MINISTRY OF NORTHERN DEVELOPMENT

Ontario's Critical Minerals: "Come and Explore"

Mines to Mobility Conference 2023

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Land Acknowledgement

We want to recognize that we are talking to you on lands of the Robinson-Huron Treaty territory and on the traditional land use area of Wahnapitae First Nation, Atikameksheng Anishnawbek First Nation, Sagamok Anishnawbek First Nation, Whitefish River First Nation, Wikwemikong First Nation and Nipissing First Nation.

Today, we are going to talk about land across all Northern Ontario. These lands include the treaty territories of the Robinson-Huron and Robinson-Superior Treaties, and Treaties 3, 5 and 9. We wish to recognize the long history of the First Nations and Metis peoples in Ontario and show them respect. They have been, and continue to be, stewards of the land.

Thank you, Miigwetch, Marsee and merci.

Northern Ontario

90% of the provincial land mass

6% of the provincial populationNorthern Ontario's

population estimated at ~800,000

17% of the population is Indigenous

• 43% are under the age of 25

61% of the population in the North's five largest centers

- Sudbury, Thunder Bay, Sault Ste. Marie, North Bay and Timmins
- 5.5% Northern Ontario's economic output, estimated at 5.5% of Ontario's Gross Domestic Product





Economic Impact of Mining

Ontario's Mining Industry

- The mining sector plays an important role in Ontario's economy and contributes to regional communities in Northern Ontario.
- Mining is supported by mineral exploration, smelting and refining and the mining supply and service industries.
- There are currently 35 active mining operations in the province that cover a diverse set of metals and minerals, including precious and base metals, and non-metallic minerals.
- In 2021, there were 29,000 people directly employed by mining companies' in Ontario, with more than \$3.7 billion paid in total worker compensation.

Economic Contribution

- Mining and mining related activities contributed \$12.9 billion to Ontario's Gross Domestic Product and approximately 75,000 jobs in the province via direct, indirect channels.
- Ontario's leading-edge mine supply and service sector employs more than 40,000 people producing more than \$10 billion worth of mining supplies and services every year.
- Approximately 77% of Ontario's mining company GDP contributions stay inside Ontario.
- 44% of supplies, materials and services were procured locally from companies across Ontario.
- 4 Ontario's mining sector has one of the highest proportions of Indigenous workers of all industries in the province, at 9%.

Sector at a glance

Indicator	Measure	%
Mining GDP (2021)	\$12.9B	1.3% of Ontario
Mining Employment (2021)	75.3K	1.0% of Ontario
Mineral Exports (2022)	\$30.2B	33.6% of Canada
Mineral Imports (2022)	\$23.0B	66.5% of Canada
Mining Production Value (2022)	\$13.5B	21.8% of Canada
 Mining Capital Expenditures (2022)	\$4.0B	30.0% of Canada
Mineral Exploration Expenditures (2022)	\$989M	24.3% of Canada

Contribution to GDP and employment in mining and related industries (2021)





\$16+ Billion in EV Investments

- Ontario's Critical Minerals Strategy and Phase 2 of Driving Prosperity: Ontario's Automotive Plan are working in concert to connect mines and minerals in the north with the manufacturing strength in the south, including Ontario's growing electric vehicle (EV) and battery manufacturing capacity.
- Since 2020, the Ministry of Economic Development, Job Creation and Trade (MEDJCT) has attracted over \$16 billion in keystone EV and EV battery investments in Ontario.
- To achieve its goal of establishing an EV battery supply chain ecosystem in Ontario, the province must signal that it is supporting new critical minerals mine construction and mineral processing capacity projects.





An Opportunity for Northern Ontario to Leverage Ontario's Automotive Sector

To date, Ontario has focused largely on EV assembly and battery manufacturing opportunities, but must now focus on filling the missing links in the supply chain (e.g., new critical minerals mines and mineral processing).





Ontario's Mining Operations

- The province is home to 16 gold mines, 9 base metal mines, 1 iron mine, 1 platinum group elements (PGE) mine and 8 other major industrial mineral operations.
- In 2022, Ontario's mining sector produced a record \$13.5 billion worth of minerals, which accounted for 22% of Canada's total production value.
- Ontario continues to remain a top metal producer in:
 - Gold: \$5.4 billion was produced totalling 41% of Canada's gold production by value.
 - Nickel: \$1.9 billion was produced in Ontario, amounting to 45% of Canada's nickel production by value.
 - Copper: \$1.9 billion, amounting to 32% of Canada's copper production by value.
 - Cobalt: by-product cobalt worth \$96 million was produced amounting to 36% of Canada's cobalt production by value.
 - Platinum Group Elements: valued at \$1.6 billion was produced totalling 77% of Canada's PGE production by value.
- Ontario's non-metallic minerals (including aggregates) production was valued at \$2.4 billion in 2022, representing 10% of Canada's non-metallic minerals production value.





Ontario's Critical Minerals List

Ontario's critical minerals list has identified 33 critical minerals





Critical Mineral Production

In 2022, Ontario produced approximately **\$5.7 billion** worth of critical minerals, as well as **\$328 million** in critical mineral exploration expenditures.

- 1st in Nickel (45% of Canada's production by value) and home to large integrated nickel, cobalt and copper smelting and refining complexes.
- 1st Cobalt (15% of Canada's production by value)
- 2nd Copper in Canada (23% of Canada's production by value)
- 1st in Platinum Group Elements in Canada, (77% of Canada's production by value).

