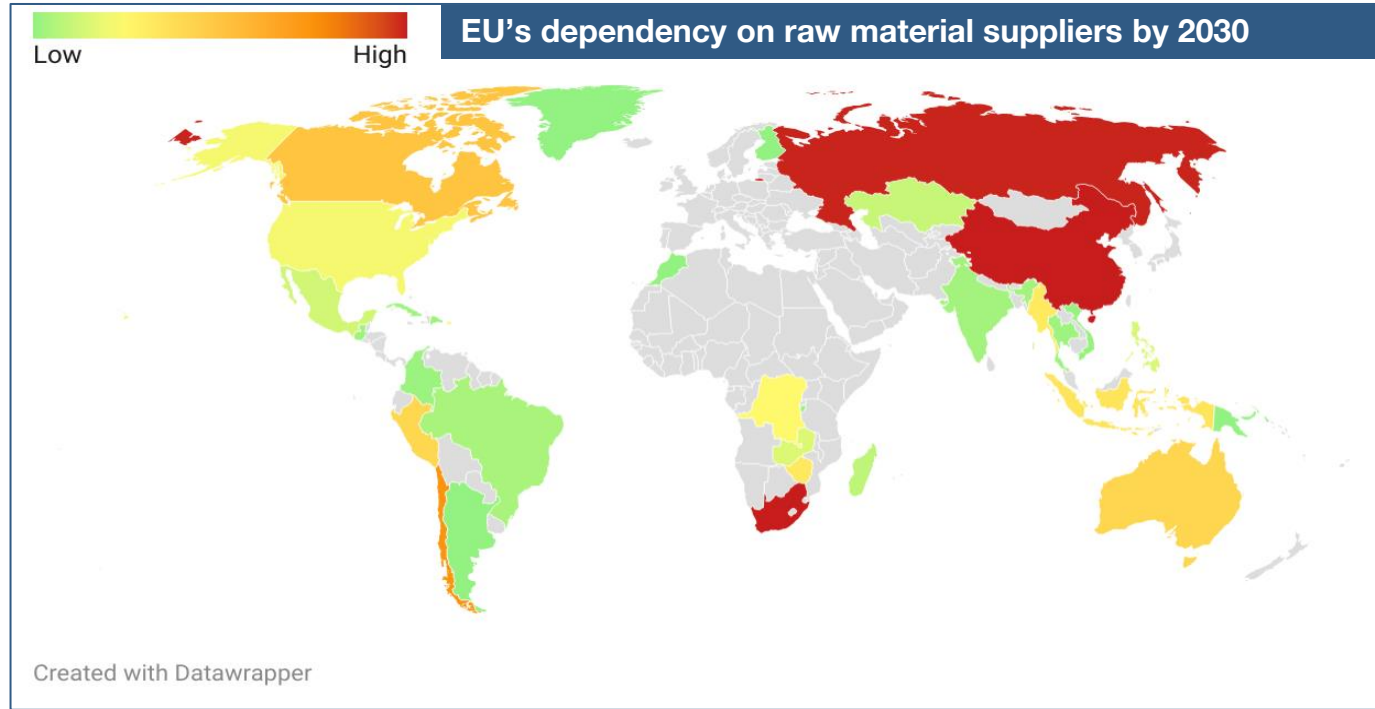


David against Goliath: The European Union facing the issue of critical minerals and metals



