

How can Swedish industry extract more critical raw materials from by-products in smelters and mines?

Project leader

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Partners

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Project duration

15 januari 2025 - 14 juni 2025

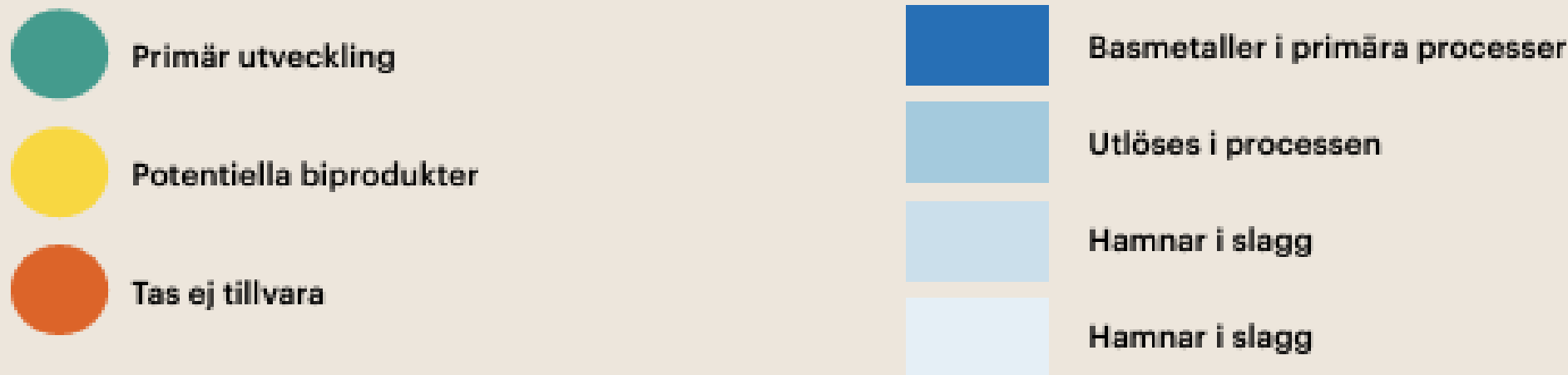


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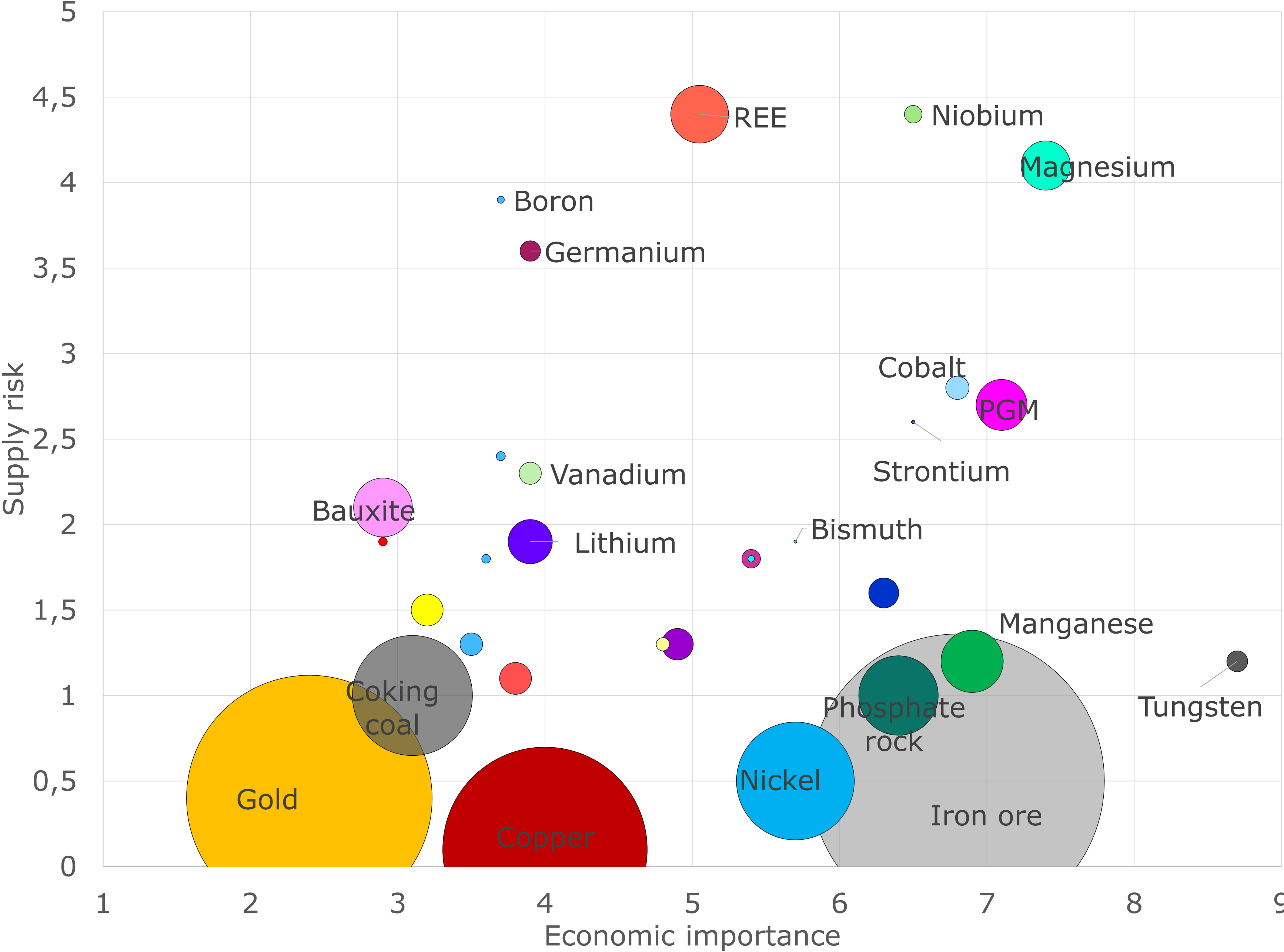
Goals of the project

