



## GeoERA RAW Materials Products - first of their kind -

- 1<sup>st</sup> combined database (MIN4EU) with data on mineral occurrences and mines, production, trade, resources and reserves (MINTELL4EU);
- 1<sup>st</sup> set of national atlases on ornamental stones (EUROLITHOS);
- 1<sup>st</sup> compilation (aggregated form) of the mineral occurrences, geology and potential for REE, lithium, cobalt and graphite and for the first time it was possible to make clusters of deposits and metallogenic (FRAME)
- 1<sup>st</sup> pan-European maps on marine deposits (MINDeSEA);
- 1<sup>st</sup> pan-European predictivity maps on marine and landlocked CRM (FRAME and MINDeSEA)



<https://geoera.eu/themes/raw-materials/>

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 731166





# Mineral Intelligence for Europe

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# Comparable and reliable Raw Materials data

- **Minerals Inventory (31 countries):**
  - Mineral occurrences
  - Mines
  - Aims at full automated 'harvesting' system



**MIN4EU**



**EGDI**




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# Mineral occurrences



GeoERA - Raw Materials






+ Base layers

Layers

- Mineral Resources

☐ Critical raw materials occurrences

☒ Mineral occurrences

Commodity deposits importance:

All deposit sizes  
Very large deposit (A)  
Large deposit (B)  
Medium deposit (C)  
Small deposit (D)  
Occurrence / Not specified

CTRL + click to select more than one entry.

Commodity group:


All commodity groups  
Base metals  
Building raw materials  
Ceramic and refractory minerals  
Energy commodities  
Fertilizer minerals  
Iron and ferro-alloys metals

CTRL + click to select more than one entry.

Commodity:

Vanadium  
Vermiculite  
Wollastonite  
Zinc  
Zircon  
Zirconia  
Zirconium

Reset

 Desktop GIS ?

☐ Occurrence areas

☐ Mines

☐ Tourist mine site

POINT(2853057.1009413265 3019690.166632904)

Go to location...

