

Past, Present and Future of Mining: the Italian Case

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Dipartimento

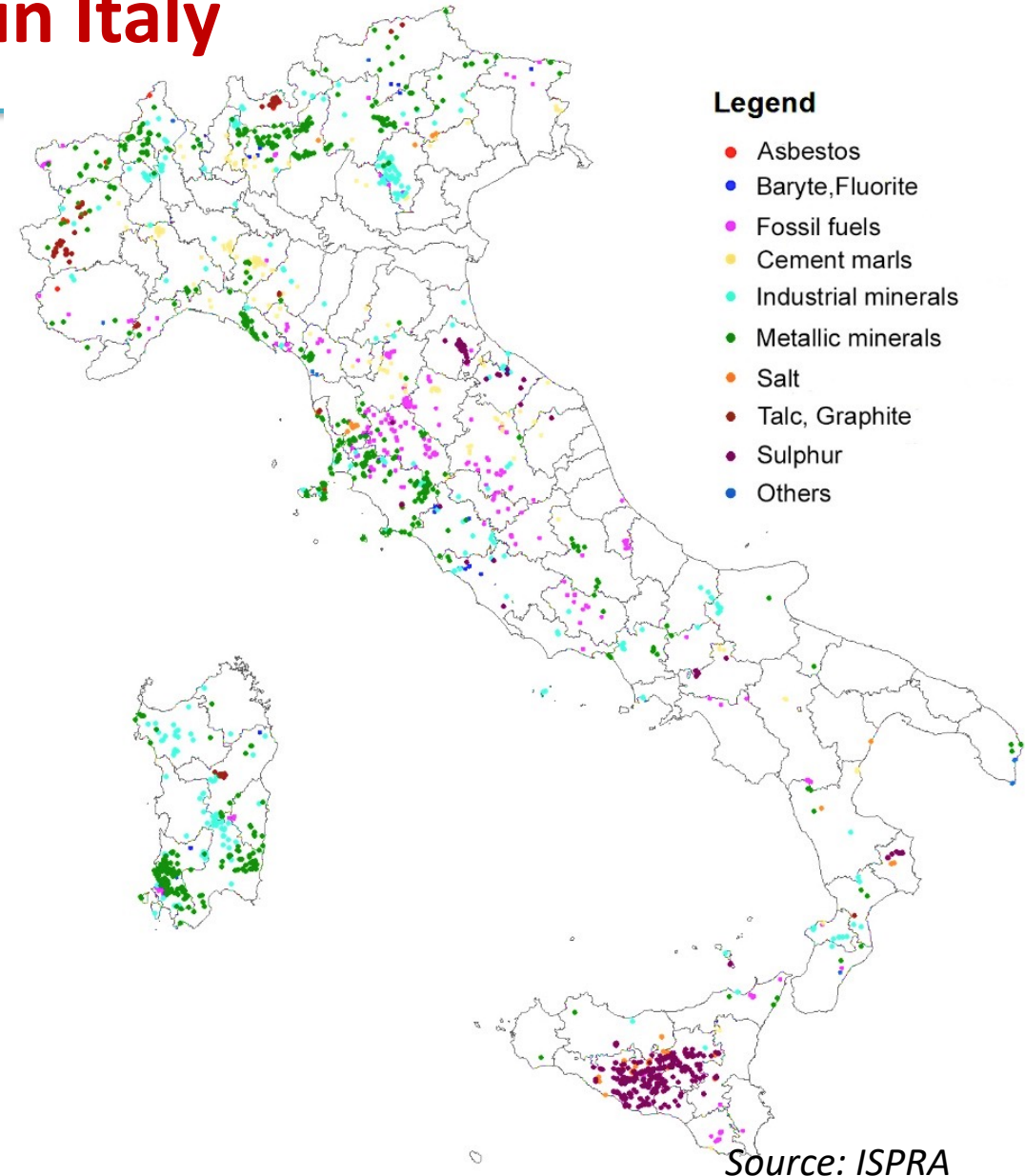
Servizio Geologico d'Italia

Mining history in Italy

- ✓ Mining in Italy has a very long history even in pre-Roman time.
- ✓ More than 3,000 mining sites active in the period 1870- 2020.

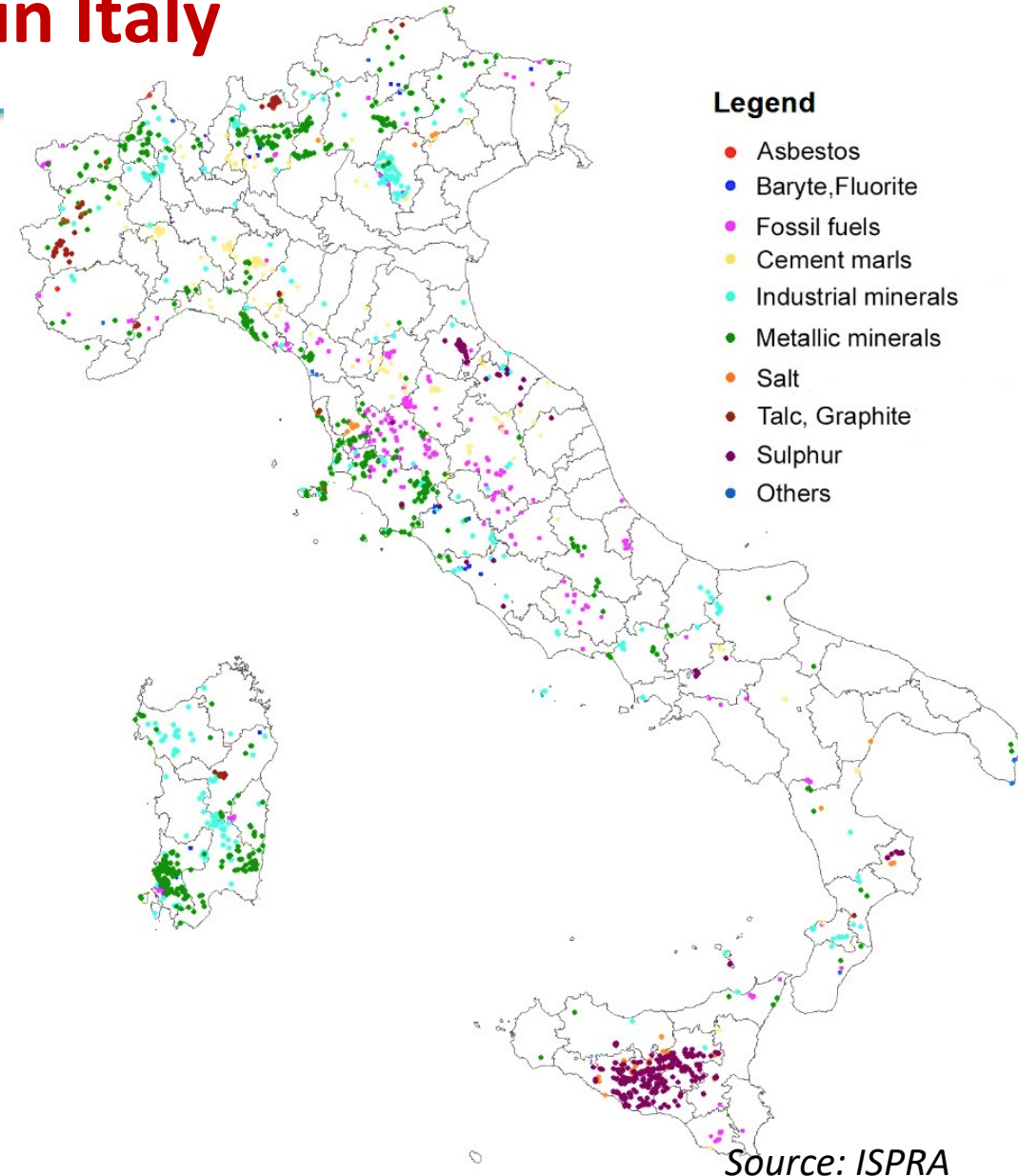
Exploitation of:

