

CURRENT DEVELOPMENTS IN THE NORDIC COUNTRIES



GEOLOGICAL
SURVEY OF
NORWAY
- NGU -

Mining and exploration activity

The combined production of ores in the Nordic countries were at an all-time high in 2022.

Very high exploration activity across the Fennoscandia, all time high for exploration investments in SE, peak in Finland, doubled licensed areas in Norway.

Several projects are maturing, 1 new mine in Sweden 2024, 1 new mine in Norway will open in 2024 (Engebø Rutile and Garnet).

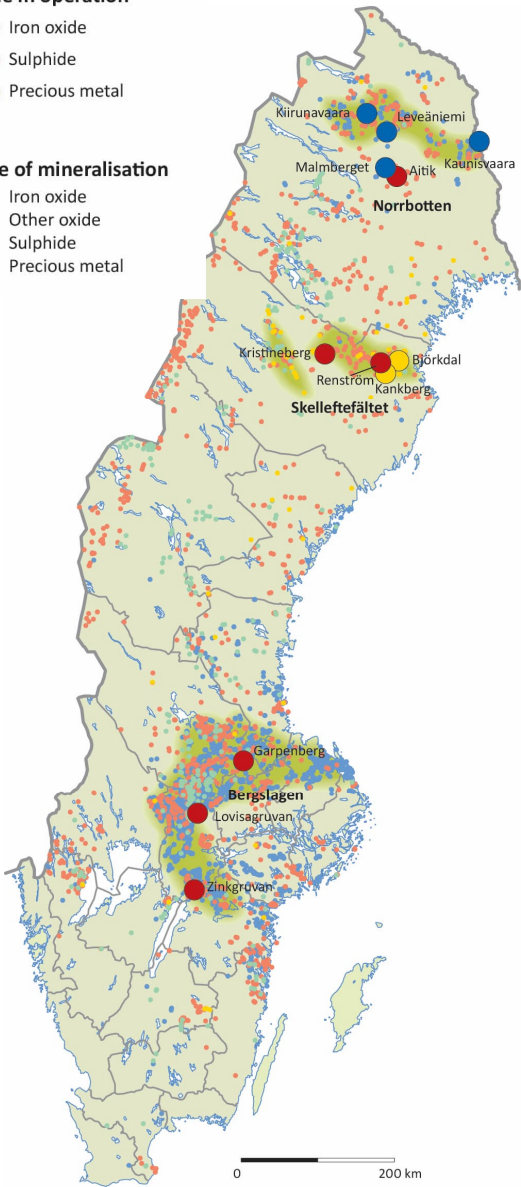


Mine in operation

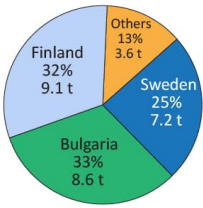
- Iron oxide
- Sulphide
- Precious metal

Type of mineralisation

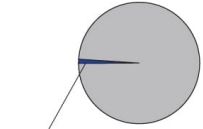
- Iron oxide
- Other oxide
- Sulphide
- Precious metal



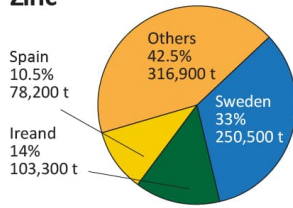
Gold



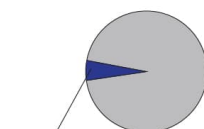
World production: 3,146 tonnes
EU production: 28.5 tonnes



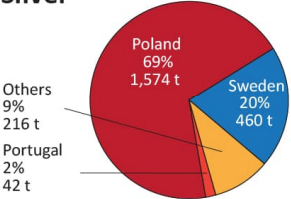
Zinc



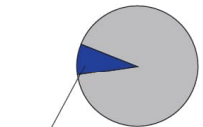
World production: 13.26 million tonnes
EU production: 748,800 tonnes



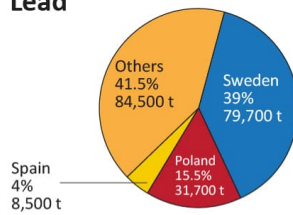
Silver



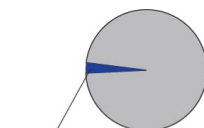
World production: 25,050 tonnes
EU production: 2,291 tonnes