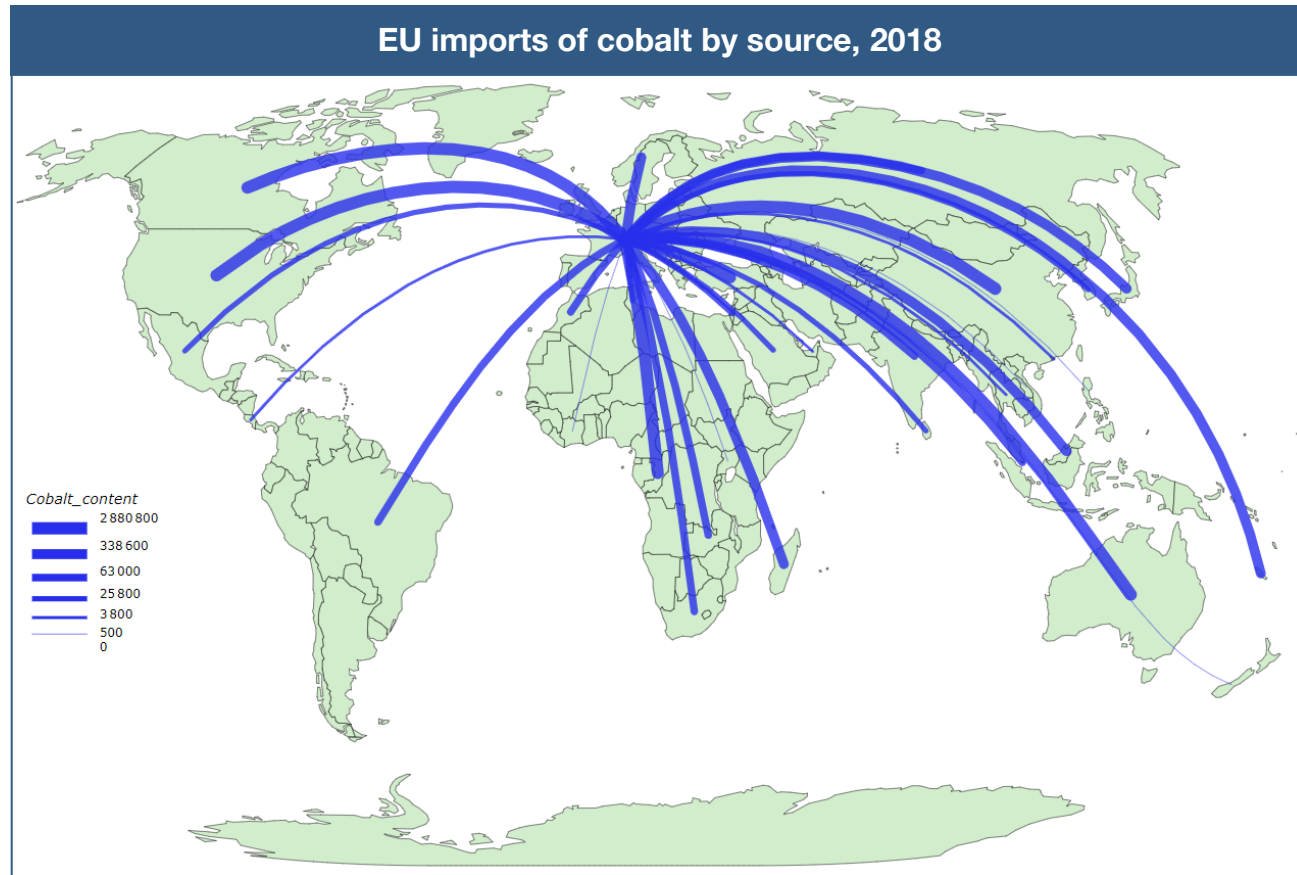
Marc-Antoine Eyl-Mazzega, Juliette Blais
Ifri Center for Energy & Climate
Paris, September 6, 2021

A growing EU dependency on supplies from South Africa, Russia, China and to a lesser extend on Chile, Australia, Indonesia, DRC