- **Metallic minerals** (now zeroed) and **industrial minerals** was widespread in the Alps, Liguria, Tuscany, Calabria and Sardinia.
- **Sulphur mines** (also zeroed) characterized Sicily and to a lesser extent, Marche and Romagna.
- **Coal** (mainly **brown coal**) was exploited along the alluvial plain of central Italy



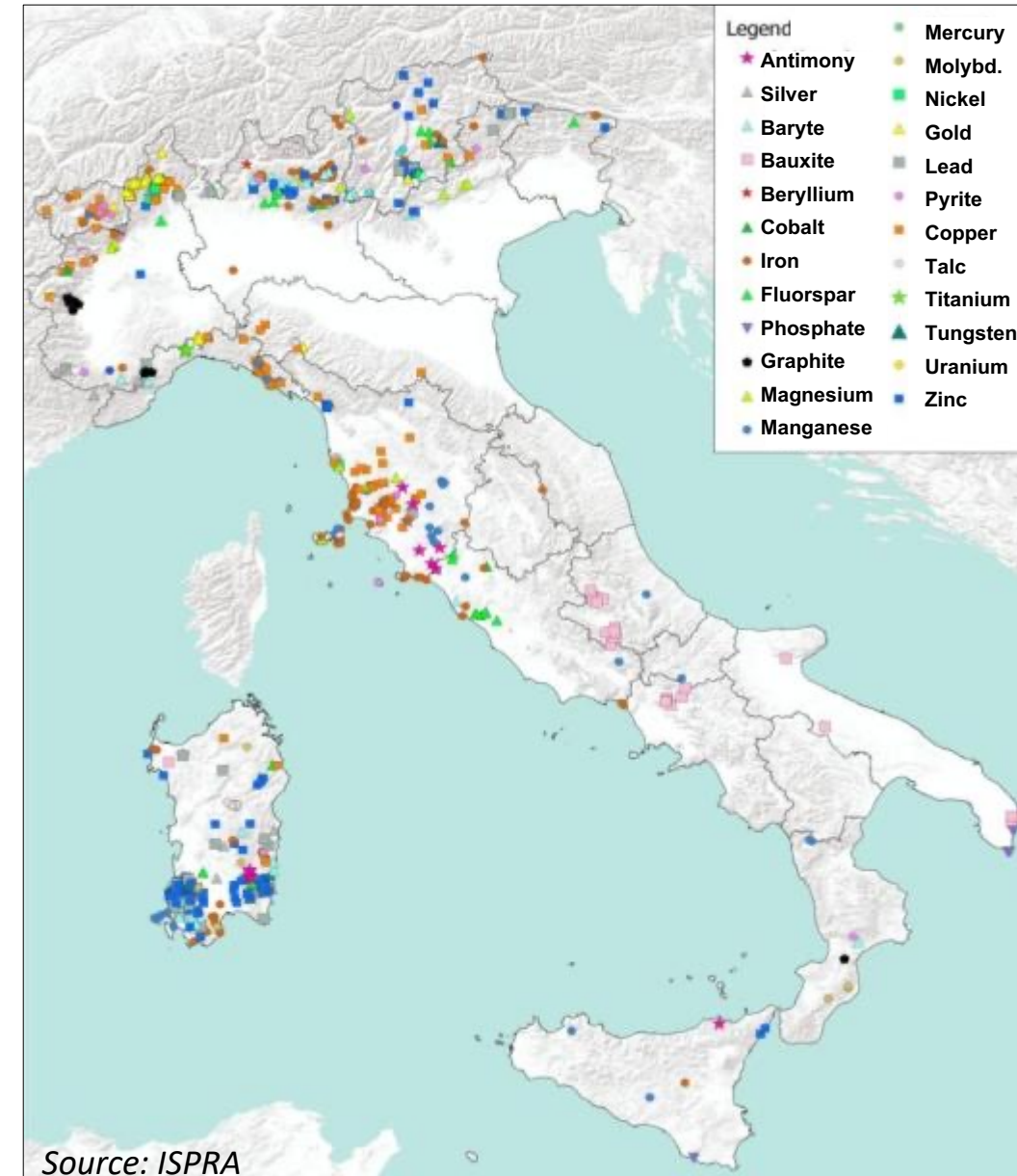
Mining history in Italy

- ✓ Despite its important mining history, **nowadays Italy does not play a relevant role in mineral exploration** and in the international race to grab mineral resources.
- ✓ For many minerals, Italy is strongly or, as with metals, **totally dependent on foreign markets.**
- ✓ The energy crisis, the pandemic and the Ukrainian conflict have shown that **it is essential to diversify the raw materials supply chain by also utilising the domestic resources.**



Minerals for ecological transition, including CRMs, still exist in Italy

- ✓ The research and exploitation of metallic minerals has been **abandoned at the end of the previous century** as the result of inappropriate political-economic decisions.
- ✓ This caused the decline of university education and **loss of knowledge on mineral resources**.
- ✓ **Italy's mining potential needs to be re-evaluated** through a joint work of academics, public administrators and mining professionals, to create a new generation of experts.
- ✓ Italy is one of the few countries in the world **that does not exploit its metal ores** and know little about them, and it is the only European country that **does not have its own strategy for supplying solid mineral resources**.
- ✓ **The Italian scientific community agrees that significant mineral resources still exist in Italy, in primary and secondary deposits (extractive waste), including CRMs**



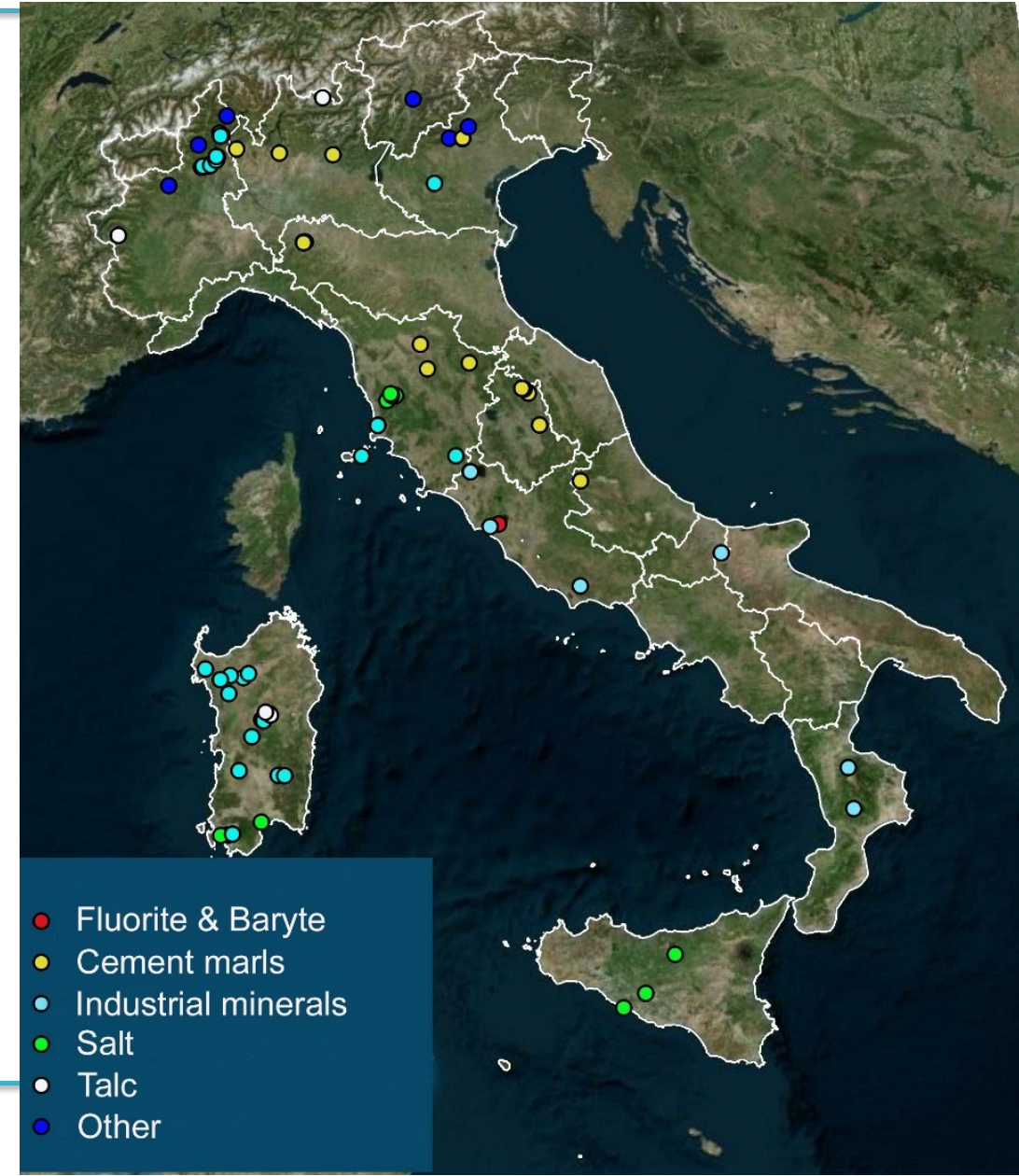
Mines State of Activity (2021)