- By-products in the Swedish/Nordic mining and smelter industry - focus on non-ferrous smelters.
- The project is an initial study to summarize the situation of by-products in Sweden/Nordic.
- Which critical raw materials are processed as by-products?
- What potential is there in Nordic ores?
- How can the process steps be developed to utilize more by-product metals?

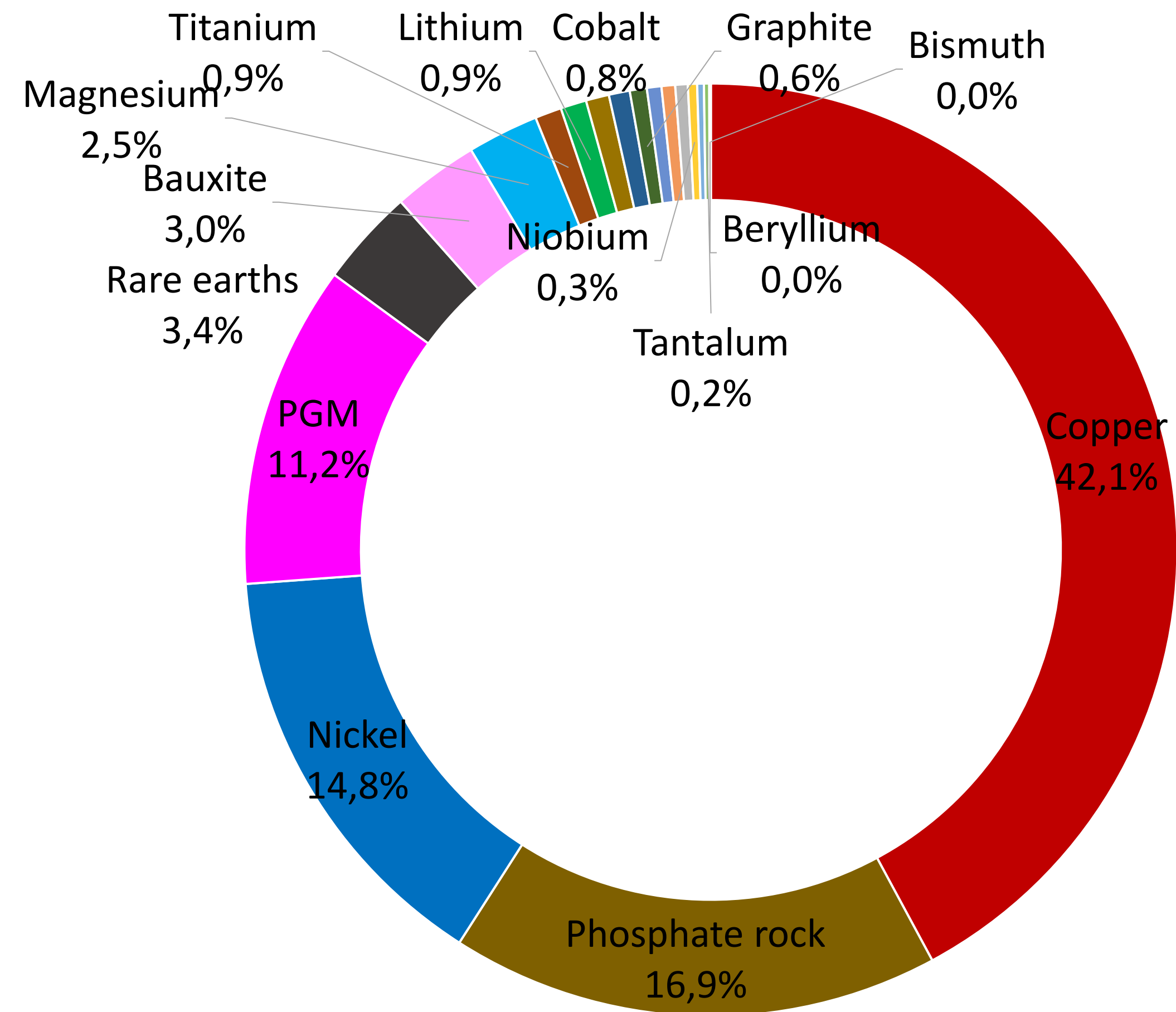




EU- Criticlaical Raw Materials