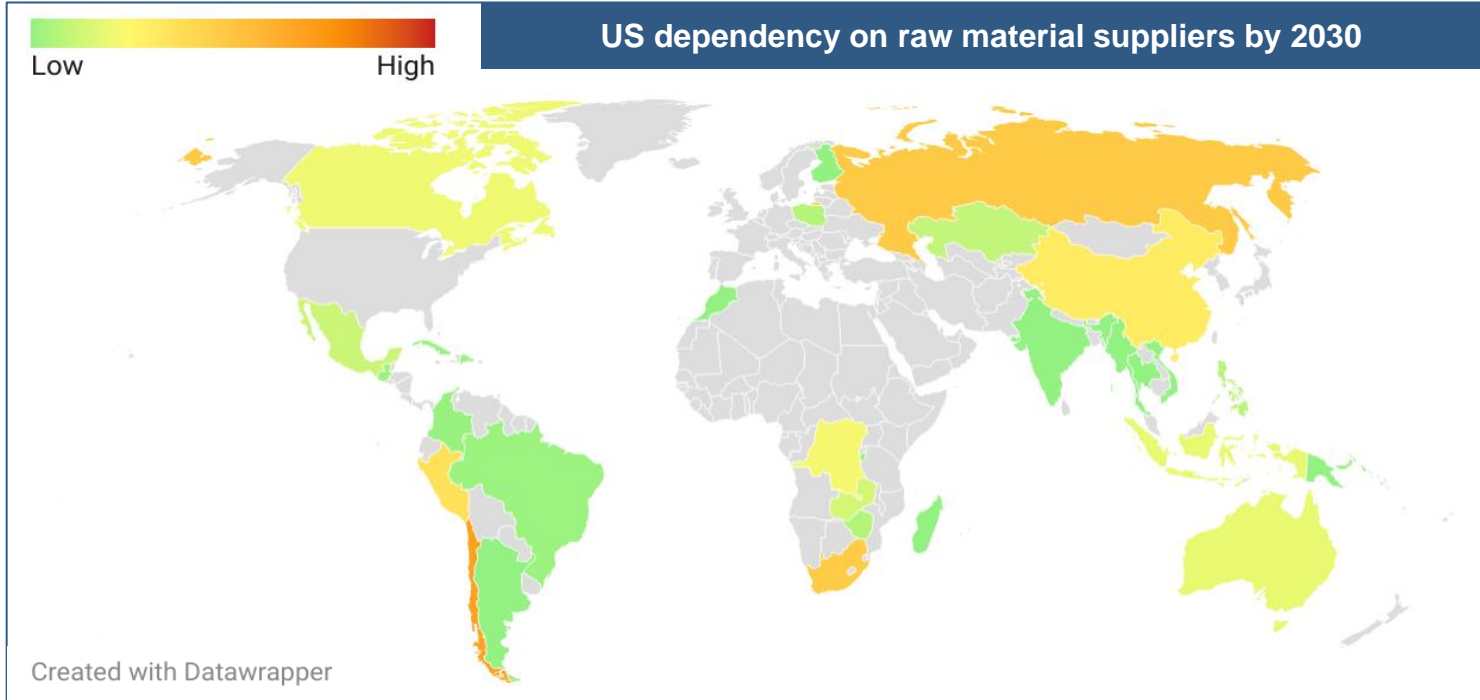


For other metals, countries of importance to the EU include: Kazakhstan (15% of chromium production and the largest uranium supplier), Namibia (major uranium exporter), South Korea (1/4 of indium production), Ghana and Gabon (manganese), Mozambique (Graphite), Ukraine...

The EU imports its cobalt from all over the world, with a very diverse supply in Asia and the Pacific