Zoom Area Path N North

Ireland

Ros Comain

Drogheda

Dublin

Shannon

Limerick

Kilkenny

Waterford

Cork

Tralee

Carrauntoohil 1038 m

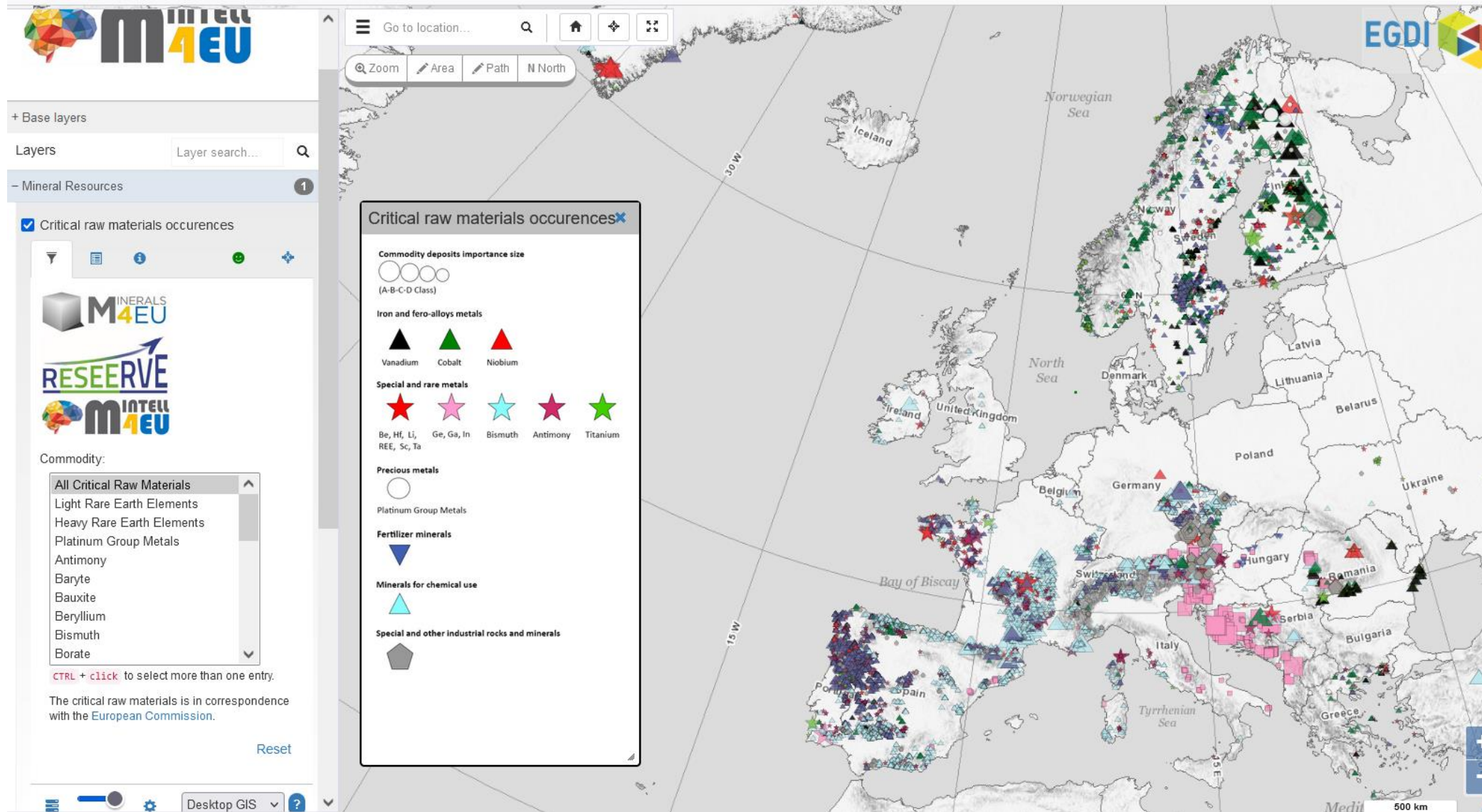
Killarney

20 km

EPSG:3034 : 2818715, 3046773 EPSG:4326 : -8.3654, 52.9230



# Critical Raw Materials



# Mines



GeoERA - Raw Materials



+ Base layers

Layers

Layer search...

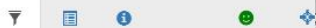
- Mineral Resources

☐ Critical raw materials occurrences

☐ Mineral occurrences

☐ Occurrence areas

☒ Mines



Commodity:

- All commodities
- Aggregates
- Alumina
- Aluminium
- Aluminosilicate
- Alunite
- Amazonite

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This project is an innovation



Commodity:

- All commodities
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CTRL + click to select more than one entry.

