federal regulators to explore regulatory mechanisms to allow for mineral recovery from waste on historical mine sites.

Pillar Three: Opportunities with Mi'kmaw Partners

The Province of Nova Scotia is committed to meaningful consultation with the Mi'kmaq of Nova Scotia when it is contemplating decisions, including those related to critical mineral resource development that may adversely impact asserted or established Mi'kmaq Aboriginal or Treaty rights. The Province of Nova Scotia is also developing a new relationship with the Mi'kmaq of Nova Scotia that includes greater opportunities for Mi'kmaw participation in social and economic development. The Province of Nova Scotia recognizes the opportunities that critical minerals may bring to the Mi'kmaq of Nova Scotia. Working together with interested parties to gain and share knowledge, and opportunities from local projects and regional development, can strengthen outcomes. The strategy encourages collaboration and engagement with all interested parties to ensure the development and application of best practices in critical minerals projects.

The work under this pillar will endeavour to:

- Support capacity building and knowledge sharing on critical minerals regarding environmental stewardship and economic opportunities.
- Facilitate the participation of the Mi'kmaq of Nova Scotia in mineral exploration and development, and critical minerals supply chain opportunities.
- Encourage Mi'kmaw collaboration and partnerships with proponents and other interested parties (e.g., academia, associations, etc.) resulting from local projects and broader critical mineral initiatives.

While the Province of Nova Scotia seeks to work with the Mi'kmaq of Nova Scotia, the province also recognizes that this strategy will need to evolve to address emerging priorities and initiatives. The Province of Nova Scotia intends to use the flexibility provided using annual work plans to address changes as required.

Pillar Four: Opportunities for Nova Scotia

Through evaluation of critical minerals supply chains, Nova Scotia not only has an opportunity to participate in the upstream (mineral production) portion, but also to capitalize in areas within the midstream (mineral processing, refining, and recycling) and downstream (manufacturing and/or end use of metals and minerals) portion of the supply chain to generate economic development. The strategy will look to facilitate ways to leverage technical expertise, natural resources, and investments to create strong outcomes and measurable improvements.

Nova Scotia will work collaboratively with government departments and agencies, the Mi'kmaq of Nova Scotia, and other interested parties to ensure actions align with federal, provincial, and territorial strategies, and to realize economic opportunities. The strategy will:

- Analyze the critical minerals supply chain including skilled labour needs, the resilience and sustainability of the supply chain, and existing barriers, with an aim to identify economic opportunities for Nova Scotia.
- Work to support the inclusion of racialized and marginalized groups, including people from the Indigenous, African Nova Scotian, and 2SLGTBQIA+ communities, immigrants and newcomers, people with disabilities, and women within critical minerals opportunities.
- Assess opportunities for Nova Scotia in midstream and downstream critical mineral value chains.

Pillar Five: Innovation, Research, and Development

The Province of Nova Scotia supports an environment that encourages collaboration, research, and development, and provides opportunities for solutions-based innovation among Nova Scotia's internationally recognized academic institutions, industry, and innovation hubs.

The Province of Nova Scotia is working to identify and support areas of research and development where the province can excel and provide meaningful advancements in downstream green energy technologies, mineral and material processing and recycling, supply chain resiliency, and the circular economy as we move toward a net-zero economy.

The Province of Nova Scotia will support innovation, research, and development through the exploration and cultivation of relationships among government, industry, innovation hubs, and academia, as well as connecting technical and skilled labour, knowledge, and resources with proponents. This will be accomplished by working to:

- Connect interested parties with external funding opportunities, information sharing and facilitation, and supporting innovative advancements.
- Develop collaborative partnerships to align innovative research and development with provincial, territorial, and federal initiatives.
- Leverage and support Pan-Canadian critical minerals initiatives.

Pillar Six: Enhancing Public Awareness

Enhancing public awareness of the importance of critical minerals in the energy transition to achieve emission reduction goals is a key step to creating greater understanding of the role minerals and metals will play in the Province of Nova Scotia's climate action objectives. Furthermore, sharing the opportunities and benefits resulting from Nova Scotian critical minerals projects, and adhering to high ESG (Environmental, Social, and Governance) standards, provides an opportunity to support sustainable prosperity in the province through the establishment of local critical mineral value chains.