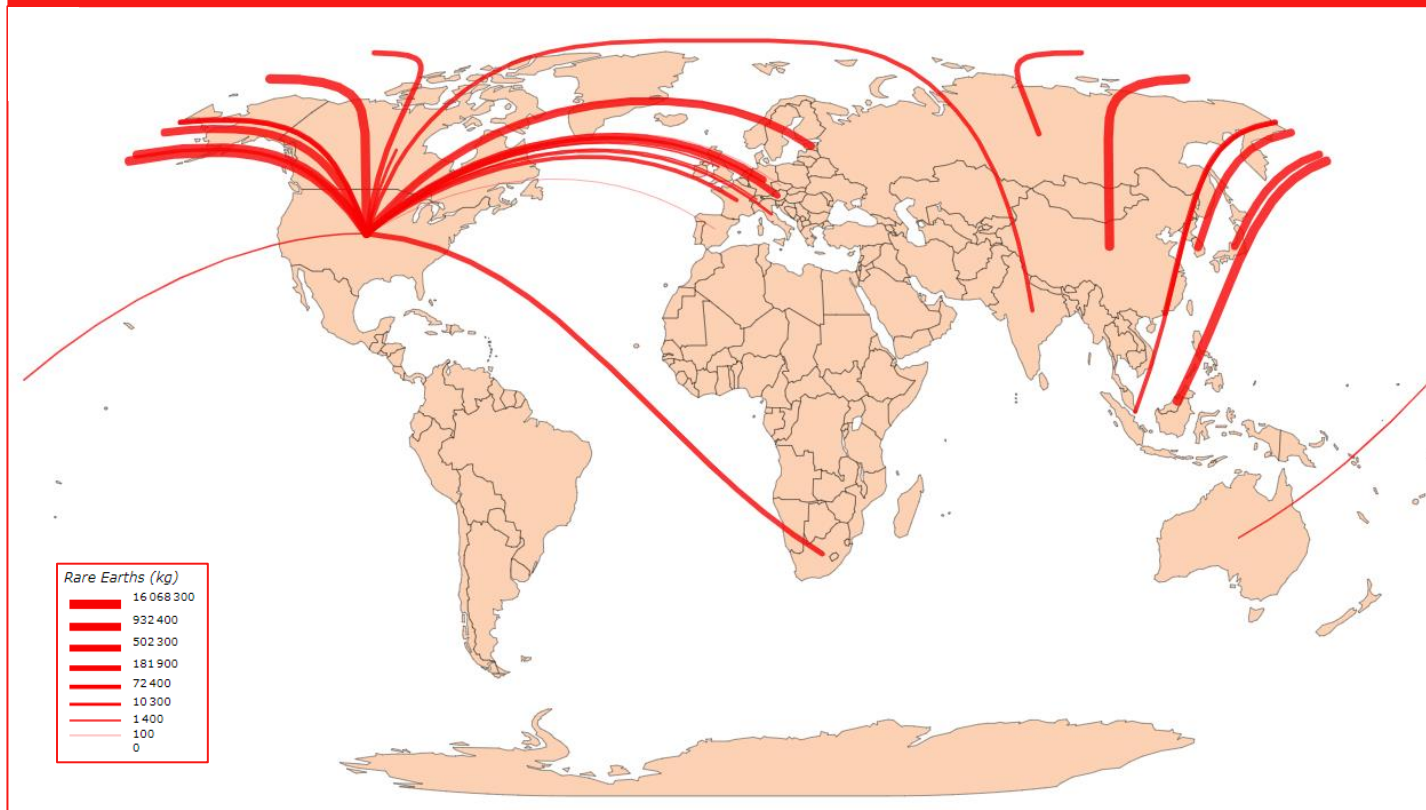
The US will be in a better position than Europe, thanks to its resources and active domestic supply strategy



The very comprehensive minerals strategy developed by the US is expected to revive the development of its mining industry, thanks to public subsidies – the Mountain Pass mine, with a unique concentration of rare earths, is operational again. Yet the country will also need to revive the refining segment.

The US is mainly dependent on the Asia-Pacific region, and also imports from Europe

Rare earths flows, US imports, 2019



European companies do not balance global leaders, even the top EU mining companies

TOP 10 mining companies (2019) – TTM revenue (\$bn)