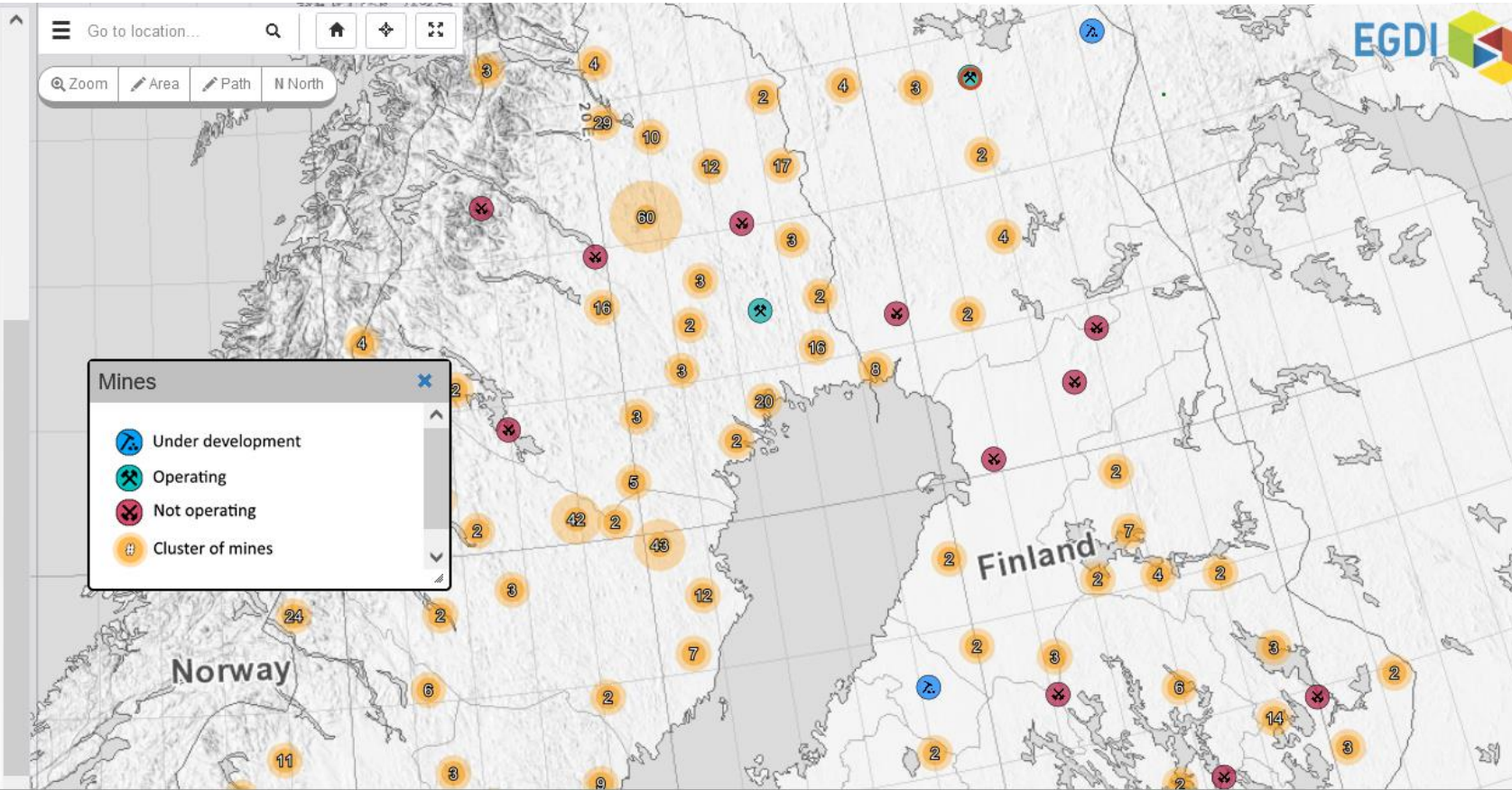
Operational status of the mine:

- All operational statuses
- Under Development
- UnderDevelopment
- Feasibility
- PendingApproval
- Construction
- Operating status

CTRL + click to select more than one entry.

Mining activity:

- All mining activities
- BoreholeMining



Details

Mines [New window](#)

Go to	Name	Alternative Name	Inspireid	Miningactivity	Status	Commodity	Processing Information	Start Date	End Date
	Kevitsa		EarthResource/12	openPit	operating	Cobalt, Copper, Gold, Nickel, Palladium, Platinum	process type: Unknown Treatment, amount: 62664000 t	Jan-2011	







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- **Electronic Minerals Yearbook:**
  - Production data (2004 to 2019) 40 countries
  - Trade (export & import) data (2004 to 2018) 36 countries
  - Resource and Reserve estimations, 20 countries