There are also numerous advanced stage battery metals projects progressing through exploration and feasibility stages of development.

Critical Mineral producers in Ontario



Significant critical mineral projects in Ontario





Current State: Critical Mineral Production, Processing & Significant Projects

Critical Mineral Production

10 producing CM mines in Ontario:

- 8 Nickel-Copper-Platinum Group Elements (PGE) cobalt mines in the Sudbury. Vale (5), Glencore (2) and KGHM (1)
- Glencore Kidd Creek Zinc-Copper Mine in Timmins
- Impala Canada Lac des Iles Palladium Mine

Critical Mineral Processing

6 CM smelting and refining facilities in Ontario:

- Vale (3 facilities): nickel/copper smelting complex and Class 1 nickel refinery in Copper Cliff, and Class 1 cobalt refinery in Port Colborne.
- Glencore (1 facility): nickel/copper smelter in Falconbridge.
- Cameco (2 facilities): Blind River uranium refinery and Port Hope uranium conversion facility.

Significant Critical Mineral Projects

19 significant projects with combinations of critical minerals

- Nickel-Copper±Cobalt (6)
- Lithium (4)
- PGEs (3)
- Graphite (2)
- Cobalt
- Chromite
- Zinc-Copper
- Niobium





Critical Minerals Exploration Activity

- Since the 2022 release of its first-ever Critical Minerals Strategy, Ontario has seen a significant increase in critical minerals exploration activity, particularly for lithium.
- In 2022, approximately \$328 million (33 per cent) of Ontario's exploration expenditures targeted critical minerals, up from \$273 million (30 per cent) in 2021.
 - 58 Nickel-Copper-PGE±Cobalt
 - Mafic-ultramafic intrusions
 - 36 Lithium±Tantalum-Cesium
 - Rare metal pegmatites
 - 17 Zinc-Copper
 - Volcanogenic massive sulphide
 - 7 Copper
 - IOCG, vein deposits
 - 6 Niobium-Phosphate-REE
 - Carbonatites
 - 6 Cobalt
 - 5-element veins
 - 3 Graphite
 - 1 Chromium
 - 1 Uranium





STRONG INVESTMENTS FOR CRITICAL MINERALS IN ONTARIO

Creating a business climate that helps attract mineral investment that will be essential to a strong critical minerals sector.

- > Ontario Geological Survey has invested in geoscience information related to critical minerals:
 - > The release of 2 publications focused on recommendations for exploration and outlining the province's critical minerals potential.
 - New critical minerals online toolsets to search for critical mineral occurrences.
- Implemented amendments to the Mining Act and its regulations to support an efficient approach to mineral development projects.
- The Ontario Junior Exploration Program (OJEP): To date, OJEP has invested nearly \$7.5 million in funding to 48 companies 33 of them exploring for critical minerals leveraging an additional \$17.5 million in investment from industry.
- Critical Minerals Innovation Fund: \$5 million over 2-years to enhance research and development of new technologies. The fund will support research, development and commercialization projects to stimulate investments in Ontario's critical minerals supply chains.
- > Northern Ontario Heritage Fund Corporation (NOHFC): Investments totaling over \$7 million towards critical mineral projects in Northern Ontario.
 - First Cobalt (now Electra Battery Material Corporation)-\$5 million, funding was invested to accelerate domestic production of battery grade cobalt sulfate for electric vehicles
 - Frontier Lithium-\$363,000, funding will help the junior mining company demonstrate its new innovative extraction process for lithium.
 - Lakehead University Research Chair-\$690,000-funding has supported the creation of a new industrial research chair to work collaboratively with Impala Canada to investigate nickel-copper and platinum-group-elements deposits in northwestern Ontario.
 - MIRARCO Research Chair-\$750,000-funding to support the creation of a new industrial research chair to work collaboratively with Vale Energy Transition Metals. To develop, pilot and work towards commercializing bioleaching and bioremediation processes including efforts to recover nickel and cobalt from tailings and other wastes.



STRONG INVESTMENTS FOR CRITICAL MINERALS IN ONTARIO

Industry Investments in Ontario's Critical Minerals

- Vale and Glencore: investments into their underground operations in Sudbury, Ontario that will allow them to sustain and expand their operations and play an important role in serving the growing critical minerals needs of North America
 - > Vale Canada (Sudbury): \$945 million expansion of the Copper Cliff Complex South Mine
 - Glencore (Sudbury Integrated Nickel Operations): \$1.3-billion Onaping Depth project
- Electra Battery Materials Corp.:
 - construction of a cobalt sulphate refinery in Cobalt, Ontario and investigating the opportunity to establish a Battery Materials Park facility that will include the production of battery grade nickel sulphate and battery recycling opportunities.
 - Signed a 3-year agreement to supply battery grade cobalt to LG Energy Solutions.
- > Avalon Advanced Materials: Signed non-binding MOU with LG Energy Solutions to supply lithium hydroxide
- Green Technology Metals (GTM): LG Energy Solutions have acquired a 7.89% stake (\$20 million) in GTM lithium project. LGES have also agreed to buy 25% of spodumene concentrate production for 5 years.
- Ring of Fire Metals (Wyloo) acquired Noront Resources and their Ring of Fire exploration and development assets in a \$600 million acquisition in April 2022. Their focus is specifically on their Nickel-Copper-Platinum and palladium deposits.



THANK YOU



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