This pillar aims to:

- Support geoscience and mineral literacy in Nova Scotia.
- Communicate the connection between the supply of critical minerals and the emission reduction targets set by the provincial and federal governments.
- Make connections between technologies used by the populace every day and critical minerals.
- Integrate lay-language critical mineral information in educational products and programs.

Action Plans

As part of Nova Scotia's Critical Minerals Strategy, action plans will be developed annually to propose expected actions to be completed during the next reporting period, and to summarize actions completed over the previous reporting period.

The use of annual action plans is intended to allow the Province of Nova Scotia to better position resources, both financial and human, with specific actions that align with this strategy. This approach will also ensure that changes in provincial, national, and international priorities, advances in clean technologies, and access to new knowledge are integrated in our strategy actions in a timely manner.

Nova Scotia will review the critical minerals list every two years and revisit the strategy every five years. In the event of significant changes to the critical minerals landscape, the Province of Nova Scotia may increase the frequency of these reviews.

To conduct work associated with the Critical Minerals Strategy, the Province of Nova Scotia will provide funding, staffing, and project support that aligns with the expected work to occur under the critical minerals action plan.

Nova Scotia's Critical Minerals

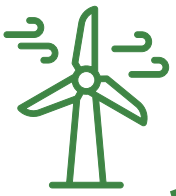
Criteria for Nova Scotia's Critical Minerals List

While Nova Scotia has most of the elements on Canada's Critical Minerals List, the Province has taken a focused approach to defining its list of critical minerals. The list was developed using four primary criteria. Minerals were assessed for their:

01 Potential for exploration and identification of a mineral resource within Nova Scotia.

02 Requirements for Nova Scotia to reach our emission reduction targets, including 80% of energy produced from a renewable source by 2030, and net-zero emissions by 2050.

03 Current and/or expected supply and demand imbalance on a global scale.



04 Likelihood of presenting a strategic opportunity for Nova Scotia.

Nova Scotia's Critical Minerals List

Using the four criteria identified, minerals containing the following elements have been deemed critical:

Added in May 2025:

High purity silica – used in semiconductors, optical fibers, coating powder, solar panels and high-performance ceramics. High mineral potential across the province.

Silver - used in advanced technologies, semiconductors, glass coatings, LED chips, medicine, nuclear reactors, photography, solar energy, semiconductors, touch screens, light sensitive sensors, water purification and more. Found across the province, can be associated with gold.

Tellurium – used in solar panels, semiconductors, thermoelectric devices, rubber vulcanization, ceramics, alloying, and glass colouring. Commonly associated with copper and found in specialized granites known to be present throughout mainland Nova Scotia.

Uranium – used as fuel for nuclear power plants, fuel for research reactors, medical isotopes, marine propulsion, and radiation shielding. Found in specialized granites and other rock types in mainland Nova Scotia and Cape Breton.

Antimony - used in batteries and electronics. High mineral potential across the province, including past producers, historical occurrences, and new discoveries.

Cobalt - used in lithium ion batteries, essential to energy storage and electric vehicles. Various early-stage projects indicate further potential of previously underexplored areas occurring with copper in IOCG (iron oxide copper gold) deposits in northern Nova Scotia and southern Cape Breton.

Copper - used in numerous electrical applications, including infrastructure to upgrade existing power grid for green energy and electric vehicles. Copper often occurs with other critical minerals, including cobalt and lithium. Several prospects, historic properties, and past producers exist across northern Nova Scotia and southern Cape Breton.

Graphite - used as an anode material in batteries and non-petroleum-based lubricants. Graphite is underexplored in the province and there is potential for deposits in northern Nova Scotia and southern Cape Breton.

Germanium, Gallium - are by-products from other critical minerals, such as zinc and copper. These elements are used in semi-conductors for various computing technologies, including energy efficiency applications. Gallium is also used in solar panels. Potential exists across Nova Scotia with other critical mineral deposits or through waste recovery.

Indium - used in semi-conductors and thermal regulation in energy efficiency applications. Additionally used as an alloy with anti-corrosion properties. High potential exists in the province, including past producing tin-indium deposits, zinc deposits, and waste recovery.

Lithium - primary component in lithium batteries, essential to energy storage and electric vehicles. Strong potential exists in the southwest and eastern areas of the province with recent resource drilling and new discoveries being made.