**MIN4EU**



**EGDI**



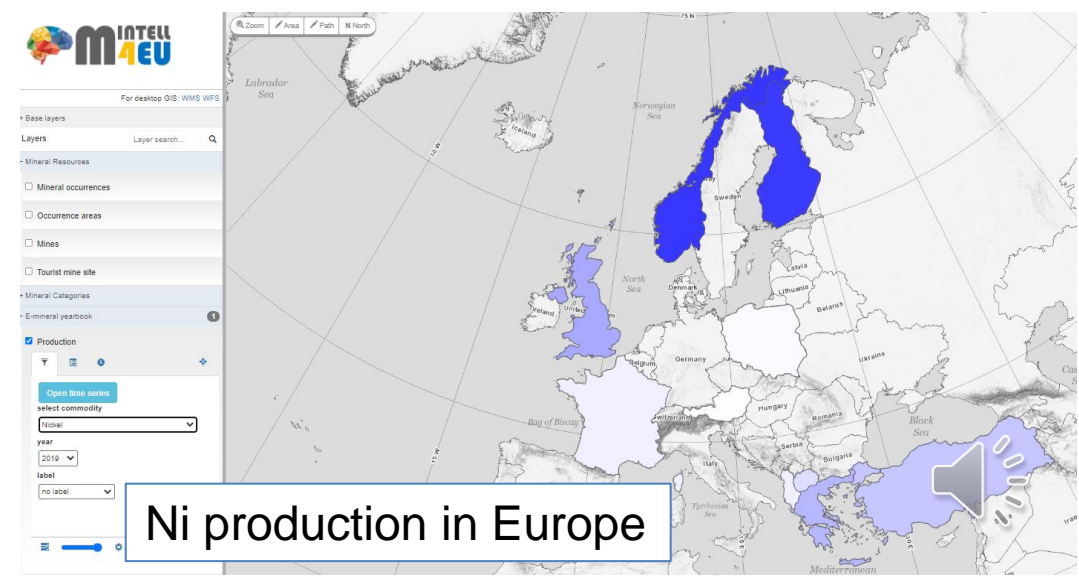
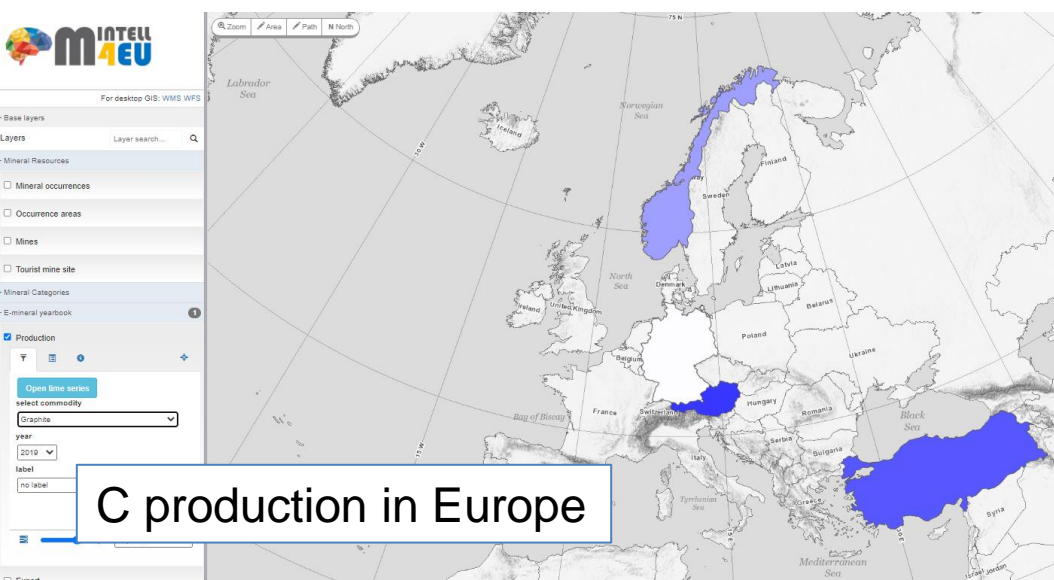
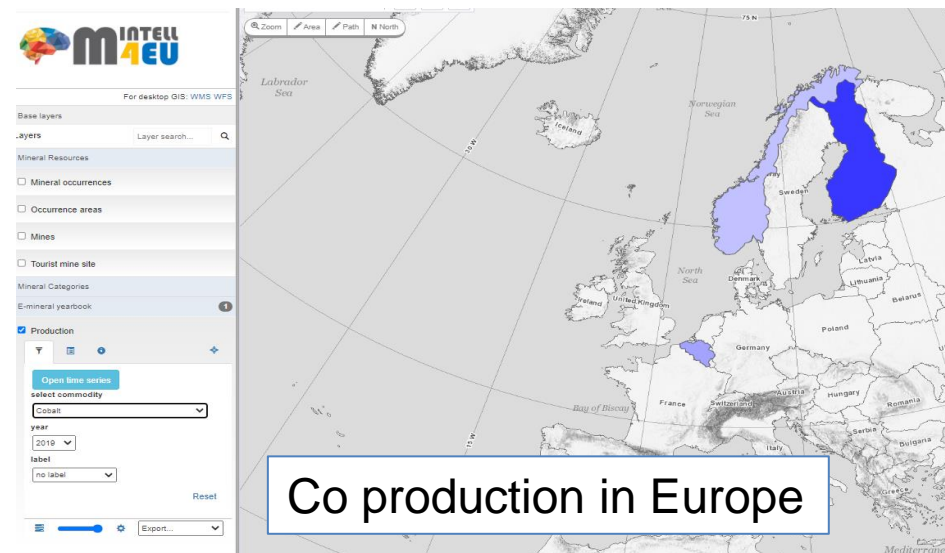