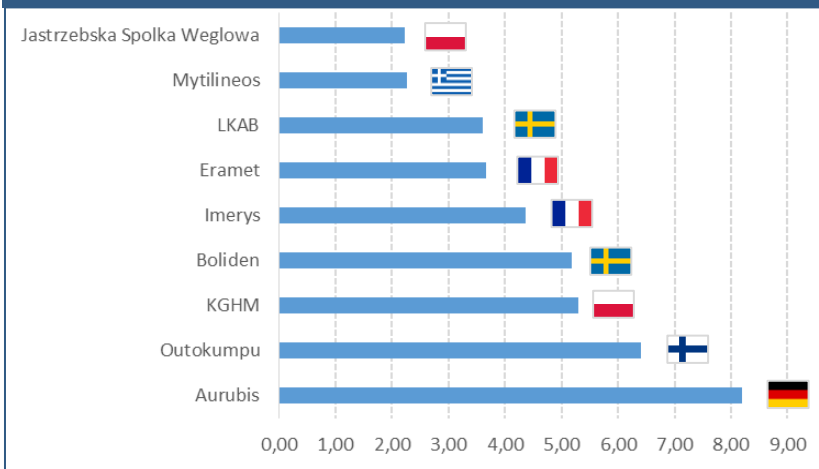


Glencore largely dominates the market while there is a very powerful Chinese presence in the world ranking.

UK companies also have a major place. Other European companies have revenues five to twenty times smaller than the smallest player in the top ten global ranking.

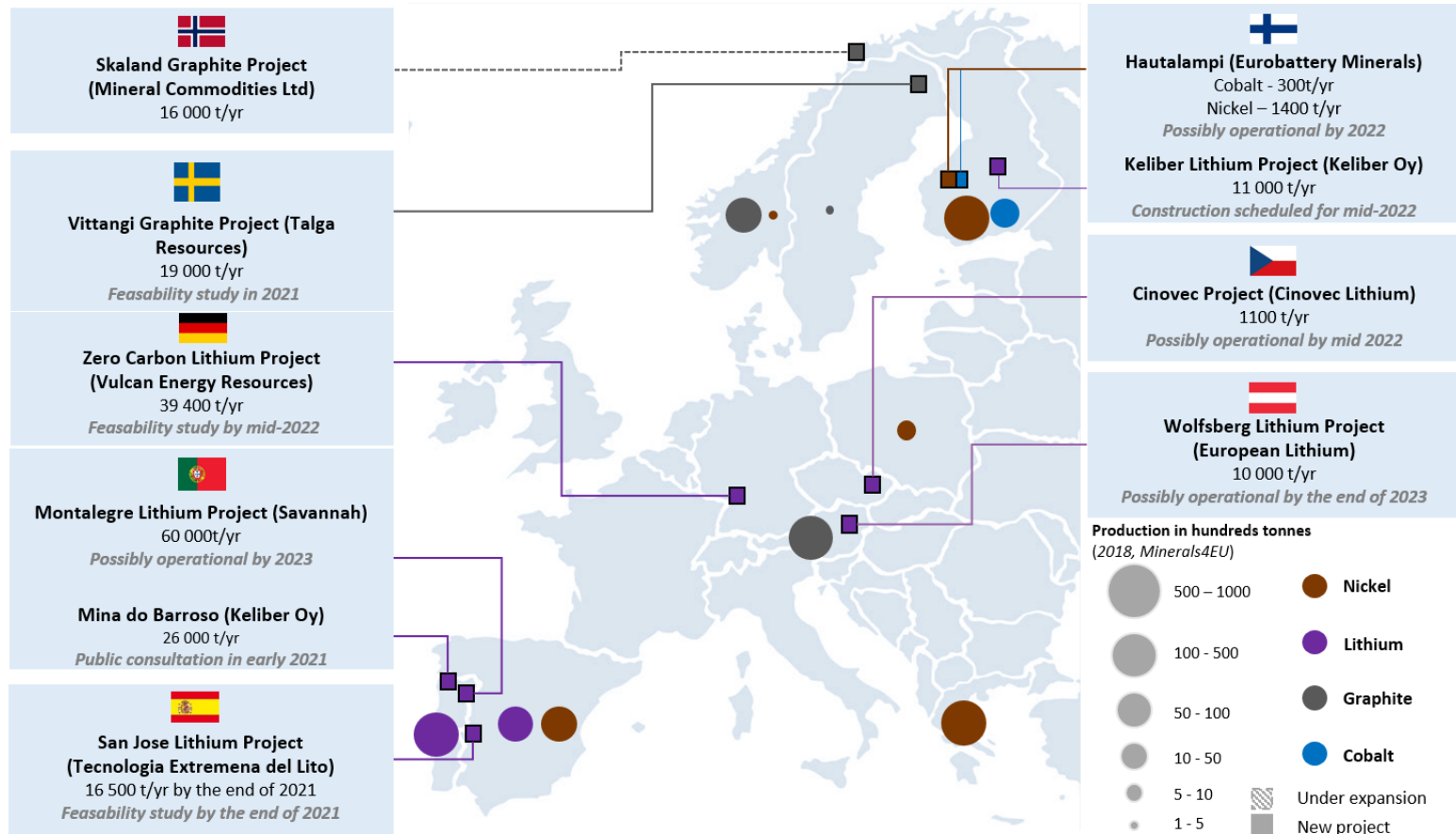
Some players could develop into niche markets, such as geothermal lithium extraction.