Manganese - alloy for infrastructure resilience and as a cathode material in lithium batteries. High potential exists across the province.

Molybdenum - alloy for steel hardening, which reduces maintenance, replacement, and carbon emission costs for infrastructure, including green energy. High mineral potential across the entire province, including past producers in southern Cape Breton.

Niobium - used in semi-conductors, including energy efficiency applications and as an alloy with anti-corrosion properties. Potential exists across Nova Scotia, often associated with other critical minerals such as tin and lithium.

Rare Earth Elements (REE)[3] - suite of metals often occurring together or as by-products with other critical minerals. Primary uses include permanent magnets in electric motors for electric vehicles and wind turbines. Potential in Nova Scotia exists across the province and REE have been underexplored.

Tantalum - used primarily in electric components, including energy efficiency applications. Often occurs with other critical minerals such as lithium. Potential exists in southern and eastern Nova Scotia, and the element has been underexplored.

[3]REEs include Cerium, Dysprosium, Erbium, Europium, Gadolinium, Holmium, Lanthanum, Lutetium, Neodymium, Praseodymium, Promethium, Samarium, Scandium, Terbium, Thulium, Ytterbium, and Yttrium.

Tin - multiple uses, including anti-corrosion for infrastructure resiliency and in lithium batteries. Often occurs with lithium, indium, niobium, and other critical minerals as the primary product. Strong opportunities exist in southwest Nova Scotia and elsewhere in the province, including past producers, historical properties, waste recovery, and new discoveries.

Tungsten - alloy for metal hardening to reduce maintenance, replacement, and carbon emission costs for infrastructure, including green energy. Strong mineral potential exists across southwest and eastern Nova Scotia.

Zinc - alloy for anti-corrosive properties (galvanizing) for infrastructure resilience and new battery developments. Former producers and near-production deposits and new discoveries are found in central and northern Nova Scotia, and southern Cape Breton.

This list will be reviewed and revised every two years.

Nova Scotia's Strategic Minerals List

The strategic minerals list focuses on economic drivers or other benefits to the province:

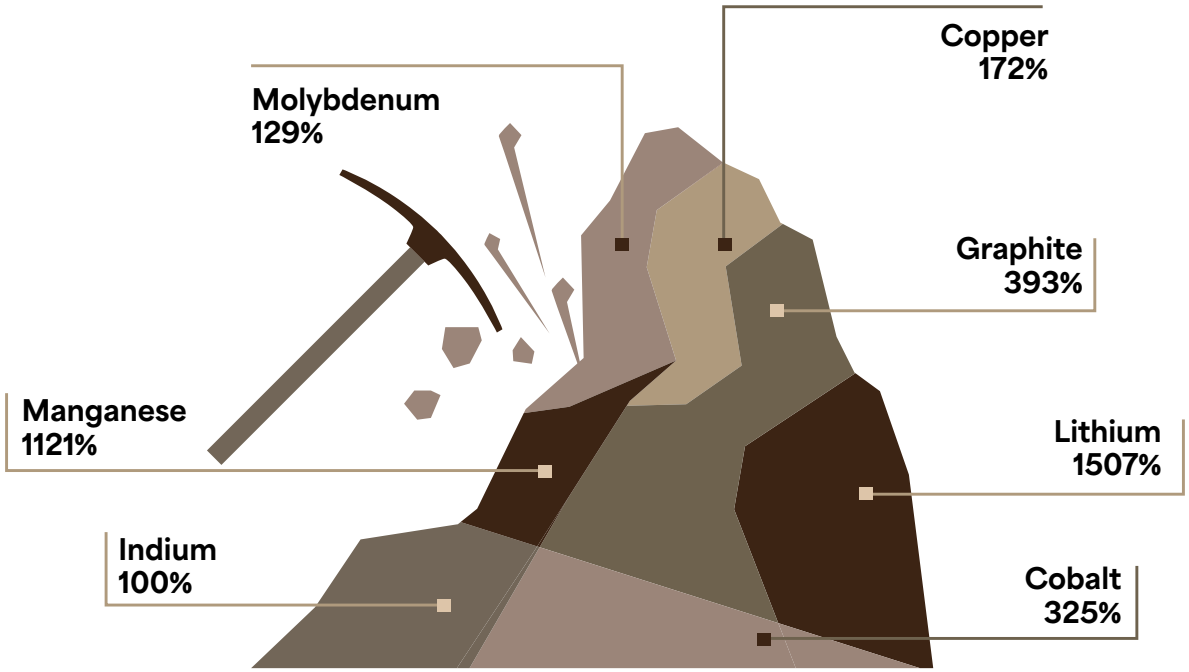
Aggregate - used in construction for various purposes including building roads, foundations, and structures, and play a role in drainage, water filtration and landscaping. Many developable sites identified across the province.