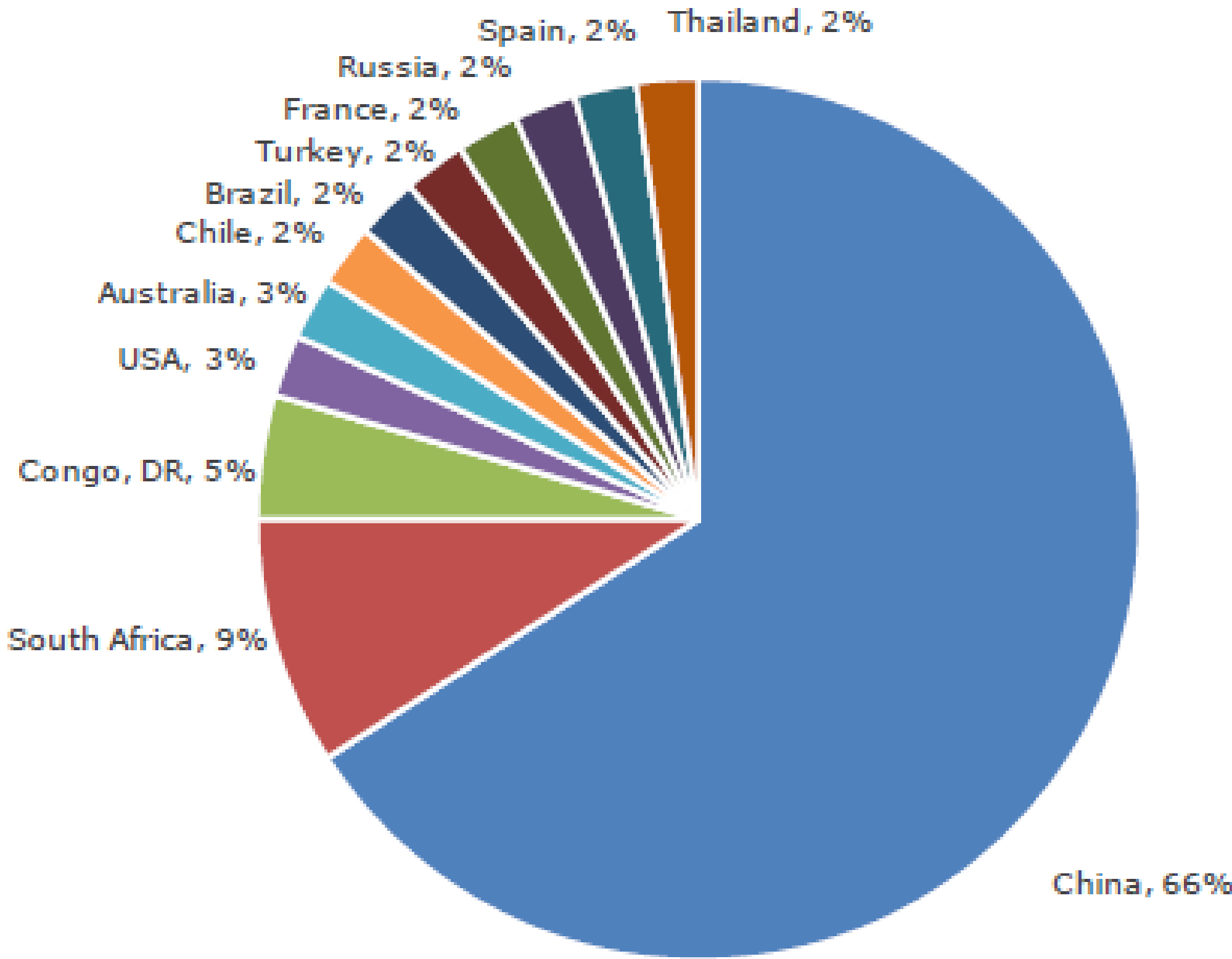


Value of CRM at mine stage

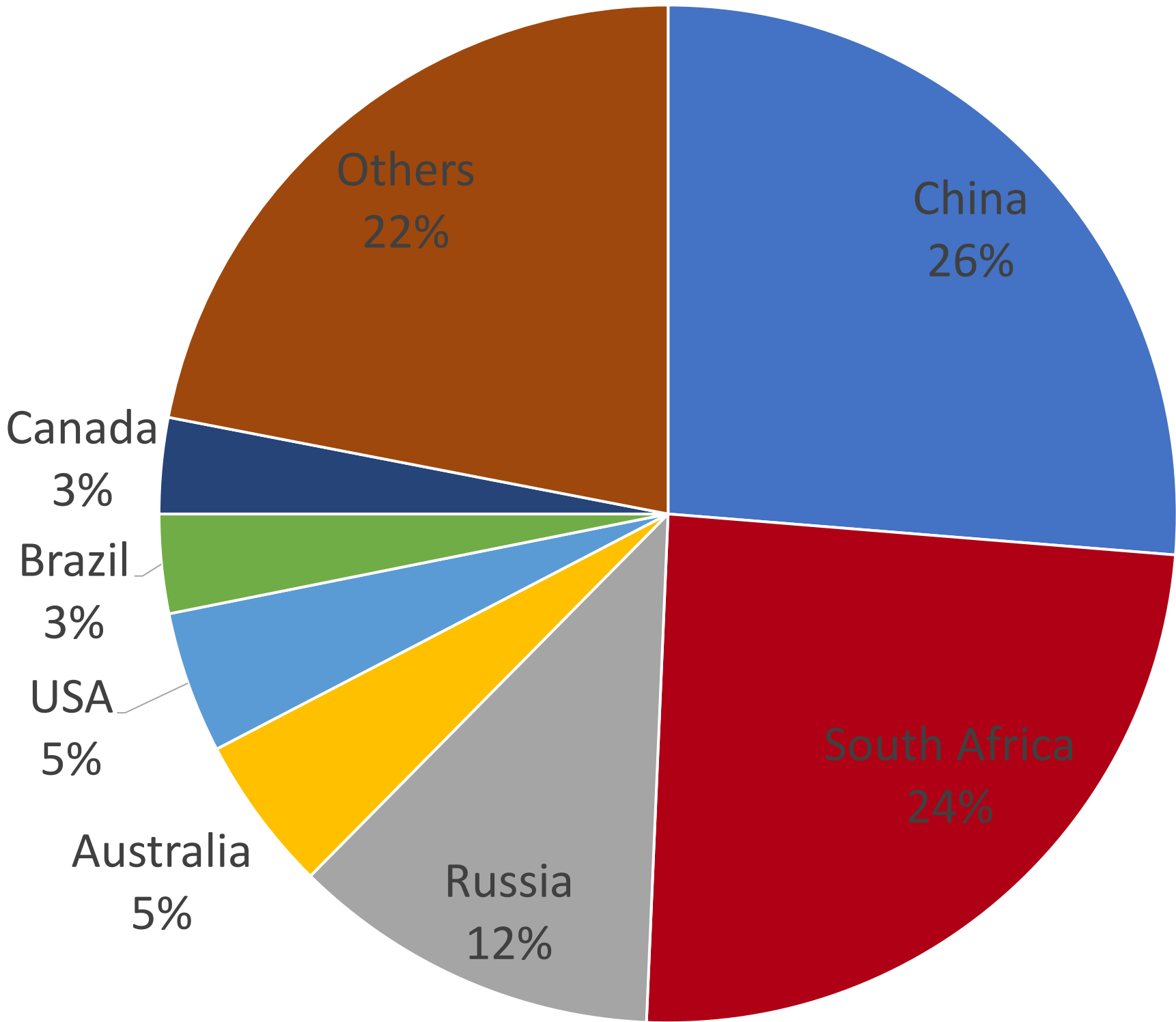


China- CRM

Number of critical raw materials
China are the most significant global supplier of

