
Natural Resources Canada
Ressources naturelles Canada
Critical Minerals Mapping Initiative
Geoscience research as part of the solution
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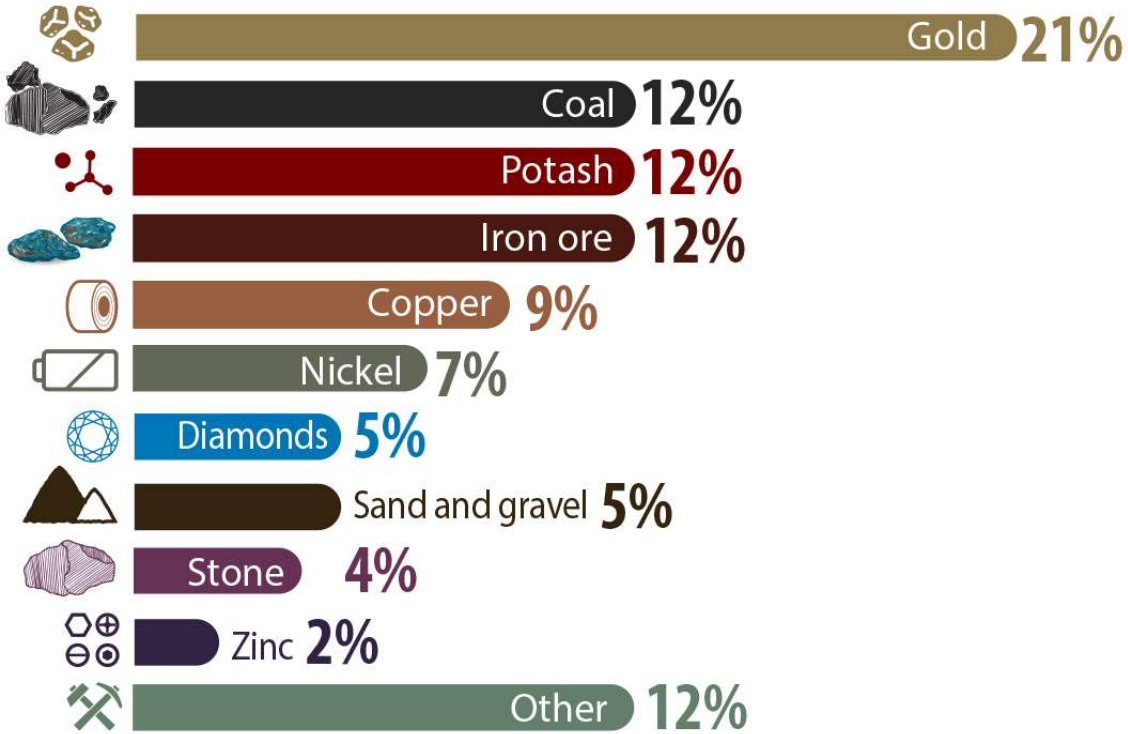
June 28, 2021
Canada

Canada is a mining nation

- Exploration and mining are important to the Canadian economy;
- Also host to large supply, service, and financial industry.

Leading minerals, by value of production, 2019



www.nrcan.gc.ca

Critical mineral list

Definition:

1. Required for economic security;
2. Required for low-carbon economy;
3. A sustainable source of critical minerals for our partners.

Motivations:

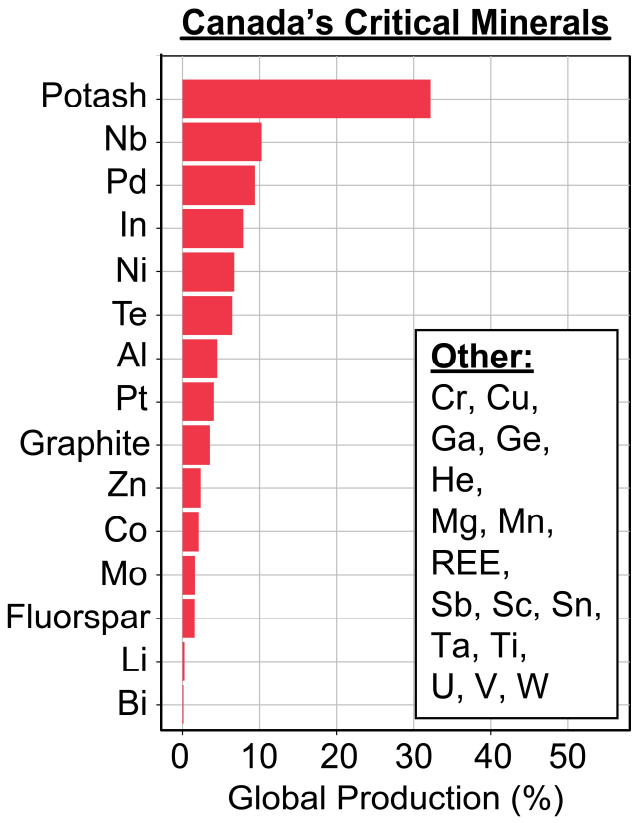
1. Supply chain development;
2. Policy development
3. International engagement;
4. Support research and development;