Major EU mining companies (2019) – Sales revenue (\$bn)



EU companies are small and very marginal players compared to Canadian, Brazilian, Australian, Swiss and Chinese companies. The high share of intra-company trade, or among state entities, reduce transparency and market liquidity. They also open the possibility, in future, for coordinated actions or cartel behaviour.

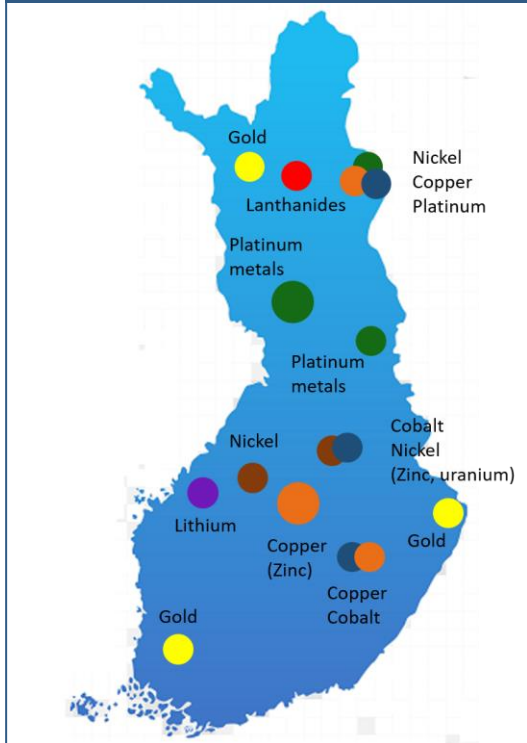
Europe's mineral extraction is burgeoning, led by Finland, but volumes will remain marginal while refining will matter



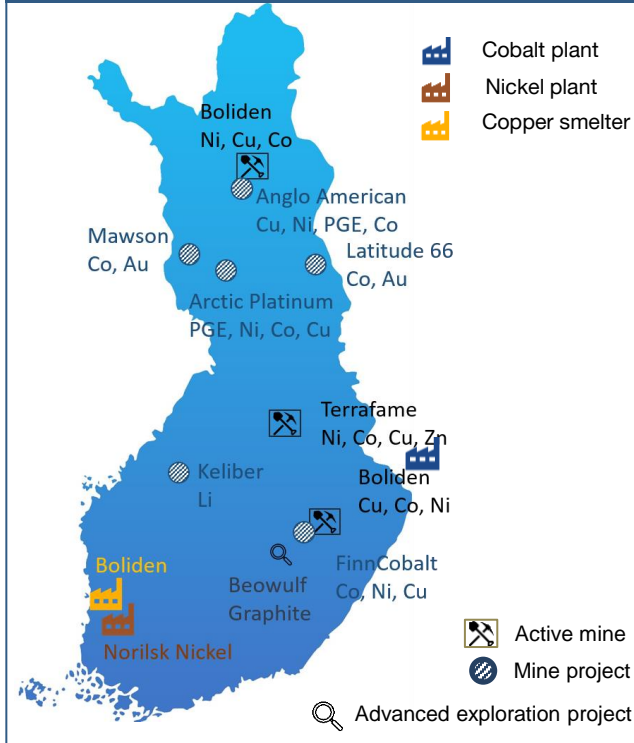
Source: Ifri, based on company/project data

Finnish soils are rich in minerals, and many exploration and mining projects are planned or already in operation

Mapping of available minerals resources and reserves



Mining, processing and refining facilities



Sweden is another mining leader in Europe, with 90% of the iron ore produced in Europe extracted in Upper Norrland, alongside new graphite and copper-cobalt projects.

