CRMs DataSpace
RFCS PROJECT

Research Fund for Coal & Steel

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Critical Raw Materials Data Space

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European Strategic Context

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Green Deal Pillar

The European Green Deal is supported by the Fit for 55 package, which states that all Union actions and policies, including the RFCS, should pull together to help the Union achieve a successful and just transition towards a sustainable future.

Responsible Mining

Increase the production of CRMs in Europe by meeting the highest environmental and social standards.

Circular Economy

Strengthen the recovery and recycling of metals from primary and secondary mining waste.

Digital Transition

Data and AI as new strategic assets for traceability and efficiency.

Challenges and Opportunities

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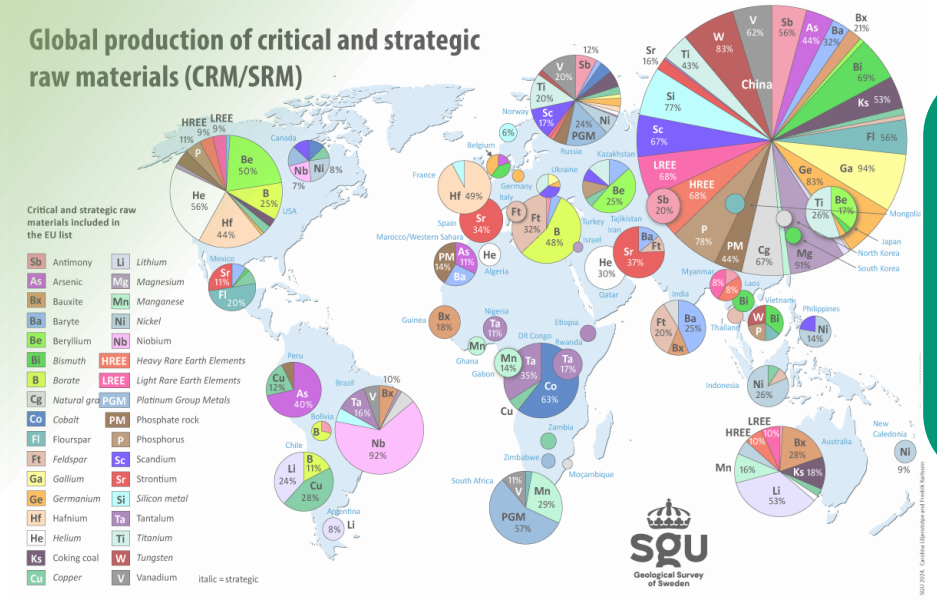
Current Challenges

Europe faces critical dependence on third countries for cobalt, lithium, and rare earth elements.

- Vulnerability in global supply chains.
- Lack of harmonized data on secondary resources.
- Inefficiencies in recovery and recycling processes.



Digital Opportunities

CRMsDataSpace transforms data into a strategic asset for mineral sovereignty.

- Enhanced transparency across mineral supply chains.
- Identification of underutilized secondary resources.
- Accelerated innovation through open data ecosystems.
- Developing of standardized EU data spaces