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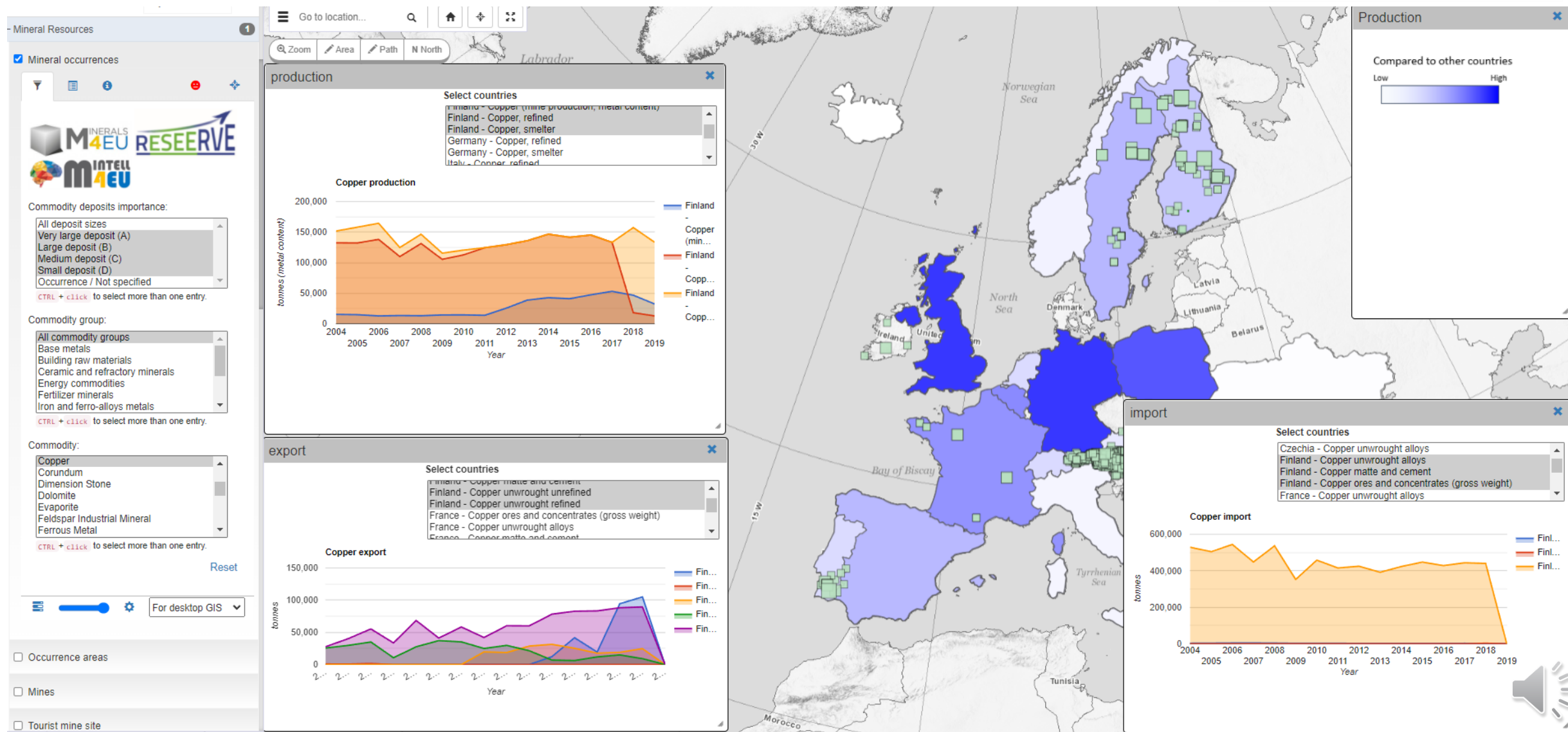
# Minerals Yearbook, battery RM