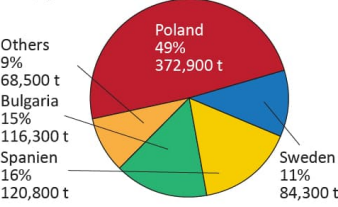
Lead



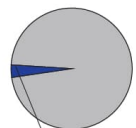
World production: 6.8 million tonnes
EU production: 204,400 tonnes



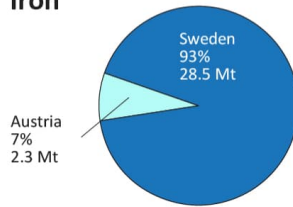
Copper



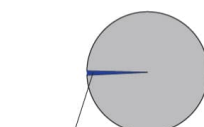
World production: 21.5 million tonnes
EU production: 762,800 tonnes



Iron



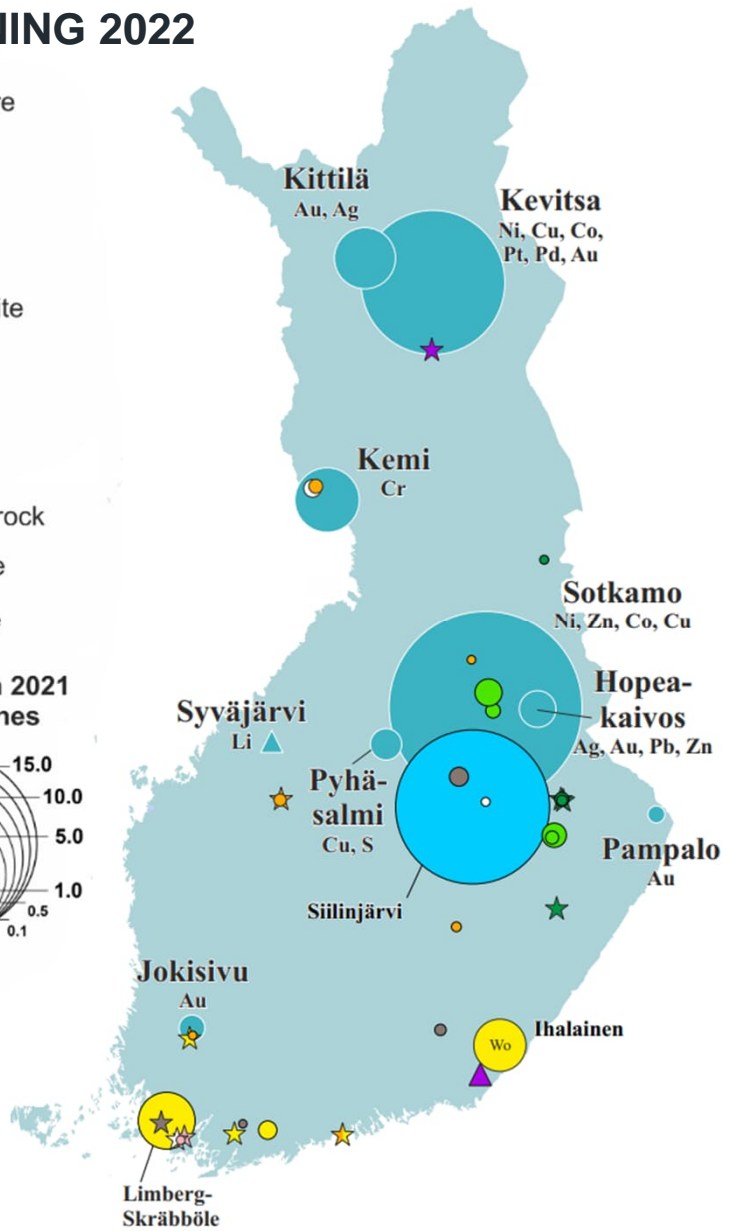
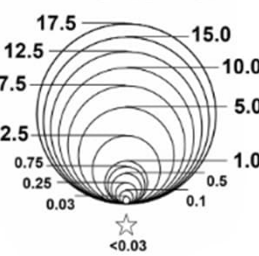
World production: 2,400 million tonnes
EU production: 30.4 million tonnes