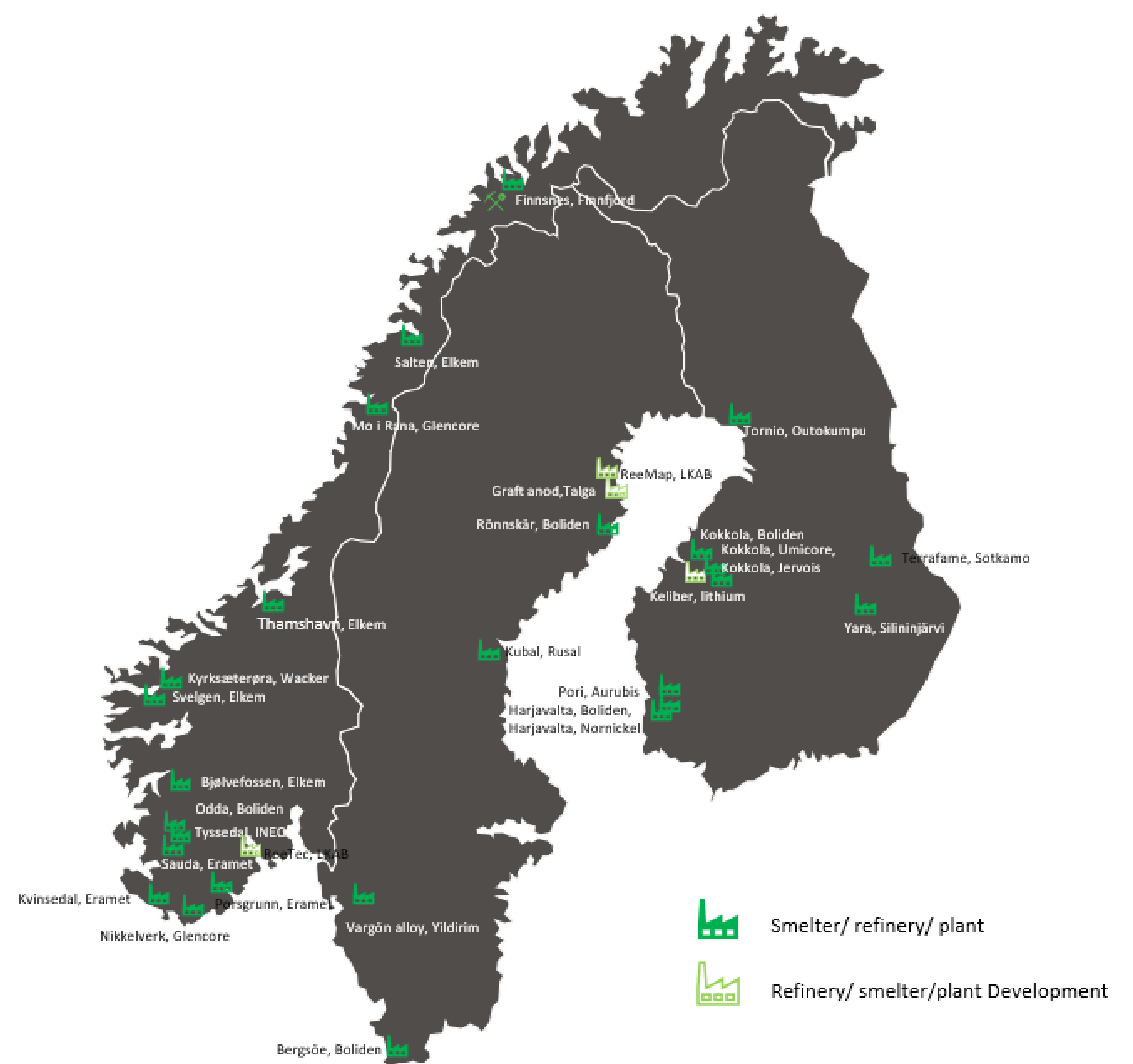


Value of CRM metals by country
(minestage)



Smelters in the Nordic

The Nordic countries account for a significant share of the EU's production of refined metals.



Refined metals – a global product

“EU-produced” metals are a product from all over the world.



Boliden smelters

1. A long-term predictable price picture (a price floor)
2. Access to cheap fossil-free electricity
3. Access to carbon dioxide emission allowances