## Lithium, Cobalt, Graphite & Nickel production in 2019



research and

# Minerals Yearbook, timeseries



# Copper export from 2004 to 2018



Copper export from 2004-2018



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GeoERA - Raw Materials



+ Base layers

+ Layers

+ Mineral Resources

- E-minerals yearbook

☐ Production

☐ Export

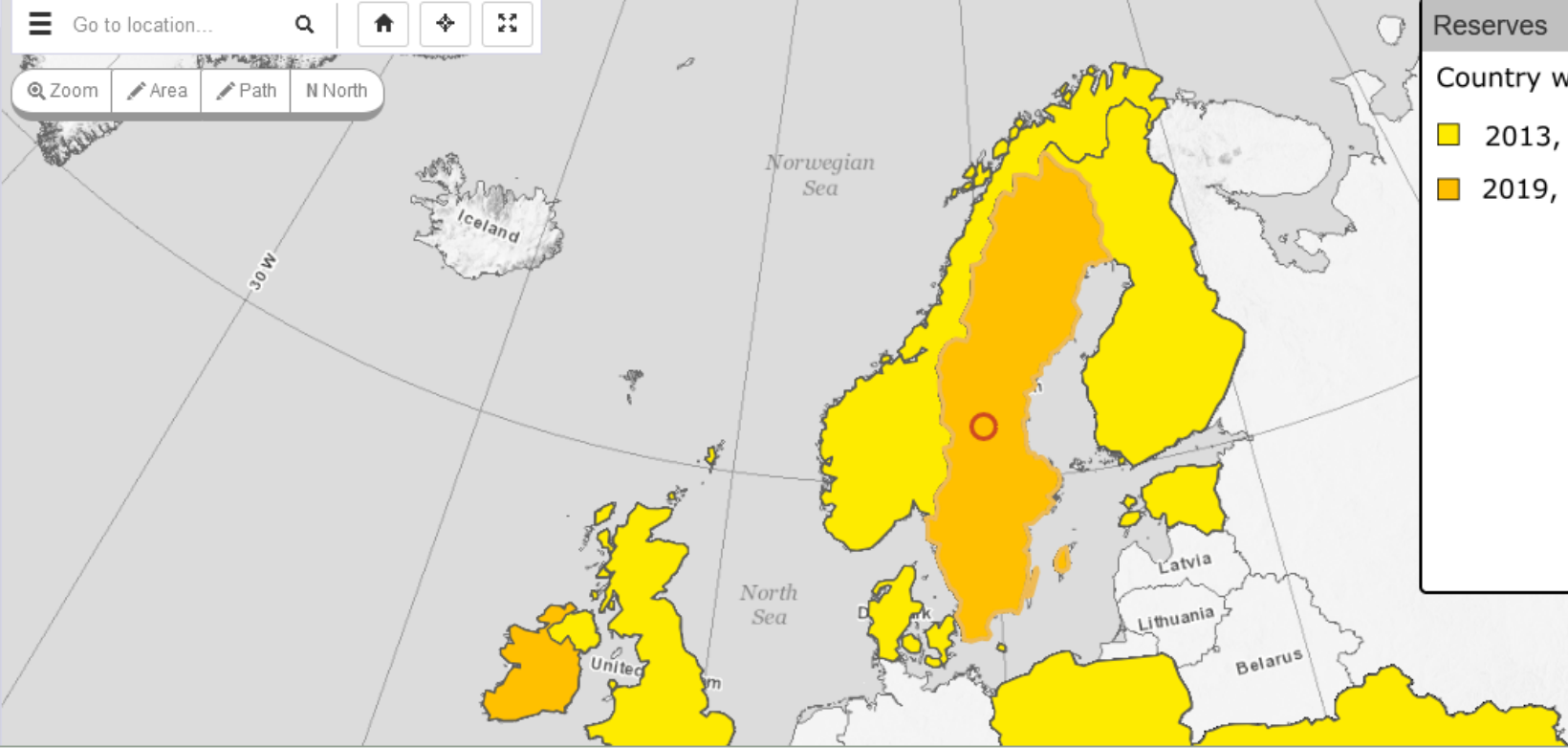
☐ Import

☒ Reserves

Details

Reserves [New window](#)