ORE MINING 2022

- Metallic ore
- Apatite
- Calcite
- Dolomite
- Wo Wollastonite
- Talc
- Feldspar
- Quartz
- Industrial rock
- Soapstone
- Gemstone

Ore mining in 2021
Million tonnes



Finland mining overview



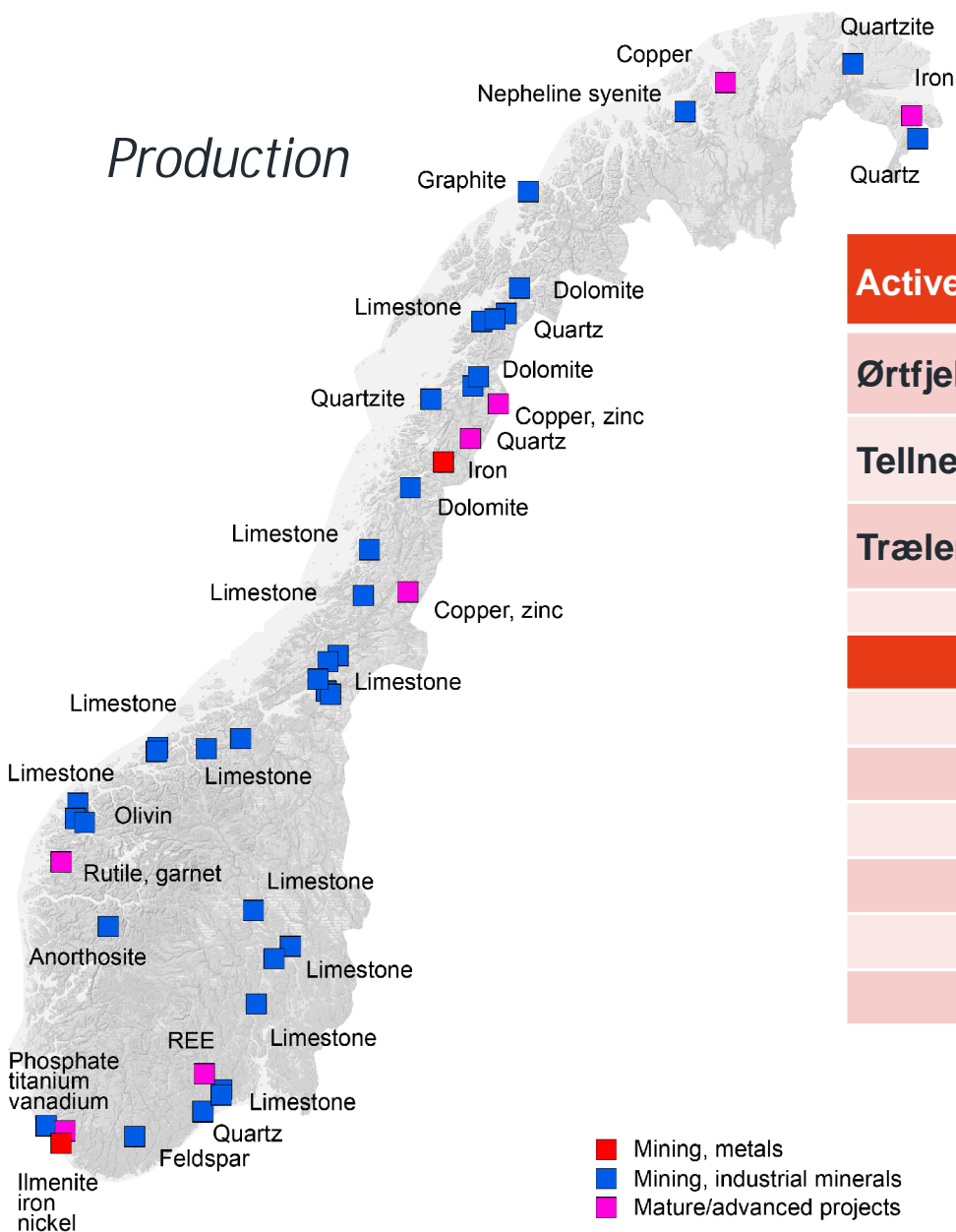
Metallic ores

- 9 mines
- 33.2 Mt ore mined in 2022
- Biggest mine: Sotkamo (TerraFame), 17.9 Mt ore
- CRM produced: Co, Pt, Pd
- National mine production: Cr (268 kt), Zn (62 kt), Ni (45 kt), Cu (28 kt), Pb (1494 t), Co (1084 t), Ag (45 t), Au (8.3 t), Pt (1.2 t), Pd (1.0 t)