Results so far

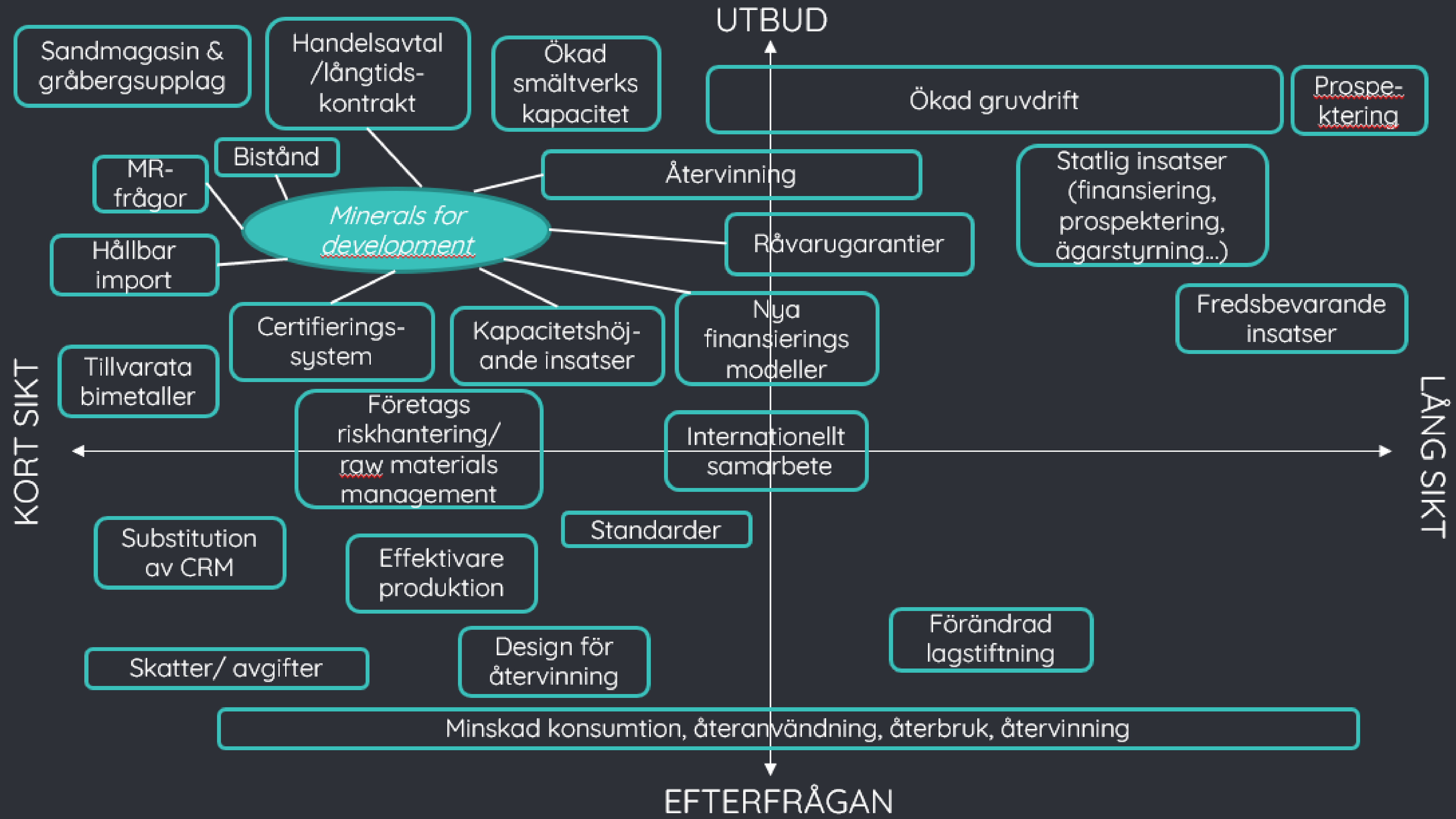
- RMG Consulting has conducted a study based on interviews with smelters.
- Existing smelters in the Nordic region are hesitant to process by-products and extract more critical raw materials.
- RMG Consulting can conclude that the EU's goal of increasing the production of critical raw materials will be very difficult to achieve when even existing smelters do not want to process more critical raw materials.

Slutsatser- EUs dilemma

- Many critical raw materials are mainly produced as by-product metals in smelters
- It is possible to produce several different critical raw materials from by-products in existing smelters in Sweden/Nordic/EU.
- The big question is at what cost?
- Who will pay for the EU-produced critical raw materials? Nordic smelters hesitant to produce more critical raw materials (commercially) in existing smelters because:
 - the costs are high the potential revenues are low (small CRM in terms of volume)
 - the risk is high -uncertain future price picture.
 - risk of increased carbon dioxide emissions

Subsidies and guaranteed prices will be needed

- Self-sufficiency is an expensive strategy



Upcoming activities and next step

Create a better understanding both nationally and at EU level about critical raw materials, not based on a fear of a shortage but on knowledge.

The EU and Sweden have a lot to learn about critical raw materials.