www.nrcan.gc.ca/criticalminerals

Canada's critical mineral production

- Canada is already a producer of some critical raw materials:
  1. Potash is important for fertilizer and is sourced from ancient evaporite deposits (e.g., K3, SK);
  2. Niobium is used in the aerospace industry and is sourced from carbonatite deposits (e.g., Niobec, QC);
  3. Nickel, cobalt, and PGE are used in batteries and other car components and are sourced from magmatic sulphide deposits (e.g., Sudbury, ON);
  4. Indium is used in touchscreens, sourced from sediment-hosted deposits (Red Dog, AK), and produced from Zn smelting-refining (e.g., Trail, BC);
  5. Caesium is used in defense and is sourced from pegmatite deposits (e.g., Tanco, MB)

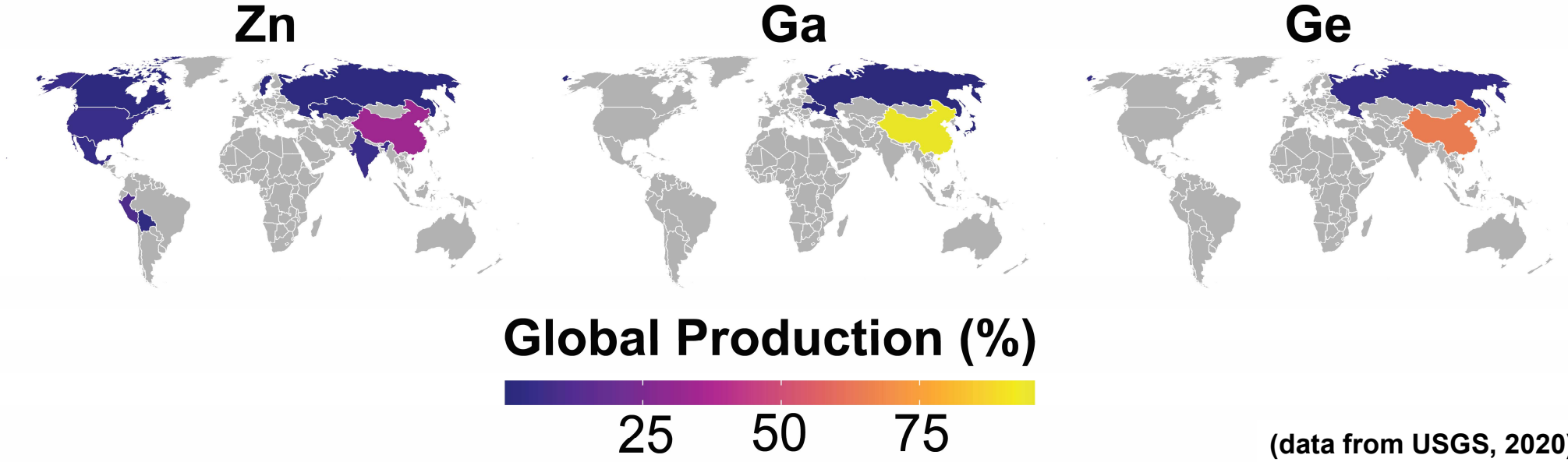
- However, production estimates for most other critical raw materials are relatively minor globally.



(data from USGS, 2020)

Critical minerals as bi-products

- Canada is a major producer of base metals (e.g., Cu, Zn, Pb);
- Bi-products from these deposits (e.g., VMS, CD, MVT) include critical minerals;
- Critical mineral associated with Zn mining is currently dominated by China;
- Basin-hosted mineral systems are the focus of CMMI and international cooperation.