Industrial minerals

- 34 mines or quarries
- 15.7 Mt ore mined in 2022
- Biggest mine: Siilinjärvi (Yara Suomi), 11.4 Mt ore
- CRM produced: phosphate rock
- National mine production: carbonate rocks (3.4 Mt), apatite (923 kt), talc (297 kt), magnesite sand (324 kt), quartz (166 kt), rocks for rockwool production (125 kt), etc.

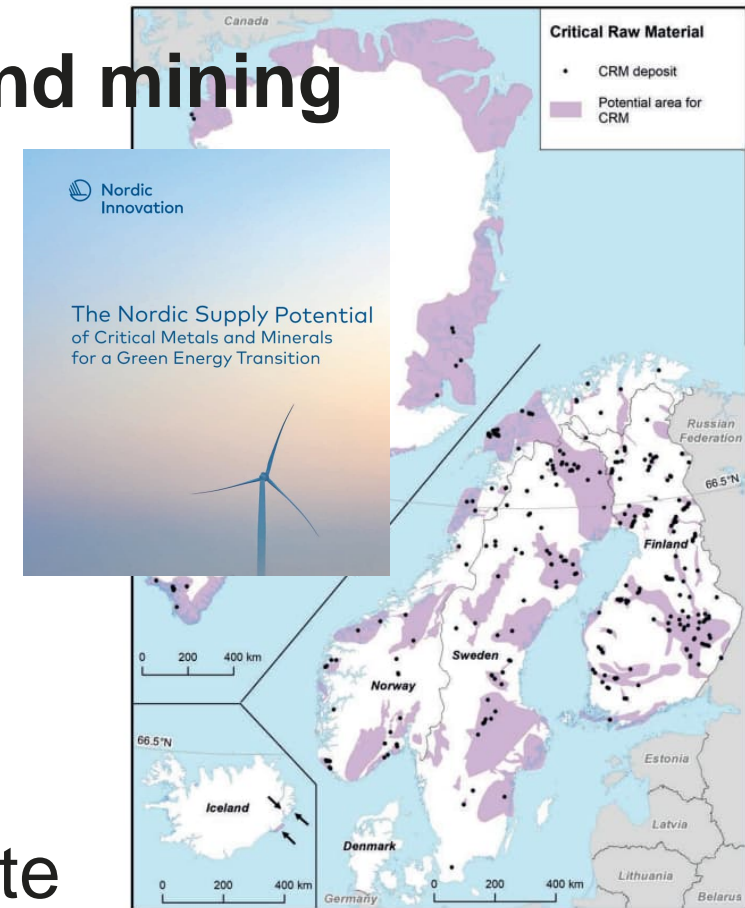
Production



Active mine	Resource	Company
Ørtfjell	509 Mt @ 33% Fe	Rana Gruber AS
Tellnes	570 Mt @ 18% TiO ₂	Titania / Kronos Worldwide Inc.
Trælen	1.8 Mt @ 28% TGC	MRC Ltd.
In addition to 34 active industrial mines covering:		
Quartz and quartzite		
Limestone and marble		
Dolomite		
Olivine		
Nepheline syenite		
Feldspar		

CRMA Implications for exploration and mining

- Improved permitting process
 - single point of contact
 - environmental+concession
 - timelines
- Strategic and critical lists
- MS mapping programs – geology, geophysics, geochemistry, mine waste (predictive mapping)