96 Active concessions ; 76 Operating mines

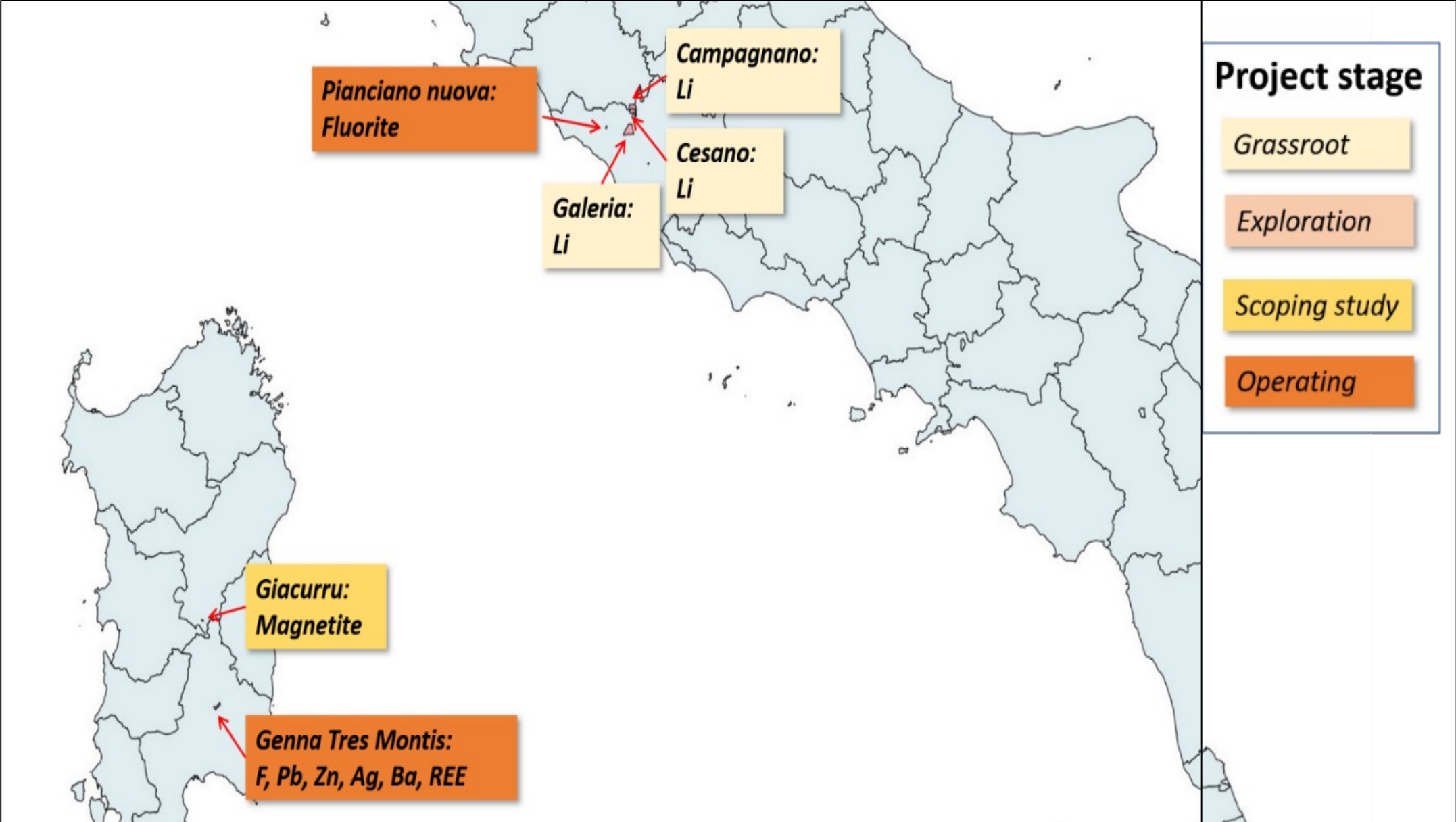
Mineral	2015	2016	2018
Cement marls	5185	5537	6509
Industrial minerals (Kaolin, Feldspar, Bentonite, Clays)	5223	5703	4355
Salt	2081	2085	2674
Talc and Fluorspar	1490	345	483
TOTAL production (t*1000)	13980	13671	14020

Source: Istat. 2020-21 production data are being processed

- 2 active CRMs mines (fluorspar);
- No extraction of metal ores. The Pb-Zn-Ag Gorno mines (Lombardy) ceased operations in 1980.
- Several exploration licenses (Ni, Pb, Zn, Co, Au, Ag, Cu, PGE, Ti) have been granted in Northern Italy



Mining concessions and exploration licences (CRMs and other metals)

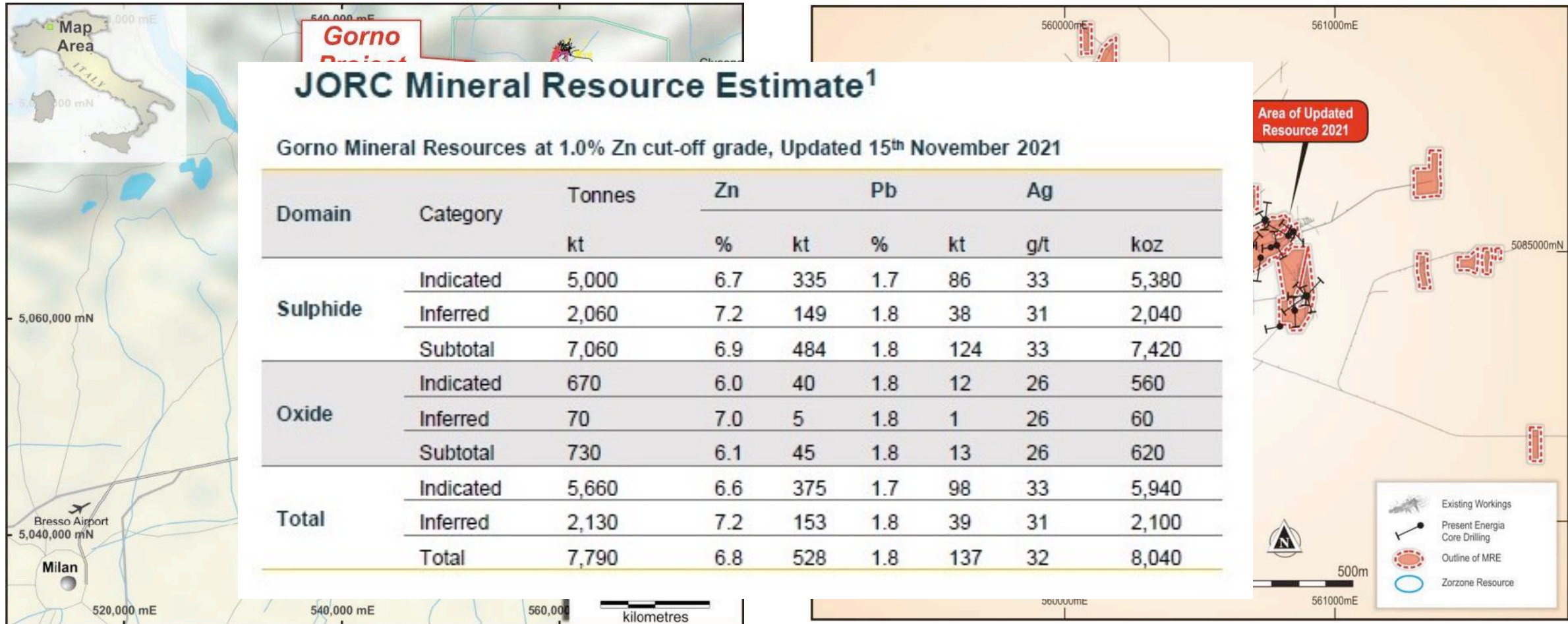


Operating CRMs mines

Lazio	Fluorspar	Fluorspar, Barite	Pianciano Nuova	42,068991	12,149843	SO.RI.CO.M. Itd	Italy	Extractive	Open pit	Brownfield	Operation	Active	E1, F1.1, G1
Sardinia	Fluorspar	Fluorspar, Lead, Zinc, Silver, Barite, REE	Genna Tres Montis	39,520489	9,259135	Società Mineraria del Gerrei	Italy	Extractive	Underground	Brownfield	Feasibility	Active	E1, F1, G1