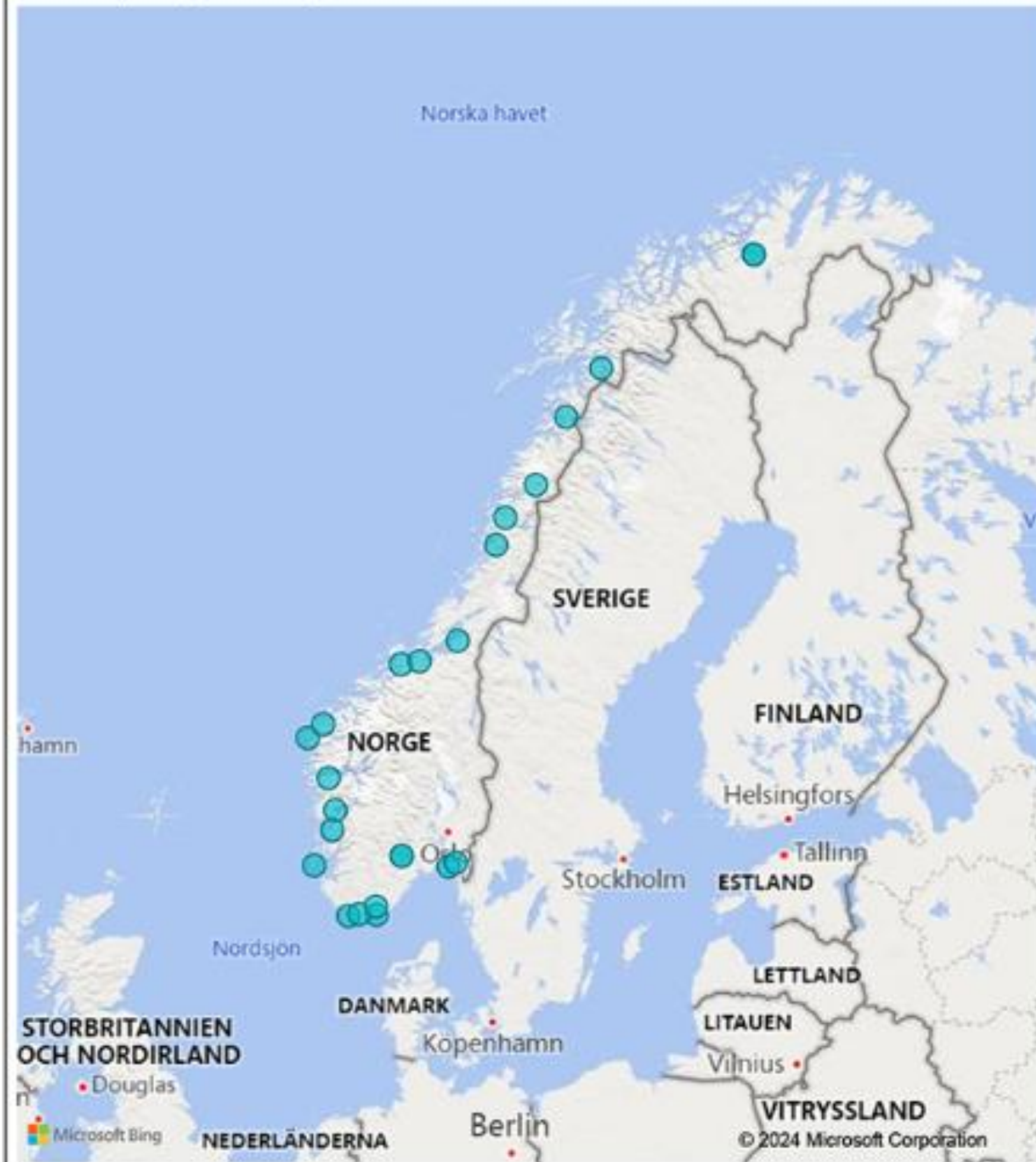
In the longer term, resilient supply chains can be created with developing countries instead of unilaterally trying to increase production within the EU.