(data from USGS, 2020)

Diversifying Canada's production

- Geological surveys can contribute by:
  1. Improving availability of pre-competitive data in prospective critical mineral districts;
  2. Improved conceptual models for unconventional mineral systems (e.g., brines, seafloor, mine waste, deposits undercover)

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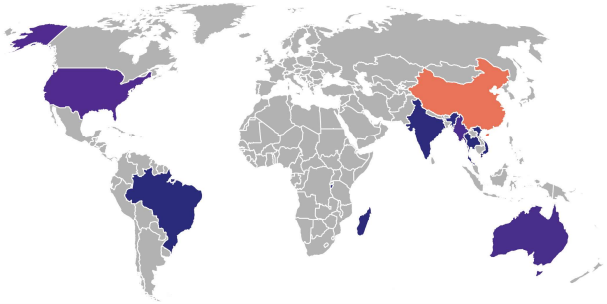

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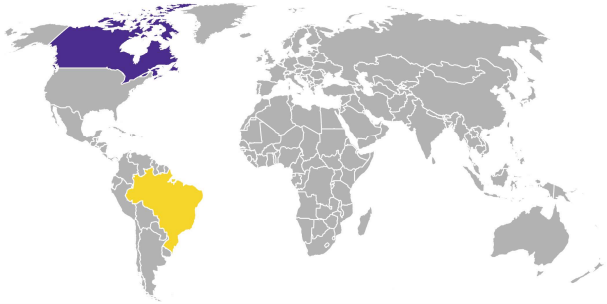

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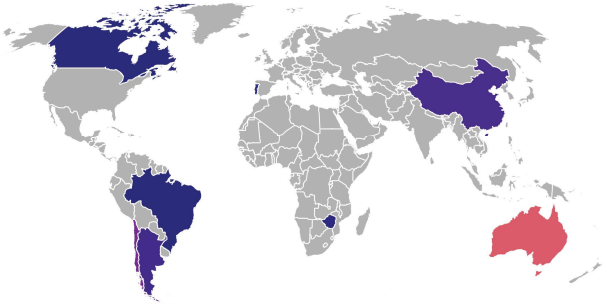


Global Production (%)

25 50 75

(data from USGS, 2020)

Targeted Geoscience Initiative

- Targeted Geoscience Initiative (TGI) program;
- Main mineral research program at the Geological Survey of Canada (GSC);
- Phase six renewed in 2020;
- Renewed focus on critical minerals;
- Results are free at **GEOSCAN**

Targeted Geoscience Initiative (TGI)

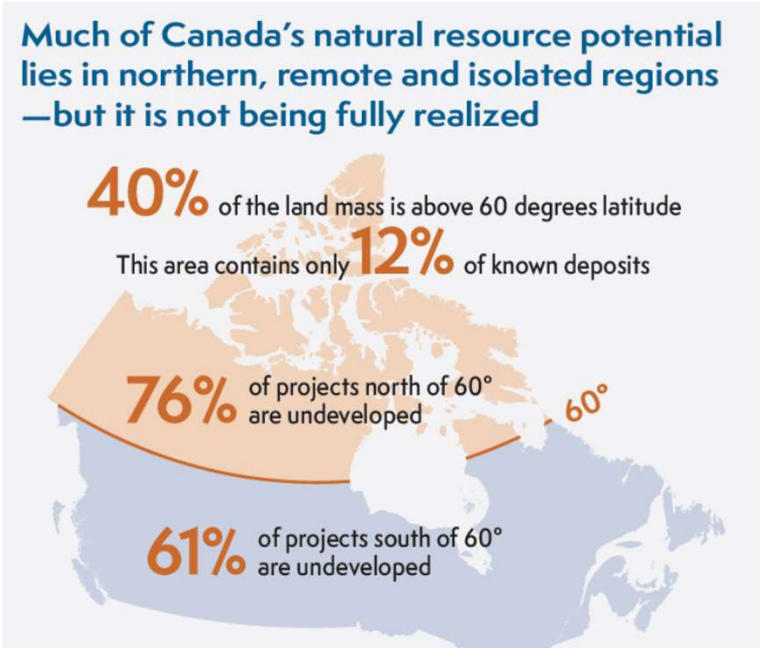
Ore Systems			Digital Geoscience		
Magmatic	Hydrothermal	Orogenic	AI	3D Modelling	Method Development

CMMI is part of the solution

Time for Action!

Canada could miss the next wave of investment for clean mineral to support building an integrated critical minerals value chain unless it:

- Maintains and improves ESG record and other best practices to secure at home projects and investments
- Maintains world renown and leading mining sector expertise
- Reduces project development lead times
- Decreases exploration risks and improve discovery of quality resource (grade and economics) and processing efficiency
- **Engages in a strong international collaboration as set by the Critical Minerals Mapping Initiative**



(PDAC, 2016)
(Canada Minerals and Metals Plan; www.minescanada.ca)

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