Project Data

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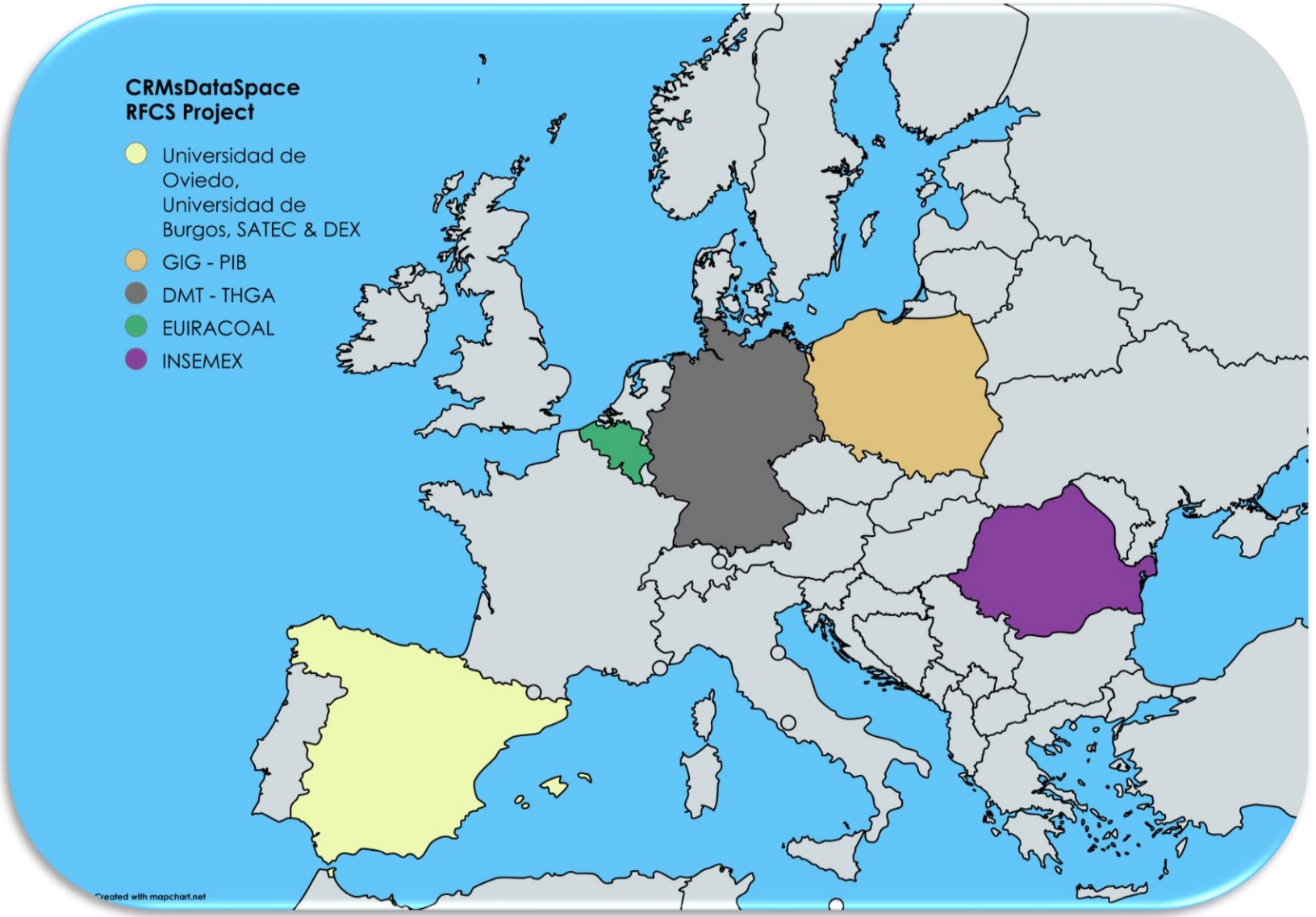
Call: ***RFCS-2024-01-RPJ***
Instrument: ***Research Project (RPJ)***
Project ID: GAP-101216677

Start date: 01/07/2025
End date: 30/06/2028
Budget: 3.966.876,79 €



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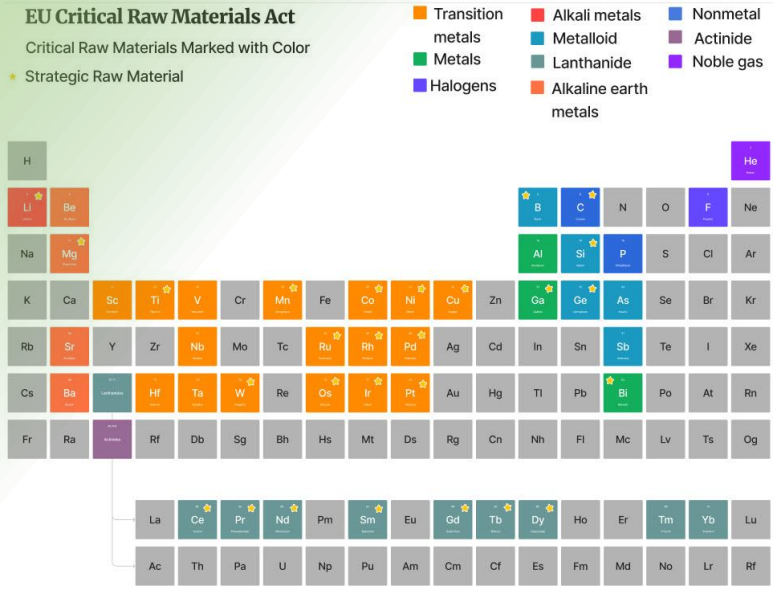
CRMsDS: Objectives



Interoperable Data Space

A unique platform that integrates primary and secondary mining data across Europe.

1

Data Standardization

Application of the UNFC-2009 framework and EU Regulation 2024/1252 for global harmonization.

2

AI Tools

Machine learning algorithms for resource prediction, demand forecasting, and recovery opportunities.

3

Business Models

New digital services: traceability, auditing, and sustainable consulting.

4

Inclusive Ecosystem

Open access for small operators, researchers, industry, and authorities.