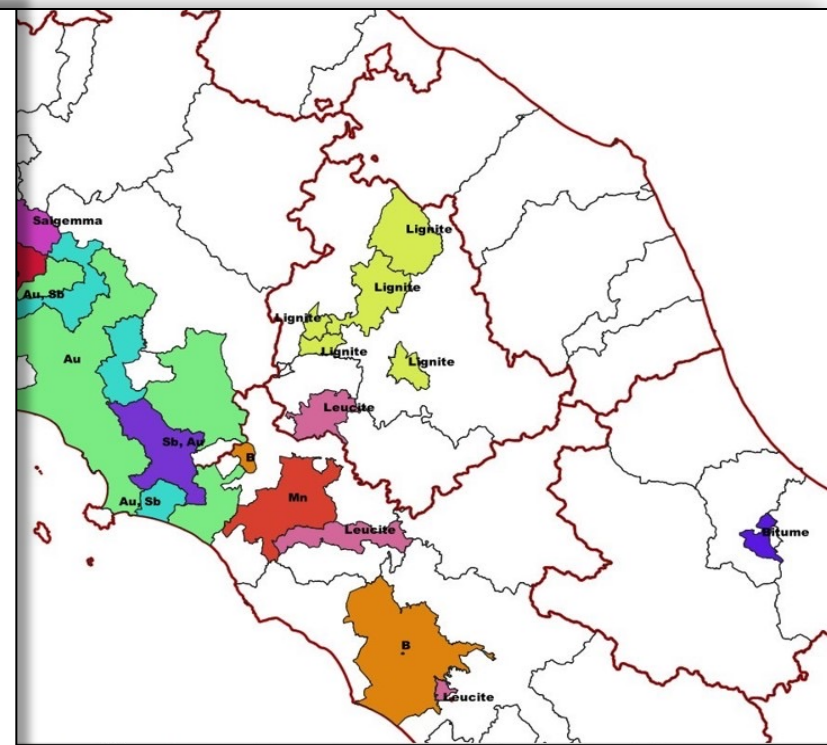
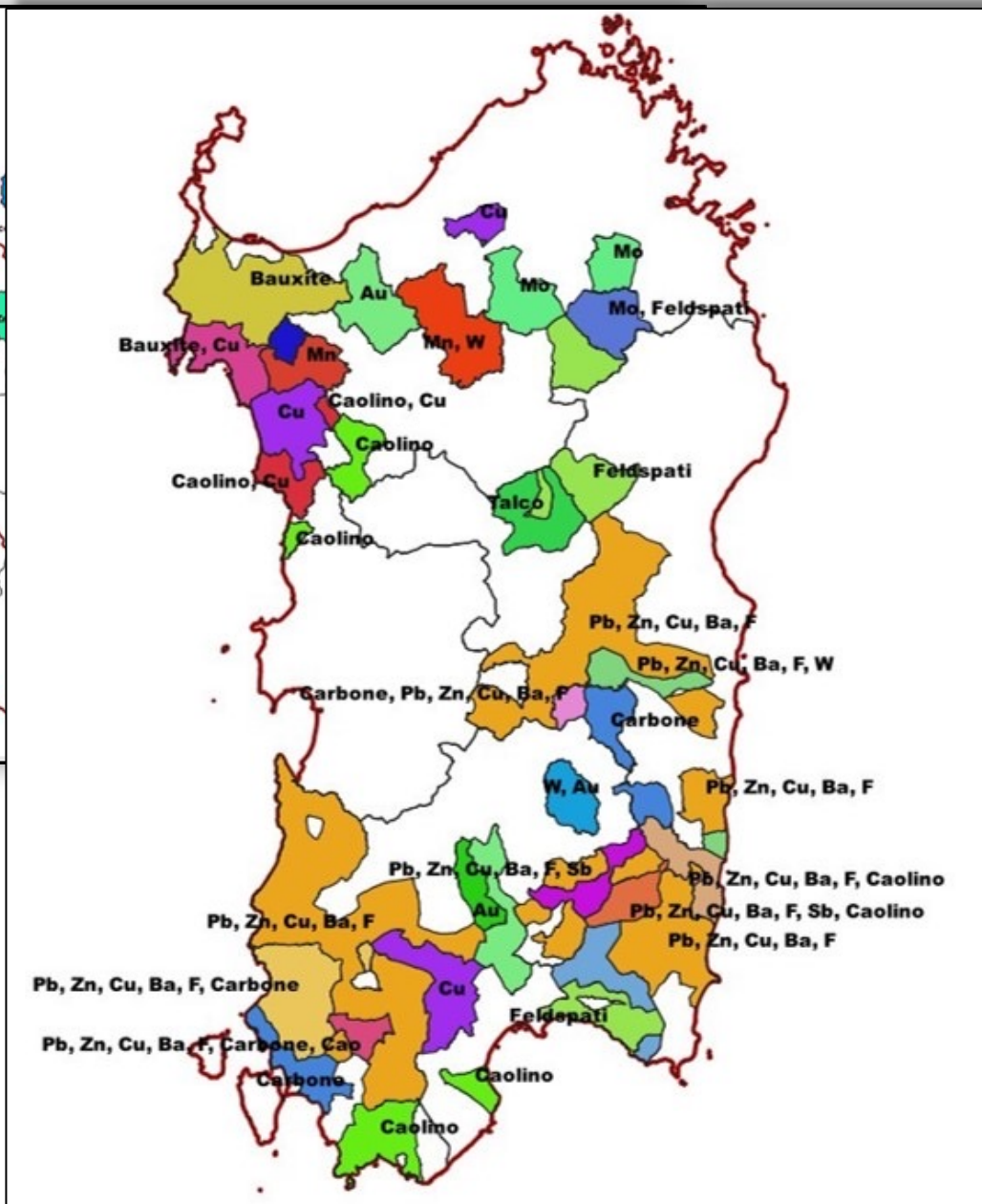
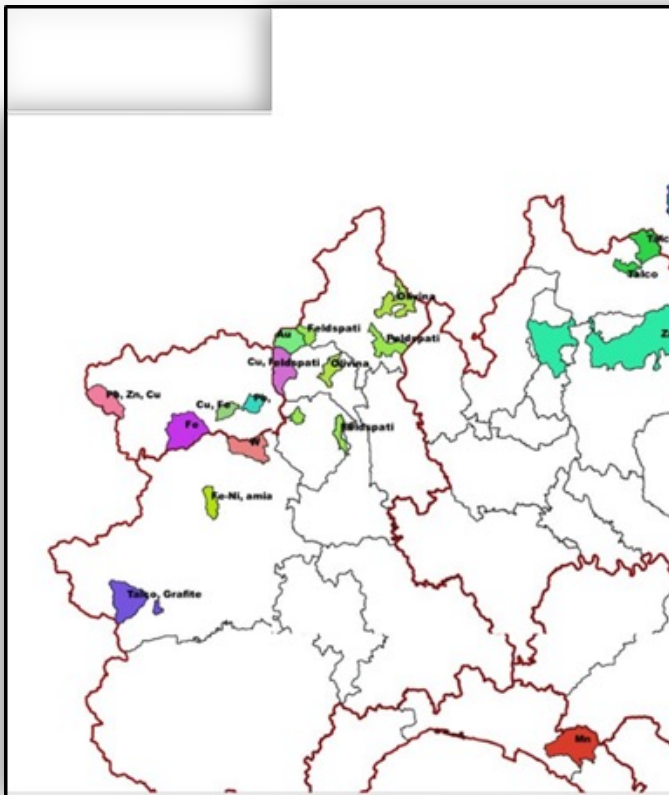