Material Side Stream Database

Municipality, County



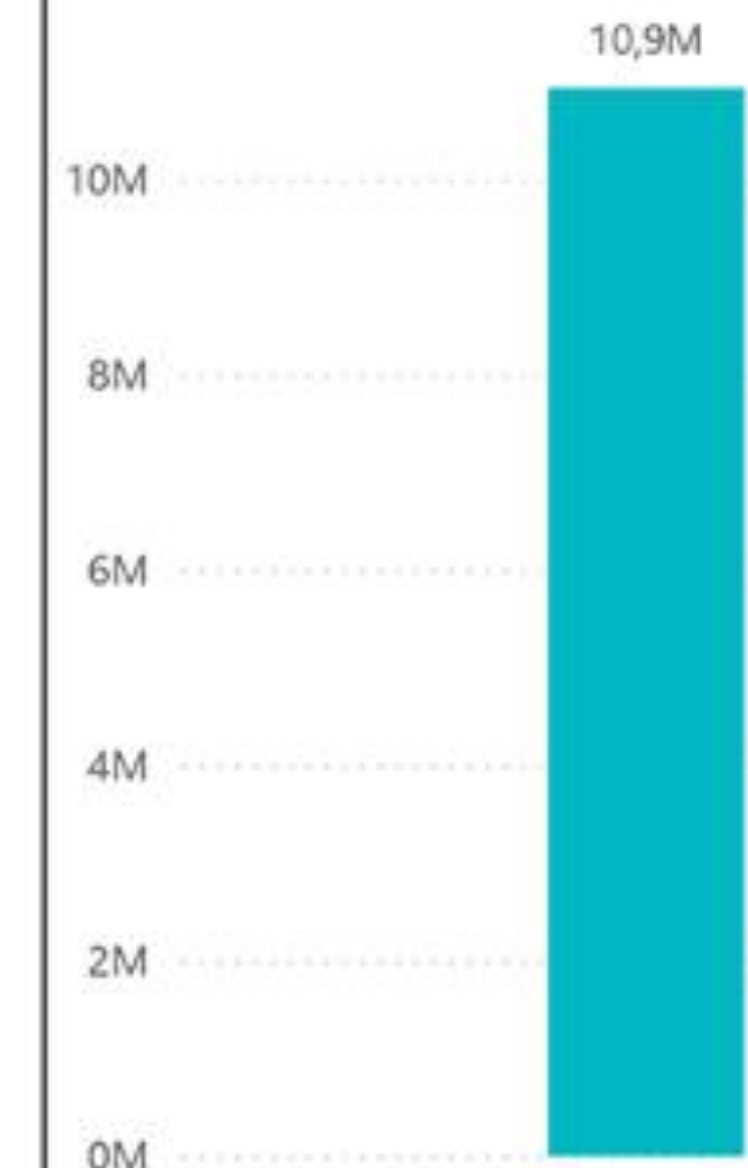
Example of Material sidestream Production (tonns/year)

Anorthosite -overburden	5 200 000
FeMn slag	270 000
Quartz , small fractions, 0-13 mm	170 000
Offgrade olivine	50 000
Overburden - dolomite marble with other minerals and rocks	50 000
Hydrochloric acid	30 000
Ilmenite sand	20 000
Aluminium dross	16 000
Fly ash	11 600
FeMn sludge	10 000
Phosphate sand	10 000
Bottom ash	9 000
Total	5 846 600

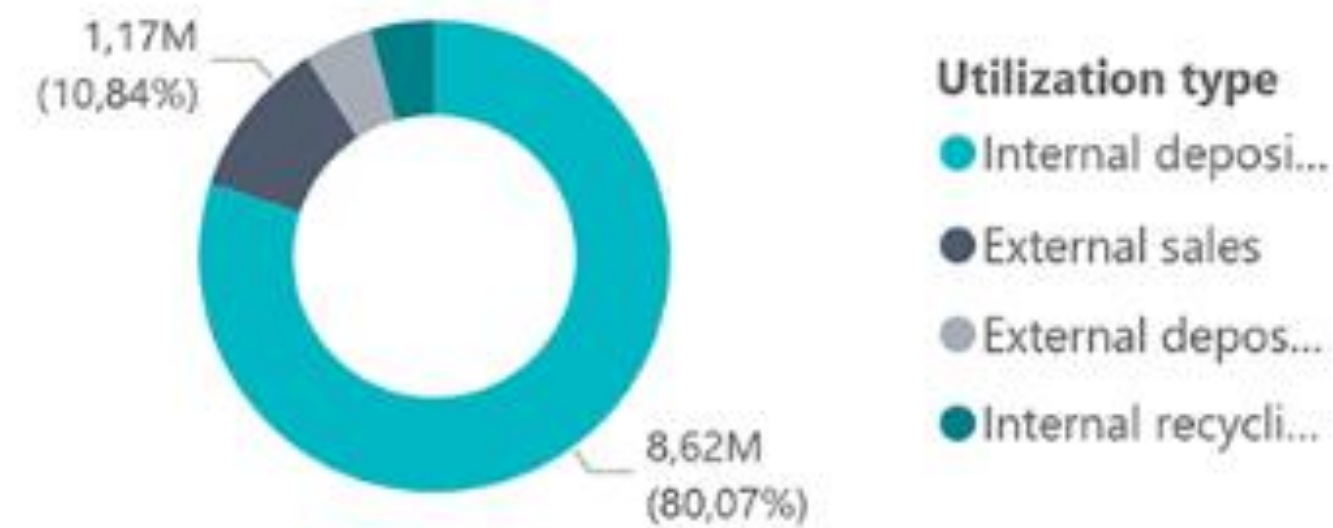
51
No. of organizations

250
No. of Side streams

Yearly production



Utilization of Side stream (tons/year)



Mining innovation for a sustainable future