5

UNFC Standardization and EU Regulation

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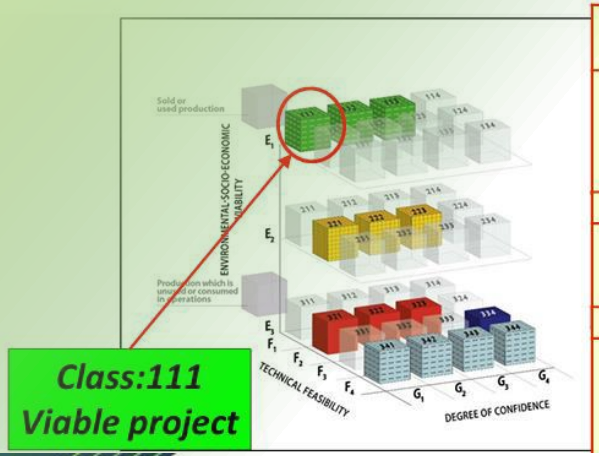

Category	Definition
E1	Development and operation are confirmed to be environmentally-socially-economically viable.
Category	**Definition**
F1	Technical feasibility of a development project has been confirmed.
Category	**Definition**
G1	Product quantity associated with a project that can be estimated with a high level of confidence.

European Critical Raw Materials Act

2030 benchmarks for strategic raw materials:

EU EXTRACTION
At least **10%** of the EU's annual consumption for extraction

EU PROCESSING
At least **40%** of the EU's annual consumption for processing

EU RECYCLING
At least **15%** of the EU's annual consumption for recycling

EXTERNAL SOURCES
Not more than **65%** of the EU's annual consumption of **each strategic raw material at any relevant stage of processing** from a single third country

European Commission

Global Classification Framework

UNFC-2009 (United Nations) provides axes E–F–G to classify resources by economic viability, technical feasibility, and level of knowledge.

Axis E: Viability

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From economically unviable to fully viable resources.

Axis F: Feasibility

From technically unproven to fully demonstrated.

Axis G: Knowledge

From exploratory to fully proven, based on research and inventories.

Work Plan

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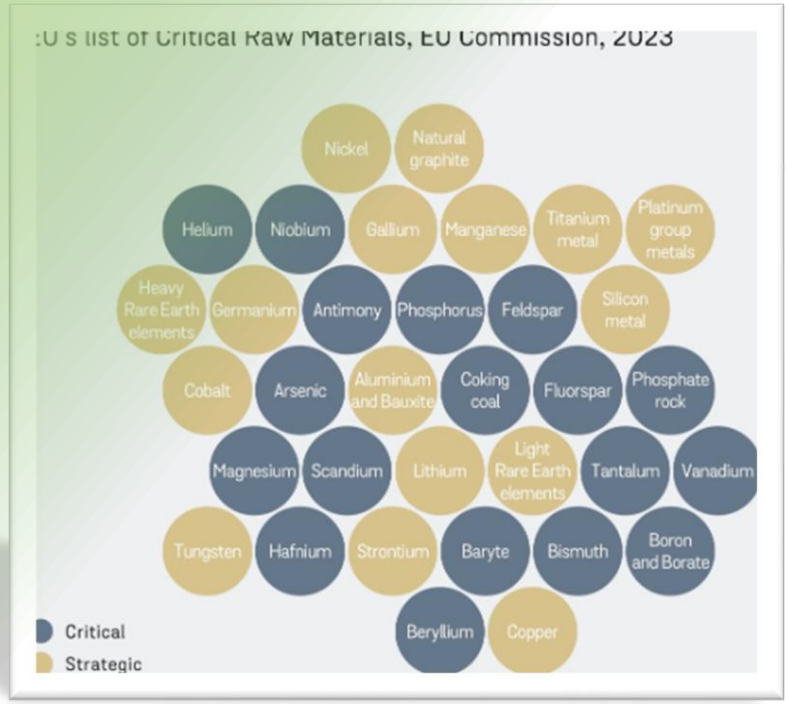

WP2: Data acquisition from closed extractive coal waste facilities

- Information gathering and geochemical sampling
- Chemical and mineralogical characterisation
- Mineralurgical and hydrometallurgical recovery
- Multihole exploration drilling
- Resource estimation
- Data space population

WP3: Development of a data catalogue

- High-level conceptual design
- Definition of data space contents
- Data and metadata specifications and catalogues
- Quality procedures and extract transform load

WP4: Deploying a Minimum Viable Data Space

- Governance system design and implementation
- Data space platform development & deployment
- Integration and support
- Data space platform hosting and maintenance

WP5: Multi-side business solutions

- Core services of the CRM ecosystem
- Data-providing interface enablement service
- GIS web portal with enhanced visualisation
- App for acquiring GPS georeferencing data

WP6: Artificial Intelligence tools

- Development and fine-tuning for specific domains
- Reporting tools using large language models
- United Nations Framework Classification for Resources