Gorno Project: a scoping study stage



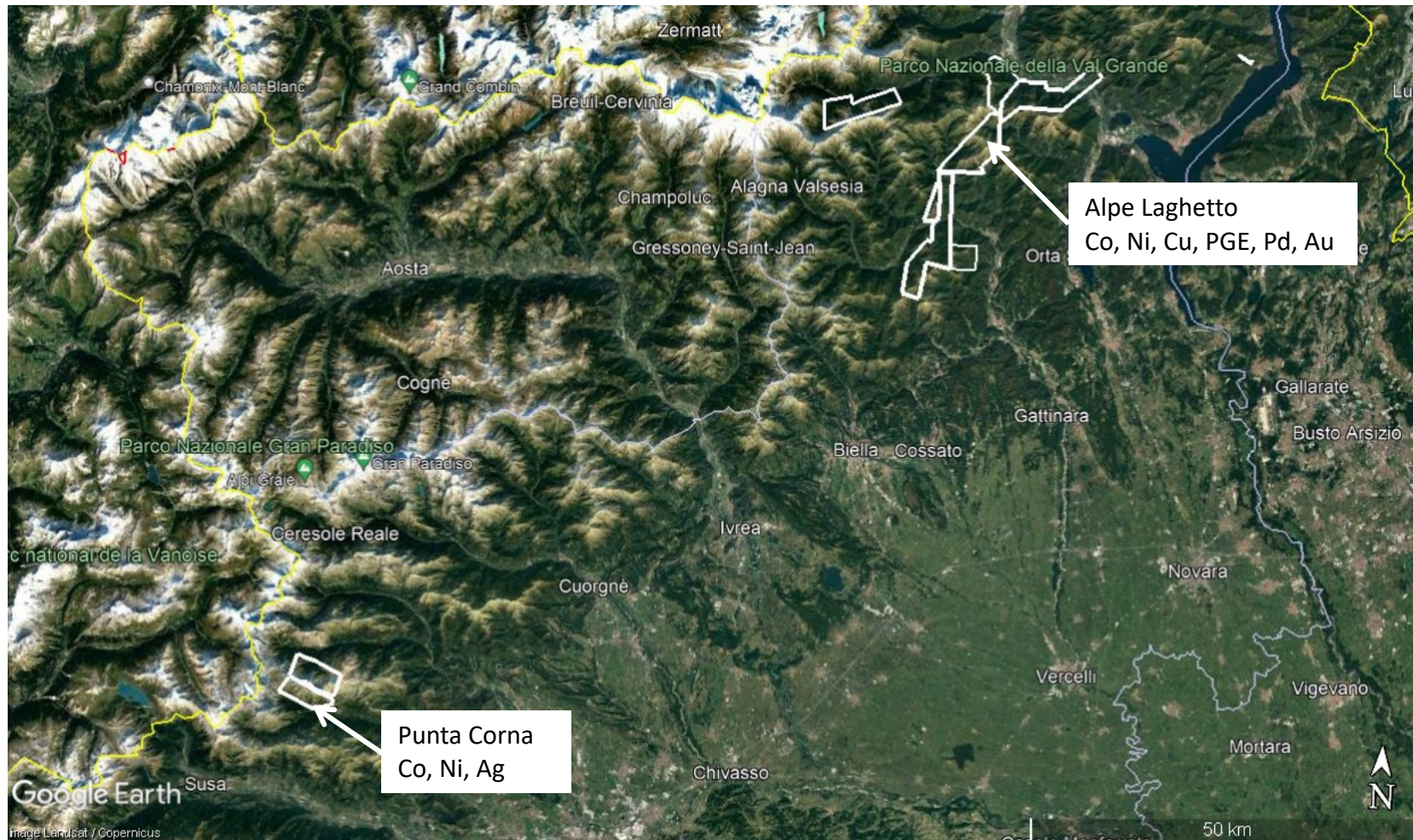
- ✓ **7.79Mt at 6.8% Zinc, 1.8% Lead and 32g/t Silver**
- ✓ 2022 - Negative Environmental Impact Assessment (EIA)
- ✓ Zinc is not yet a critical mineral but may soon become one

RIMIN – Areas for operative mineral research (1985-2000)

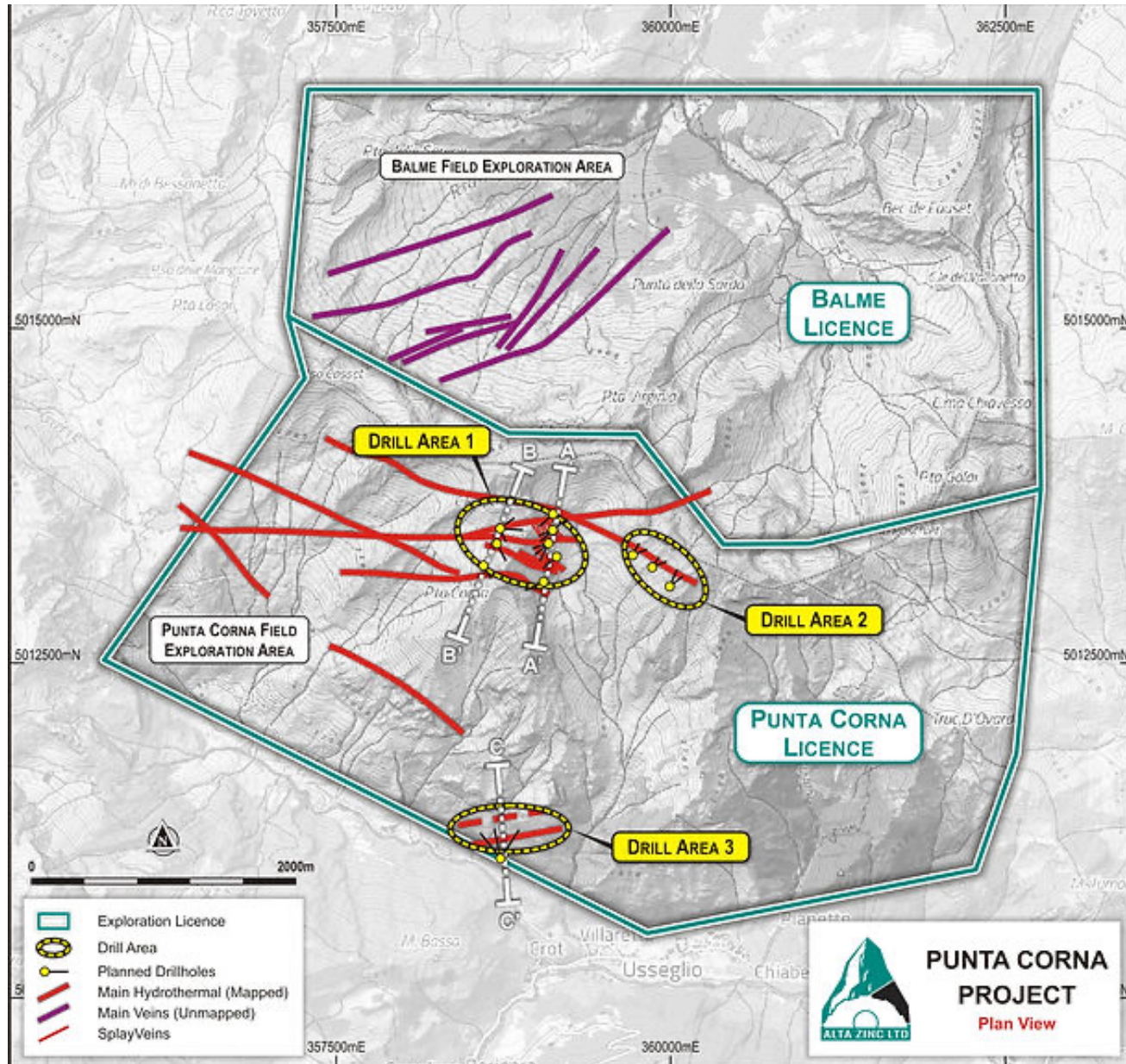


Two exploration stage projects: Alpe Laghetto and Punta Corna

Piedmont	Cobalt	Nickel, Copper, Platinum, Cobalt, Palladium, Gold	Alpe Laghetto	45,902672	8,238115	Ivrea Minerals Pty Ltd	Australia	Extractive	Openpit & Underground	Greenfield	Exploration	Active	E3, F3.3, G4
Piedmont	Cobalt	Cobalt, Silver, Nickel	Punta Corna	45,255832	7,195292	Energia Minerals italia	Italy-Australia	Extractive	Underground	Brownfield, Greenfield	Exploration	Active	E2, F2, G2