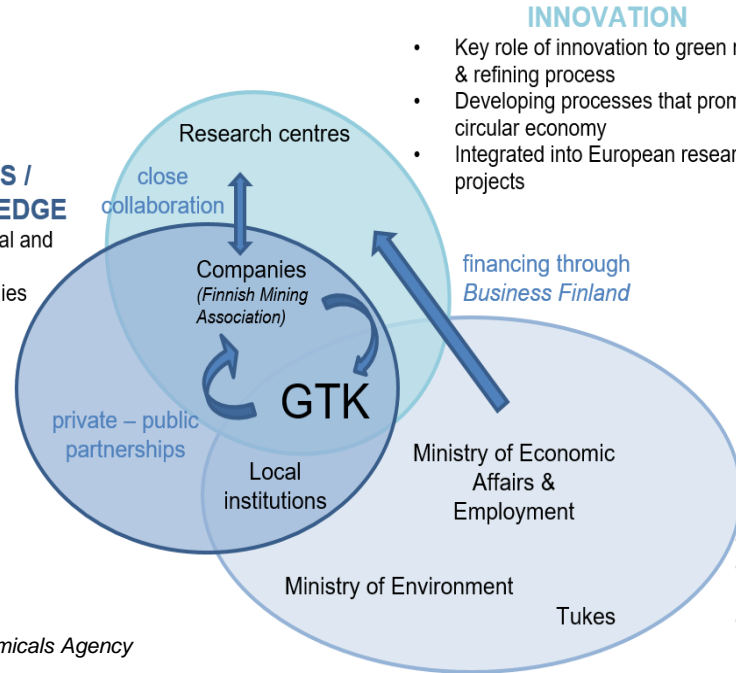
Key to successful development are inclusive mining development processes, predictability and trust, alongside skilled labour force.

And a strong value chain integration and circular economy culture.

The Finnish mining ecosystem: a model for the Golden rules of sustainable, responsible and effective mining

MAPPING RESOURCES / GEOSCIENTIFIC KNOWLEDGE

- High quality geoscience national and regional database
- Prompt to use digital technologies



INNOVATION

- Key role of innovation to green mining & refining process
- Developing processes that promote circular economy
- Integrated into European research projects

POLICY / REGULATION

- Efficient permission system
- Finland's Mineral Strategy and *Green Mining Concept* implemented by the GTK
- Consultation and dialogue at/between national, regional and local levels

*Tukes = Finnish Safety and Chemicals Agency

In the 2020 Fraser Institute Annual survey of mining companies, Finland ranks 10th in Investment Attractiveness Index and 3rd in Policy perception Index, thanks to a good mix of regulation & flexibility, collaboration between different public, private and institutional levels and scientific & research excellence.

The European Raw Materials Initiative needs to move up a gear

EU battery alliance and strategy to move up the raw material value chain through mining and recycling is a core element of EU's industrial strategy and a an unprecedented success of the European Commission. Unprecedented and highly successful coordination and financial support efforts and support to innovation and scale up:

- EITTechnology, HorizonEurope
- Battery cell IPCEIs: triggered dozens of billion euros in investments
- Recycling IPCEIs
- Battery recycling directive forthcoming relating to sustainability and safety, labelling and information, end-of-life management
- Embryo of mining support: ERA-NET Cofund scheme

The challenge is now to move bigger, faster and take up the geopolitical challenges:

- More political and financial support to foreign mining projects
- Support to refining projects in Europe
- Support to recycling activities in Europe
- Need for new IPECEIs and greater involvement by EBRD and EIB
- Develop skills and education