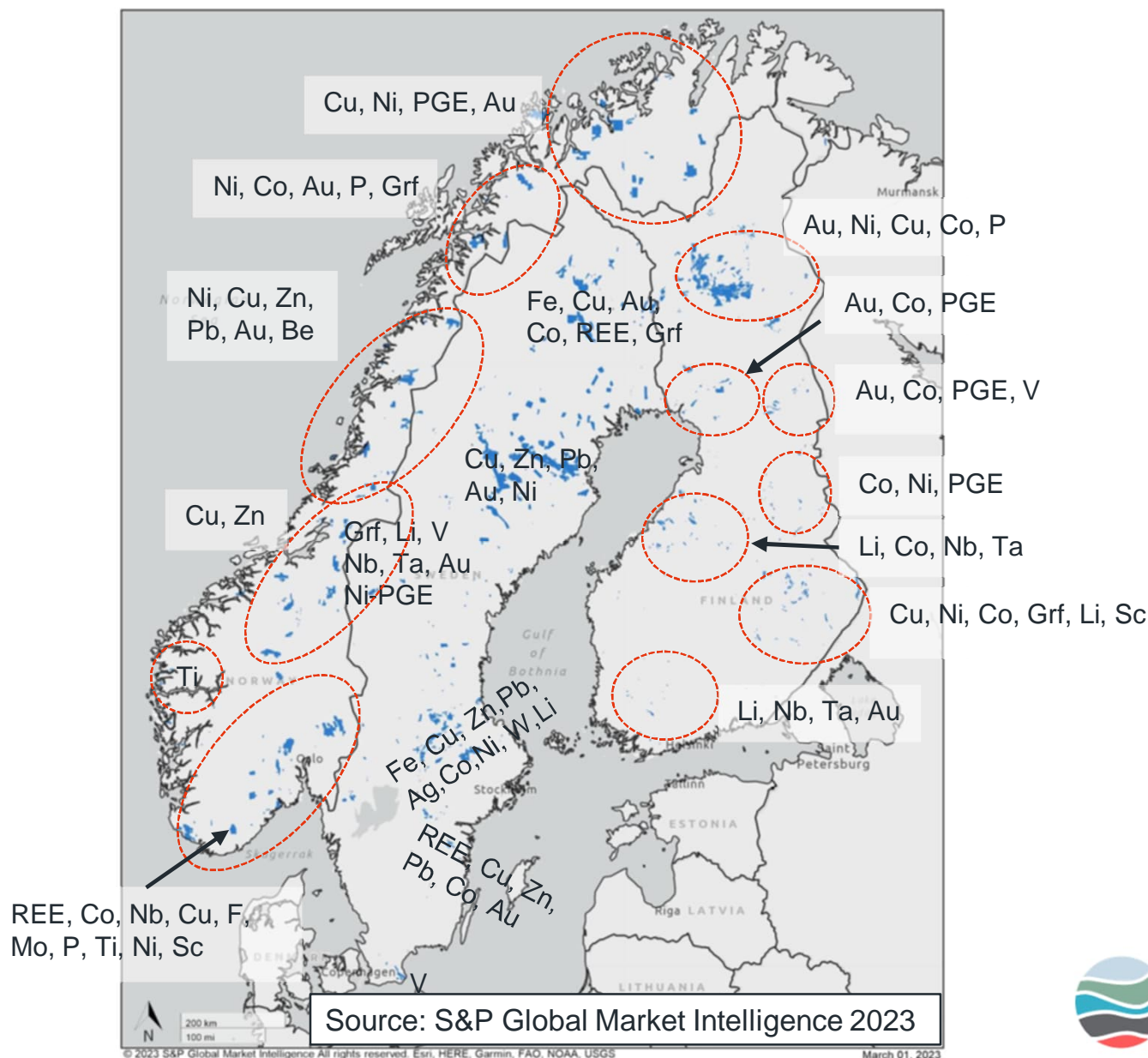


Actions in Finland, Sweden, Norway (EEA)

NO: New mineral strategy (June 2023, ambition to increase mineral production, develop the world's most sustainable mineral industry) new mining legislation on the way, extra funds for mapping to NGU, Partnership w EU

FI: New mineral strategy (work started 1/2024 will be finished by end of year), Revised mining legislation (June 1 2023)

SE: New mineral strategy (in progress 2024), added funding to SGU for mapping, reduce bottlenecks, mineral hunt and mineral information office.