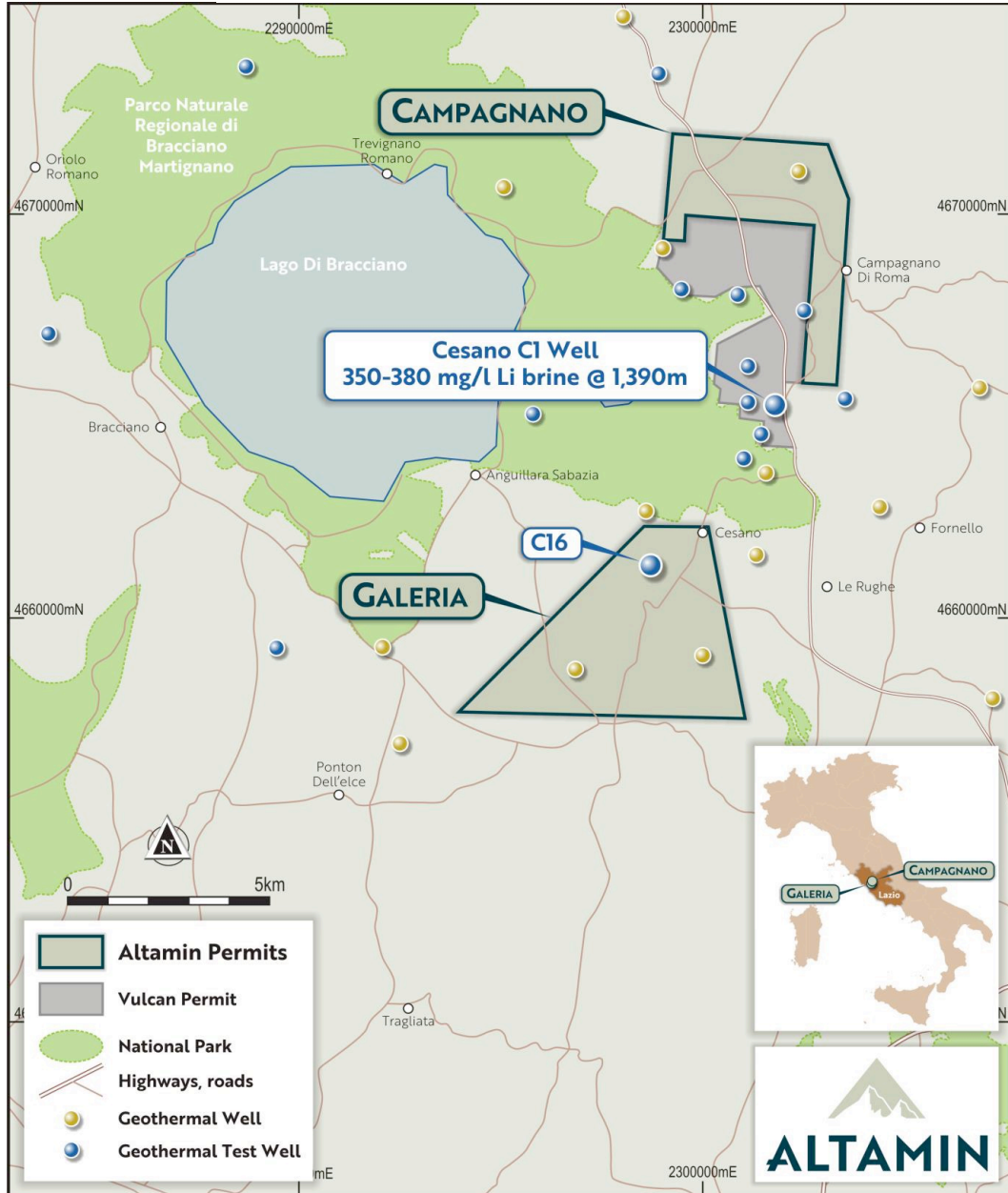


High grade cobalt mine, Punta Corna (Piemonte)



- Stacked hydrothermal veins, with mineralisation defined over >2km strike length
- A comparative study showed strong similarities to the Bou Azzer Cobalt, Nickel, Gold deposits in Morocco – (the worldwide highest grade cobalt mine)
- High-grade cobalt, nickel, copper and silver results from grab sampling:
 - ✓ 5.0% Co, 6.5% Ni, 0.3% Cu, 11g/t Ag, and 5.8% Cu, 405g/t Ag
 - ✓ 1.0% Co, 0.4% Ni, 0.2% Cu and 38/t Ag
 - ✓ 2.2% Cu and 450g/t Ag, 1.2% Cu and 260g/t
- **Planned drillings will start in 2023**

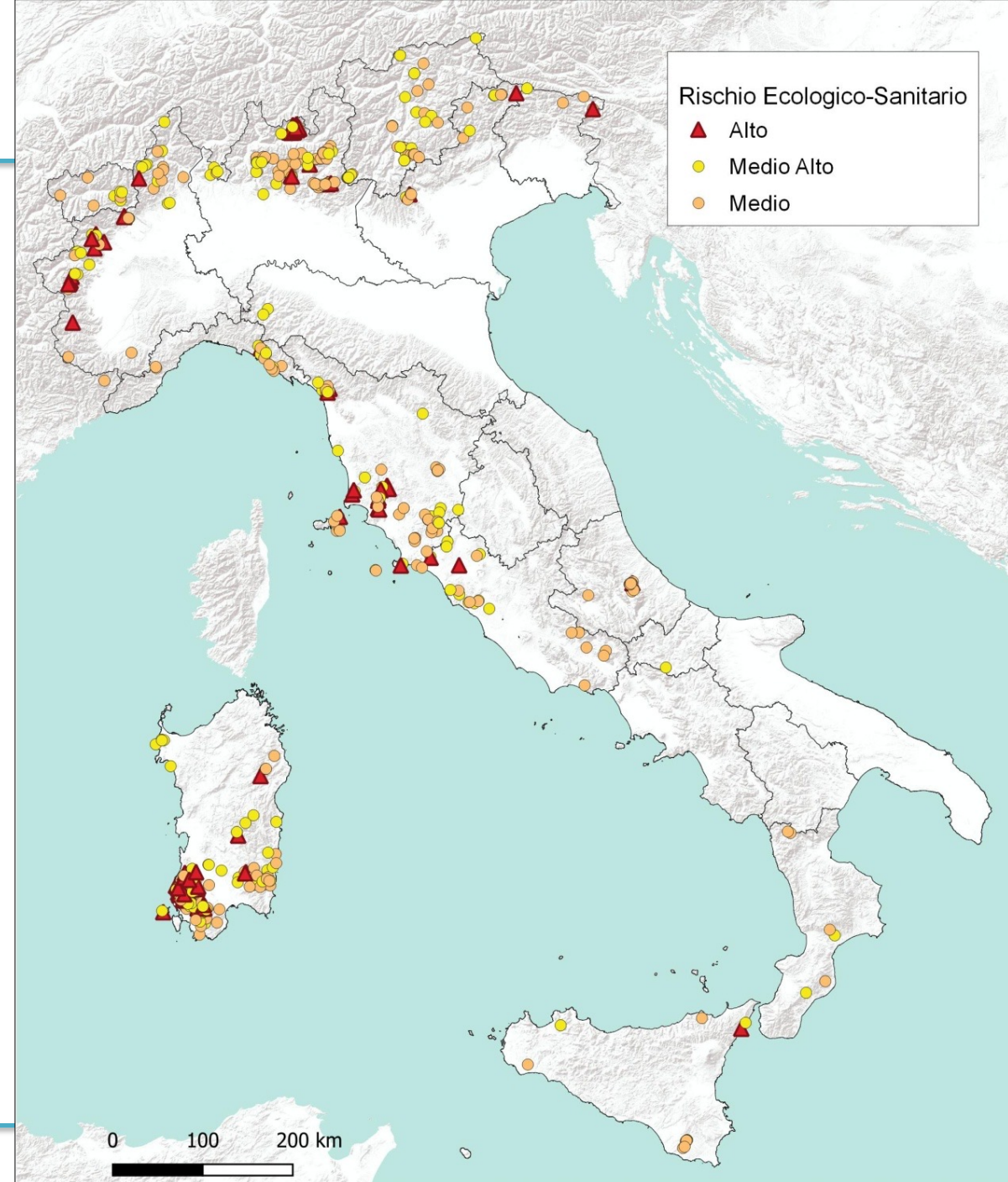
Grassroot stage projects: lithium from high salinity brines