Gold - used for investments, jewellery, aerospace, medicine, and advanced technology applications. Gold is found throughout the province, but the main deposits are located along the eastern shore.

Gypsum - used in construction, agriculture, and other applications. It is used in drywall, plaster, cement, soil conditioner, fertilizer, dust suppressant, mold-making material, and personal care products. Nova Scotia is one of the world's leading producers.

Potash - used primarily as fertilizer for plant growth, animal feed, de-icing products, and also for glass manufacturing, detergents, and water softening. Present at a few sites in Cape Breton and counties along the north shore.

Projected demand increases for select critical minerals for clean energy technologies in a net-zero 2050 scenario compared to 2022



(IEA (2023), Critical Minerals Data Explorer, IEA, Paris
https://www.iea.org/data-and-statistics/data-tools/critical-minerals-data-explorer)

In accordance with the *Uranium Exploration and Mining Prohibition Act*, exploration for uranium is currently prohibited in Nova Scotia. The categorization of uranium as a critical mineral can be reassessed during the biennial review of the *Nova Scotia Critical Minerals List.*

Looking Forward

The Province of Nova Scotia looks forward to working with government departments and agencies, the Mi'kmaq of Nova Scotia, and other interested parties to achieve a secure, responsible, and reliable supply of critical minerals for clean technologies. *Nova Scotia's Critical Minerals Strategy* is intended to provide the framework to help guide the province toward a net-zero economy. It will be reviewed and updated, and work plans will be released to include new initiatives and programs, as the critical minerals industry advances and as engagement continues.

Appendix A - Canadian Critical Minerals Comparison List

Commodity	Nova Scotia	Canada[4]	Alberta [5]	Ontario [6]	Quebec [7]	Newfoundland and Labrador [8]
Aluminum		X	X			
Antimony	X	X		X	X	X
Arsenic			X			X
Barite			X	X		X
Beryllium				X		X
Bismuth		X	X	X	X	X
Cadmium					X	
Cesium		X		X	X	X
Chromium		X	X	X*		X
Cobalt	X	X	X	X	X	X
Copper	X	X		X	X	X
Feldspar						X
Fluorspar		X		X		X
Gallium	X	X	X	X	X	
Germanium	X	X	X	X		
Graphite	X	X	X	X	X	X
Hafnium			X			X
Helium		X				
Indium	X	X	X	X	X	
Iron Ore (high-grade, low-impurity)						X
Lead						X
Lithium	X	X	X	X	X	X
Magnesium		X	X	X	X	X
Manganese	X	X	X	X		X
Molybdenum	X	X		X		X

(Comparison List continues on page 16.)

Commodity	Nova Scotia	Canada[4]	Alberta [5]	Ontario [6]	Quebec [7]	Newfoundland and Labrador [8]
Nickel		X	X	X	X	X
Niobium	X	X	X	X	X	X
Phosphate				X		
Platinum Group Elements		X	X	X	X	X
Potash		X	X			X
Rare Earth Elements (REE)	X	X	X	X	X	X
Scandium		X	X	X	X	X
Selenium				X		
Silicon						X
Tantalum	X	X	X	X	X	X
Tellurium		X		X	X	
Tin	X	X	X	X	X	X
Titanium		X	X	X	X	X
Tungsten	X	X		X		X
Uranium		X	X	X		X
Vanadium		X	X	X	X	X
Zinc	X	X	X	X	X	X
Zirconium			X	X		X

Several other Canadian jurisdictions have adopted Canada's list.

* - Ontario's Critical Minerals Strategy lists the mineral Chromite.

[4](Government of Canada, 2022)
[5](Government of Alberta, 2021)
[6](Government of Ontario, 2022)
[7](Ministère de l'Énergie et des Ressources naturelles., 2020)
[8](Government of Newfoundland & Labrador, 2023)

Appendix B - Multi-Year Action Plan Elements

What is the Vision?