Go to	Country Name	Collection Year	Commodity Group	Commodity Name	Amount	Grade	Gradeunit	Classification Method Used	Category	Comments
	Sweden	2013	Copper	Copper (mine production, metal content)	.08 Mt	2.1	percent	NI 43-101	probable ore reserves	Copper (Cu). Grade= 2.1%
	Sweden	2013	Gold	Gold (refined metal)	.09 Mt	1.71	gt	NI 43-101	proved ore reserves	Gold (Au). Grade= 1.71 g/t
	Sweden	2013	Silver	Silver (metal)	12.30 Mt	69.0	gt	NI 43-101	proved ore reserves	Silver (Ag). Grade= 69.0 g/t
	Sweden	2013	Zinc	Zinc (mine production metal content)	12.31 Mt	6.69	percent	NI 43-101	proved ore reserves	Zinc (Zn). Grade= 6.69%
	Sweden	2013	Molybdenum	Molybdenum (metal)	134.00 Mt	37.0	gt	FRB Standard	probable ore reserves	Molybdenum (Mo). Grade=
	Sweden	2013	Iron	Iron ore (gross weight)	154.00 Mt	44.67	percent	FRB Standard	probable ore reserves	Iron (Fe). Grade= 44.67%
	Sweden	2013	Iron	Iron ore (gross weight)	165.40 Mt	34.85	percent	NI 43-101	probable ore reserves	Iron (Fe). Grade= 34.85%



Reserves

Country with reserves

2013, Minerals4EU

2019, Mintell4EU



# Resources and Reserves, UNFC



The screenshot displays the GeoERA - Raw Materials web application. The interface includes a sidebar with navigation options like 'Base layers', 'Mineral Resources', and 'E-minerals yearbook'. A map of Europe is shown with several countries highlighted in yellow, indicating they have UNFC data. A legend box titled 'UNFC' shows a yellow square for 'Country with UNFC'. A 'Details' panel at the bottom right displays a table of UNFC data for Greenland.

Go to	Country	Collection Year	Commodity Group	Commodity	Amount	Unfc Class	Unfc Code	Socio Economic Viability	Viability
	Greenland	2019	Cryolite	Cryolite	10.10 kt	Non-commercial projects	E3.2 F2.3 G2	Development Unclassified	Mittuut
	Greenland	2019	Vanadium	Vanadium pentoxide	1.01 kt	Potentially commercial projects	E2 F2 G3	Reasonable Prospects for Environmental-Socio-Economic Viability	Isortoq
	Greenland	2019	Rare Earth Oxide	Total rare earth oxide	110,200.00 kg	Potentially commercial projects	E2 F2 G3	Reasonable Prospects for Environmental-Socio-Economic Viability	Kvanefjeld
	Greenland	2019	Iron	Hematite ore	1.11 Gt	other combinations	E3 F3 G3	No Knowledge of Environmental-Socio-Economic Viability	Isua Iron
	Greenland	2019	Silver	Silver (mine production, metal content)	12,500.00 kg	Exploration projects	E3 F3 G4	No Knowledge of Environmental-Socio-Economic Viability	Ladder
	Greenland	2019	Strontium	Strontium	12.50 Mt	Exploration projects	E3 F3 G4	No Knowledge of Environmental-Socio-Economic Viability	Karstry
	Greenland	2019	Lead	Lead (mine production, metal content)	1.33 kt	other combinations	E2 F2.2 G2	Reasonable Prospects for Environmental-Socio-Economic Viability	Black A