Exploration permit areas (blue)

Labels show commodities of main interest

Critical and **strategic** list 2023 – Nordic perspective

Antimony	Copper	Lithium – battery grade	Scandium
Arsenic	Feldspar	Magnesium – metal	Silicon metal
Aluminium/Bauxite	Fluorspar	Manganese – battery grade	Strontium
Baryte	Gallium	Natural Graphite – battery grade	Tantalum
Beryllium	Germanium	Nickel – battery grade	Titanium metal
Bismuth	Hafnium	Niobium	Tungsten
Boron/borates – metallurgy grade	Helium	Phosphate rock	Vanadium
Cobalt	Heavy Rare Earth Elements	Phosphorus	REE for magnets (Nd, Pr, Tb, Dy, Gd, Sm, and Ce)
Coking Coal	Light Rare Earth Elements	Platinum Group Metals	

Mining

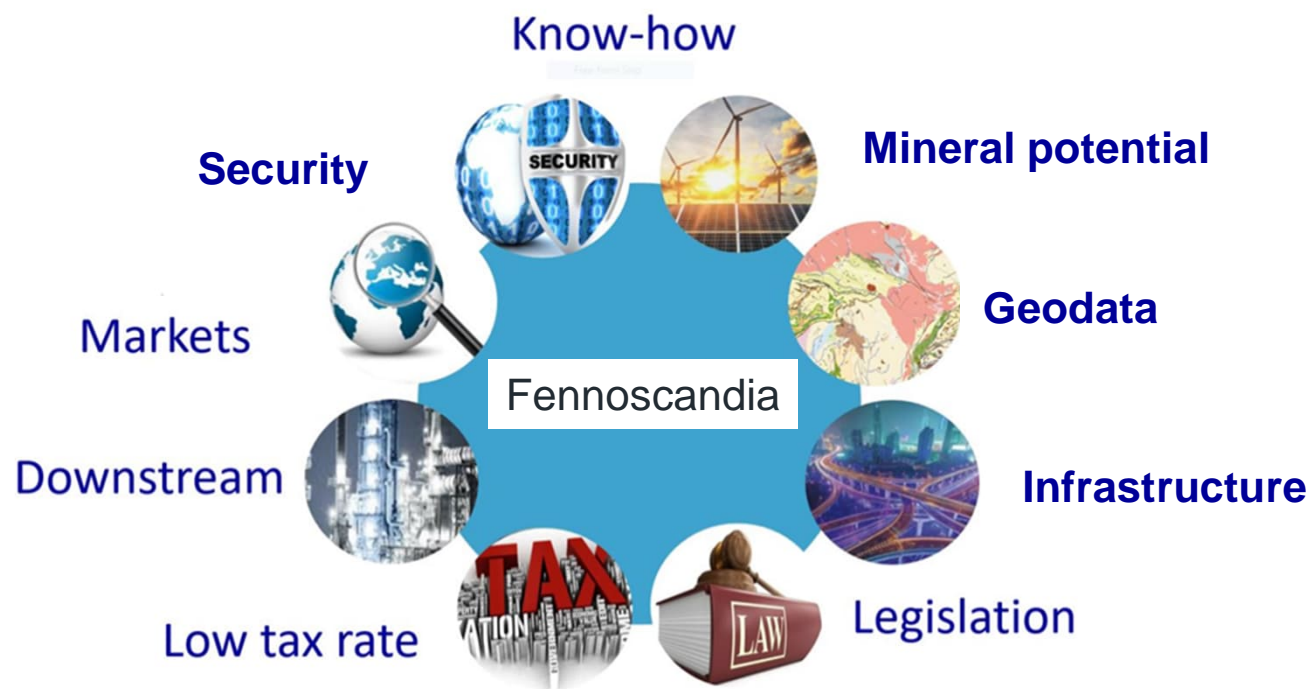
Resource

Fennoscandian ore deposits and the CSRM list – new exploration strategies?

- Li rich clays (Metamorphosed supracrustals; Thacker Pass type)
- Ti, V, Hf, REE (Metamorphosed supracrustals; heavy mineral sands)
- Li (granite related, geochemical/geophysical sampling density? Lithogeochemistry vs till geochemistry?)
- Co, Sc, V (IOCG / IOA)
- PGM (Layered intrusions)



Fennoscandia - excellent location to operate



EXPLORE IN FENNOSCANDIA!



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