Nova Scotia's Critical Minerals Action Plan 2024-2025 is intended to provide the framework to help address the critical need for minerals and metals to support the sustainable prosperity of the Province of Nova Scotia in the transition into a low-carbon economy, establish value chains, and reach net-zero greenhouse gas emissions by 2050.

How will this be done?

- Provide a stable supply of critical minerals, for Nova Scotia and Canada, required for clean technologies and transitioning to net-zero by 2050.
- Work collaboratively with stakeholders, the Mi'kmaq of Nova Scotia, and governmental departments and agencies to advance the intent of this strategy.
- **Pillar 1:** Increase our understanding of Nova Scotia's geology, as it relates to critical minerals, and provide this information to the stakeholders and interested parties in a useful manner.
- **Pillar 2:** Review the current regulatory framework and identify opportunities to help project proponents navigate regulations, incentivize critical minerals projects, and identify potential regulatory efficiencies and improvements.
- **Pillar 3:** Support the Mi'kmaq of Nova Scotia involvement in opportunities related to critical minerals.
- **Pillar 4:** Create and/or support sustainable economic opportunities within Nova Scotia through job creation, economic growth, and increased competition with a focus on rural and long-term economic development.
- **Pillar 5:** Incentivize innovative research and development to strengthen exploration, mining, mid-stream processing, and clean technologies.
- **Pillar 6:** Enhance public education and awareness regarding the sustainable development, critical minerals, and geoscience literacy.

Actions and anticipated schedule

	2024	2025	2026	2027
Province wide prospectivity mapping for Nova Scotia, focusing on critical minerals. (2024-2027)				
Regional reassessment of drill core and other material to support critical mineral exploration and development. (2024-2027)				
Expand historical data sets and align data with current publication standards. (2024-2027)				
Review and update of Nova Scotia's critical minerals list. (2024, 2026)				
Regulatory roadmap for Nova Scotia to better communicate the regulatory needs for the mineral resources sector. (2025)				
Review regulatory pathways to reprocess tailings and promote brownfield development. (2025)				
Preliminary assessment of historical tailings materials for the reprocessing and recovery of critical minerals from waste, in support of a circular economy. (2025)				
Assess economic opportunities for the Mi'kmaq of Nova Scotia related to critical mineral value chains, in partnership with the Kwilmu'kw Maw-klusuaqn Negotiation Office (KMKNO). (2025)				
Build capacity and facilitate the participation of the Mi'kmaq in mineral exploration and development. (2025)				
Analysis of the economic opportunities from critical minerals along supply chains - including primary, secondary, and recycling, with an aim to identify feasible and sustainable economic opportunities in partnership with Invest Nova Scotia. (2024-2026)				

	2024	2025	2026	2027
Evaluation of Nova Scotia's battery value chains and local battery R&D, for areas of collaboration, connections, and expansion of the battery supply chain within Nova Scotia. (2025)		→		
Labour market plan to support labour and training needs. (2027)				→
Supporting critical mineral exploration, research, and education through the Mineral Resources Development Fund. (2024-2027)	→	→	→	→
Applied research to mitigate impacts and maximize rural and long-term economic development on Crown land. (2027)				→

Actions for 2025-26

- Create educational materials to support critical minerals literacy
- Hold training and awareness sessions for industry and interested parties on critical minerals, exploration and mining
- Host the Mineral Resource Forum to discuss critical mineral projects
- Develop a Nova Scotian Critical Minerals Atlas
- Define mineral domains and deposit types
- Update the Mineral Occurrence Database
- Undertake uranium and related research

- Complete geochemical recharacterization of relevant historic core samples
- Advance work in assessing opportunities for critical minerals from secondary sources (mine waste, recycling)
- Create a critical minerals project facilitator to help proponents navigate the regulatory process
- Create a new stream under the Mineral Resources Development Fund to help with project advancement (e.g. economic assessments).
- Continue to support academia to identify tin and tungsten in the Davis Lake Pluton in southwestern Nova Scotia.
- Undertake market and criticality assessments
- Examine the development of a new mineral potential model and create an interactive map of the results
- Characterize flake graphite at several locations (sampling and analysis)
- Initiate the digitization of documents and create workflows to extract information from the new versions
- Undertake field research to identify and quantify critical minerals in the province

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