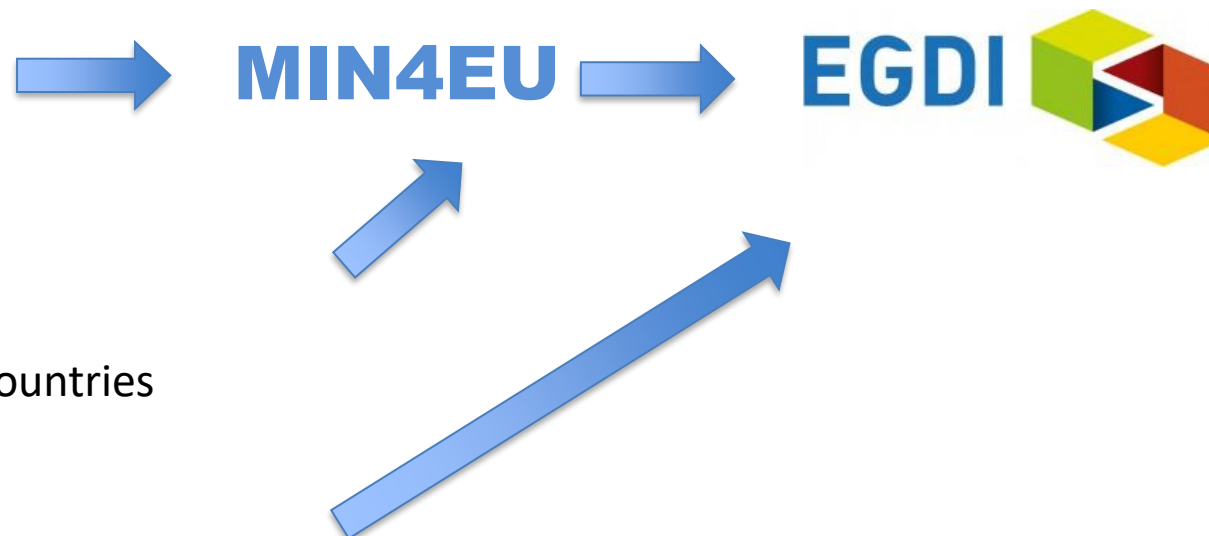


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- **Pilot testing UNFC on Raw Materials**
  - 19 test cases, 13 commodities, nine countries
  - Challenges and recommendations



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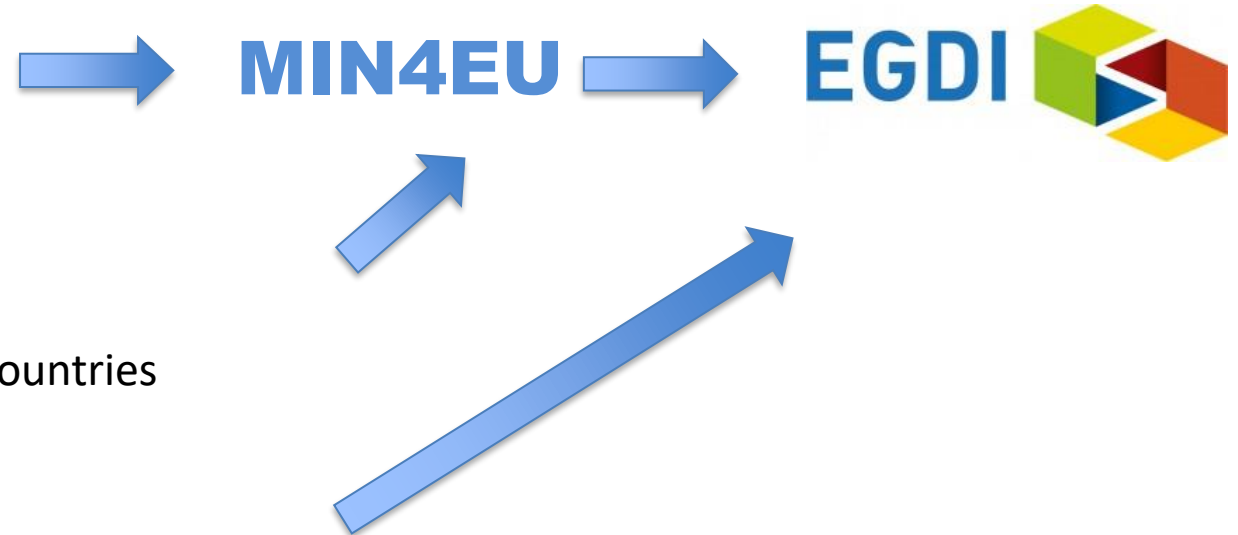




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- **Pilot testing UNFC on Raw Materials**
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  - Challenges and recommendations
- **Sharing data, e.g. with Raw Materials Information System (RMIS)**



## Contributions from a long range of partners!



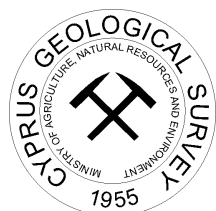
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# THANK YOU FOR LISTENING!



GEOLOGICAL  
SURVEY OF  
NORWAY  
- NGU -



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