- **Three exploration licenses in central Italy (Lazio region) in the Tuscany-Lazio geothermal system.**
- The reservoirs are dominated with high salinity brines unexploited for geothermal power but very promising for lithium.
- Studies conducted in the 1990s in the Cesano brines suggest the potential feasibility of lithium recovery from these fluids.
- Test Well Cesano C1 yielded brines from a depth of 1,390m with **a lithium content of 350 mg/l and 380 mg/l.** (more than the average 200 mg/l lithium concentrations of the brines of the Salton Sea geothermal field in California which is regarded as the most significant lithium brine resource in the USA).

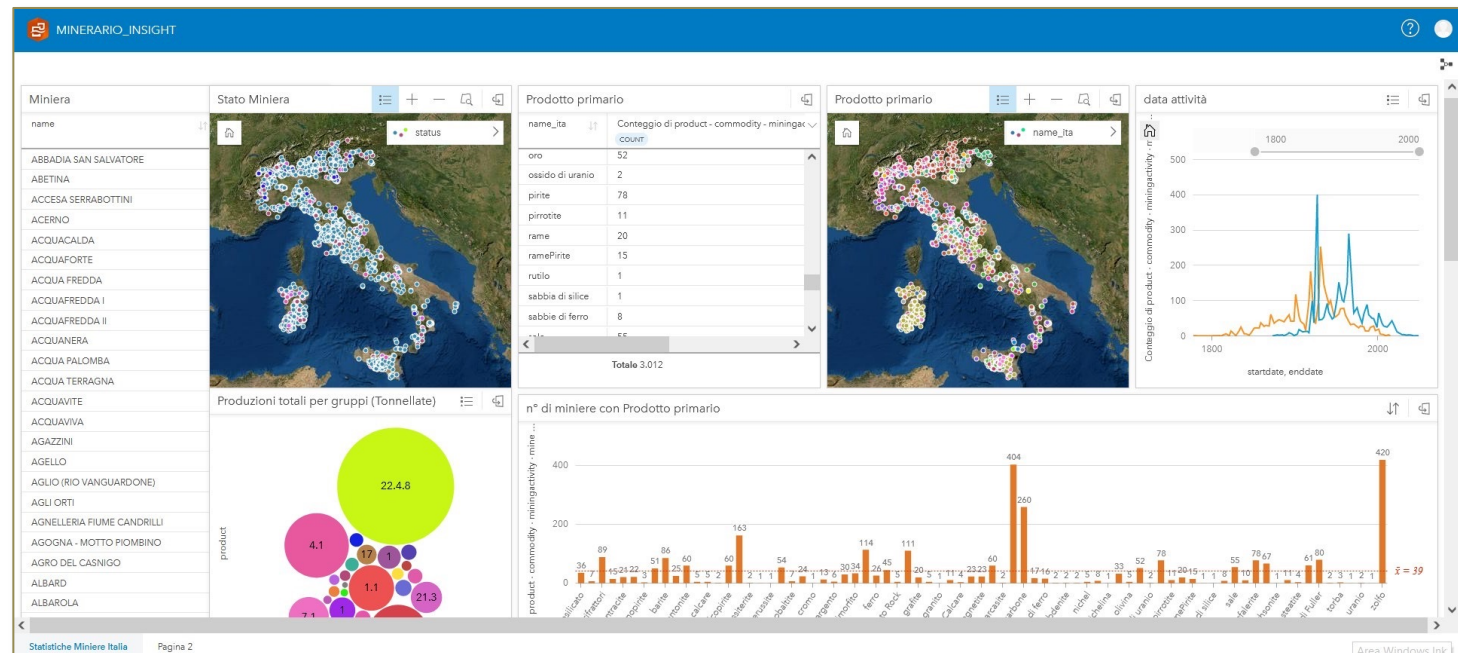
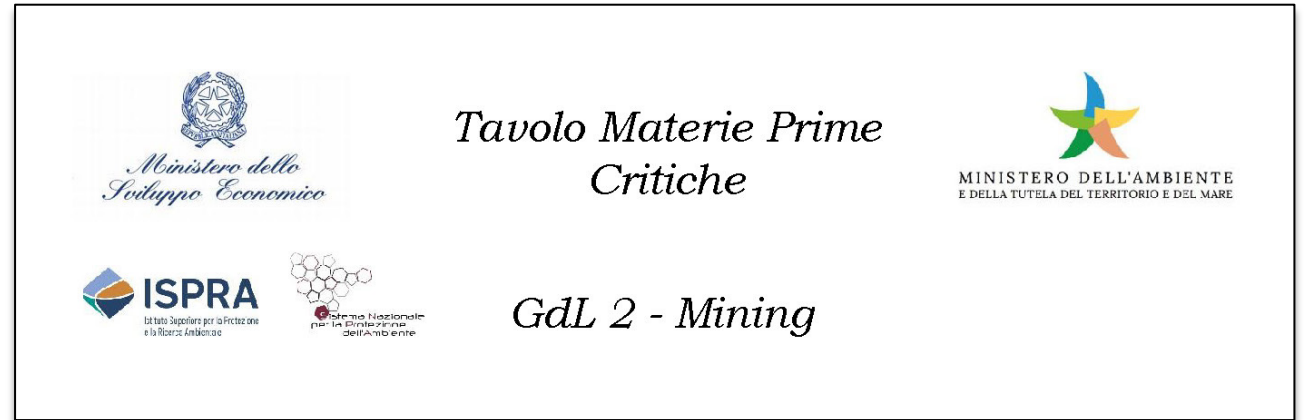
Extractive waste

- ✓ Abandoned extractive industries have generated **huge quantities of extractive waste** deriving from extraction, processing/treatment, drilling etc. that may represent **potential new deposit of critical and non-critical resources**, which could be reused in a circular economy perspective.
- ✓ In the **Sardinian mining district** there are about 70 million cubic meters, with a consequent high environmental impact.
- ✓ They generally have good mineral potential, e.g. red mud of Monteponi (Iglesias), with 7-8% average **zinc** content.
- ✓ In several cases the storage deposits also contain interesting quantities of **CRMs** (e.g. REE in Silius)

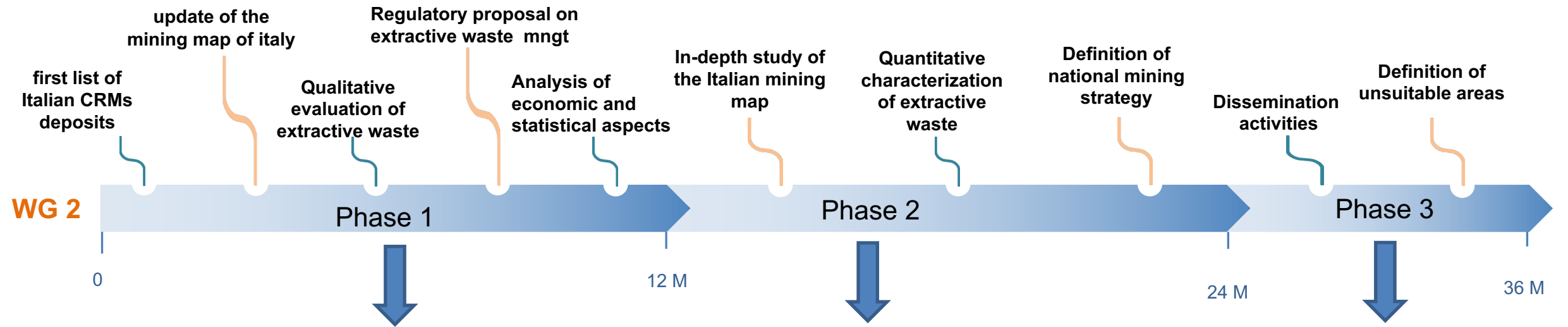


Future perspectives: CRM National Board – WG Mining

- ✓ A National Board on CRMs jointly established by two Ministries in 2021
- ✓ ISPRA coordinates a WG on Mining composed by experts from research and policy makers (national and regional), aiming at defining potential mineral resources (primary and secondary) and identify best options for sustainable exploration.



Future perspectives: CRM National Board – WG Mining



- ✓ First list of CRMs and update Italian mining map
- ✓ Qualitative assessment of extractive waste
- ✓ Support to policy for extractive waste management
- ✓ Statistical data on mining

- ✓ In-depth analysis in CRMs areas
- ✓ Quantitative assessment of extractive waste
- ✓ Criteria for social acceptability
- ✓ Sustainable national mining strategy

- ✓ Definition of areas **not suitable** for issuing permits for mining activities and those **open** to research

The contribution from EU-funded projects

GSEU - Geological Service for Europe

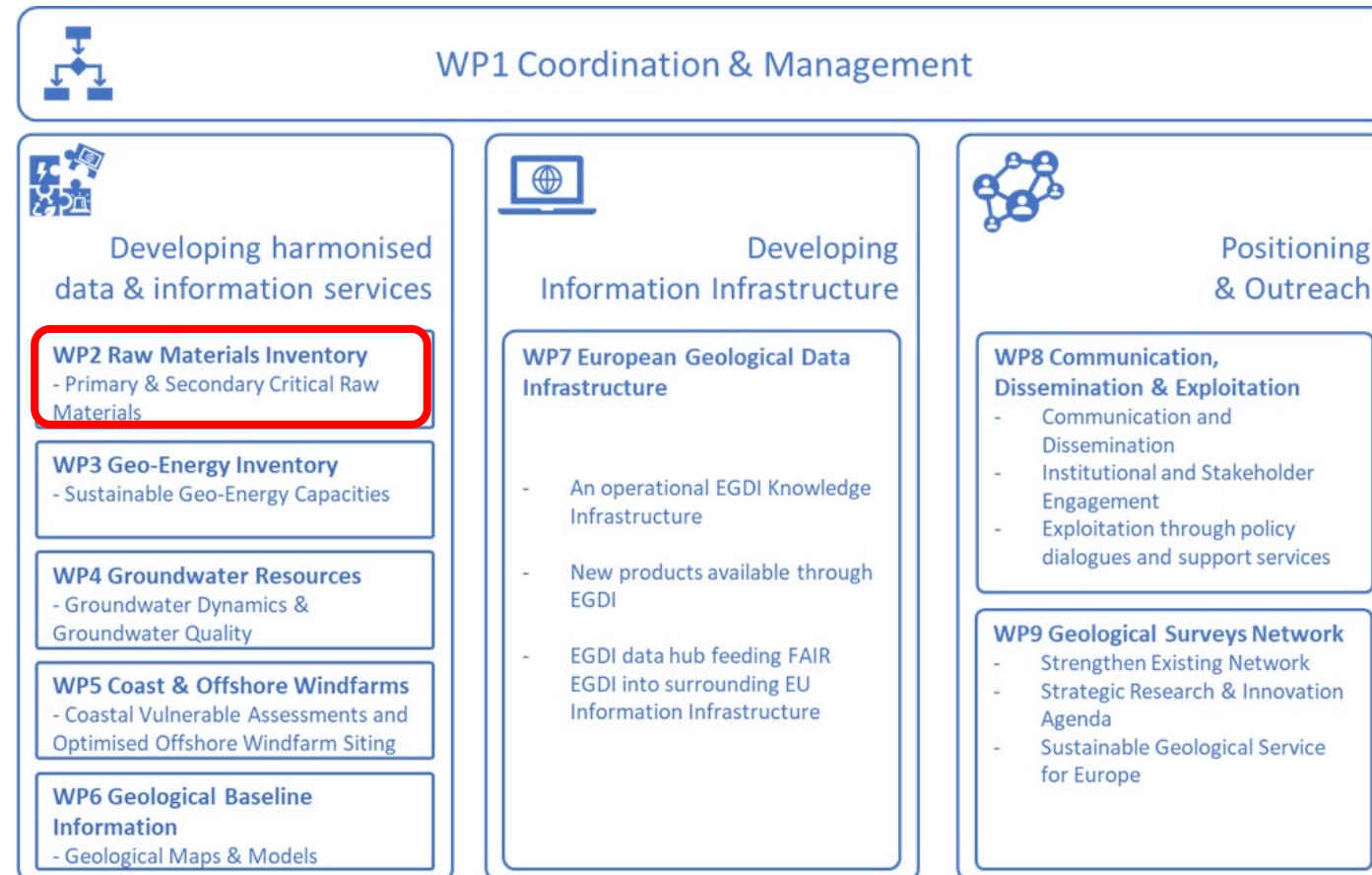
www.geologicalservice.eu



The Geological Surveys of Europe

WP 2 Raw Materials Inventory

- ✓ EU primary and secondary onshore CRM resources
- ✓ EU offshore CRM resources;
- ✓ EU International Center of Excellence on Sustainable Resource Management;
- ✓ Resource management using the UNFC (United Nations Framework Classification system);



The contribution from EU-funded projects

GeoSciences IR

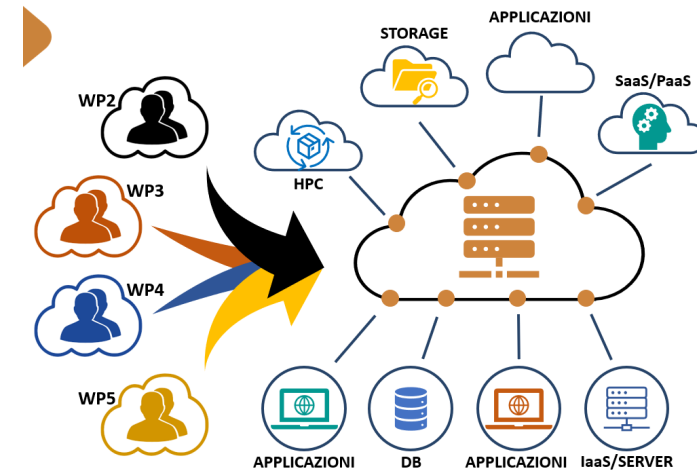


Finanziato
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NextGenerationEU

www.geosciences-ir.it

A PNRR project aimed at building a research infrastructure for Regional Geological Surveys

- ✓ **Partners:** 13 Universities and 3 Research Institutes coordinated by ISPRA
- ✓ **Timeline:** 30 months (October 2022 to March 2025)
- ✓ **Structure:** 8 Work Packages, 60 Operative Units



WP 5, ACTION 5.1 – Sustainable mining of primary and secondary mineral deposits, from exploration to land rehabilitation

- ✓ Realization of web-based Italian Solid Mineral Resources Information System (ISMIRIS)
- ✓ Update of the Sardinian mining and mineral resources database as prototype on new national mining map



THANKS FOR YOUR ATTENTION

*Mining is not everything, but without
mining everything is nothing (Max Planck)*