WP7: Communication and dissemination

- Promotional videos
- Stakeholders' involvement and newsletters
- Presentations, publications and webinars
- Exploitation and Business Plan
- National and transnational workshops

Challenges

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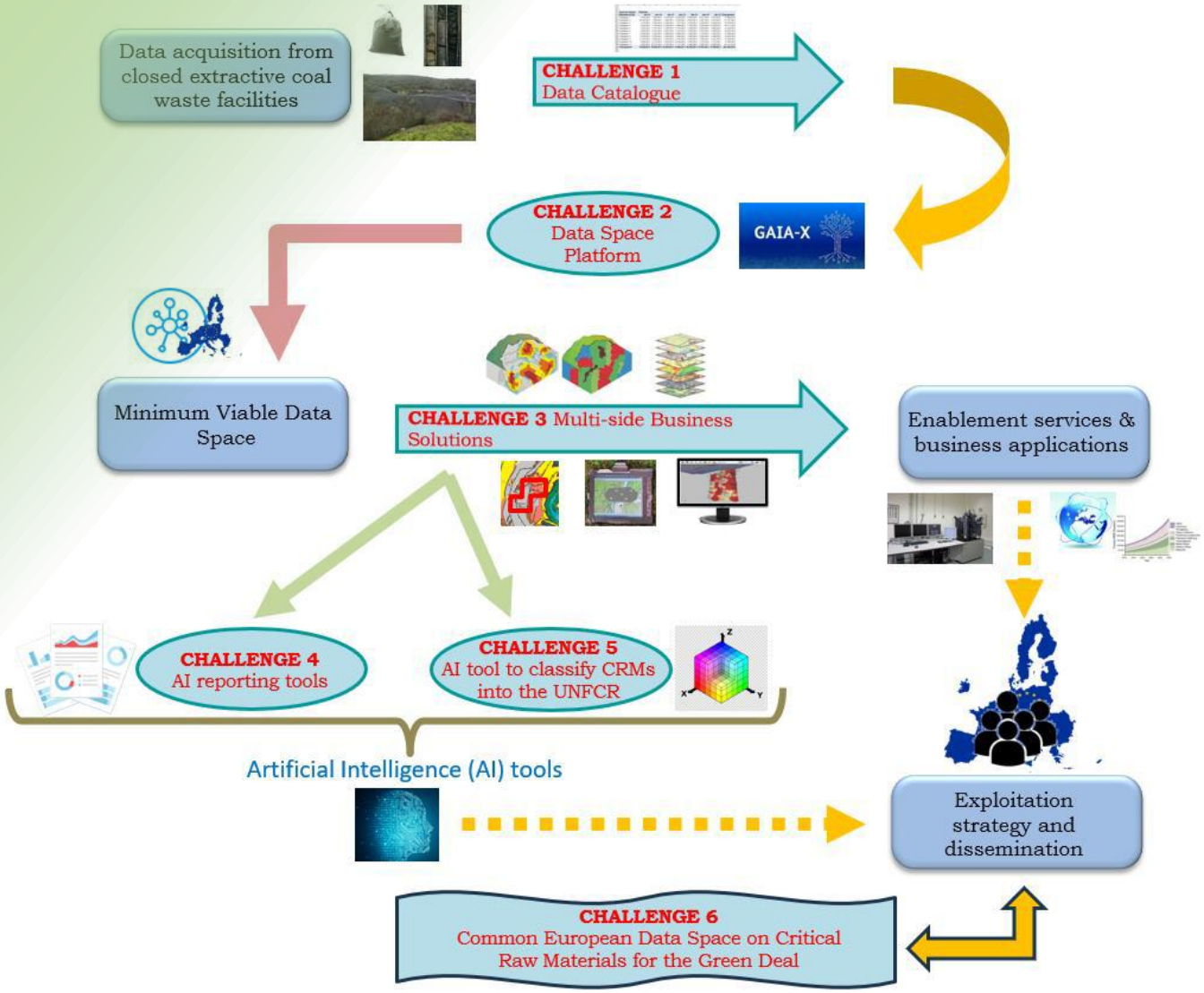

Create a European Digital Data Platform

A centralized geospatial database to identify, assess, and map critical raw materials within extractive waste facilities

Use Artificial Intelligence (AI) and Large Language Models (LLMs)

AI-driven tools will automate data processing, classification, and reporting, enhancing efficiency in CRM recovery projects.

Conduct Geochemical and Metallurgical Assessments

Analysis of resource viability in coal mining waste, including chemical composition, processing potential, and economic feasibility.

Develop Business Models for CRM Recovery

Supporting investments and new market opportunities for industries interested in sustainable raw material extraction.

Facilitate Knowledge Transfer & Capacity Building

Organizing workshops, training sessions, and dissemination events to ensure broad adoption and collaboration across EU Member States.

Data Space Architecture

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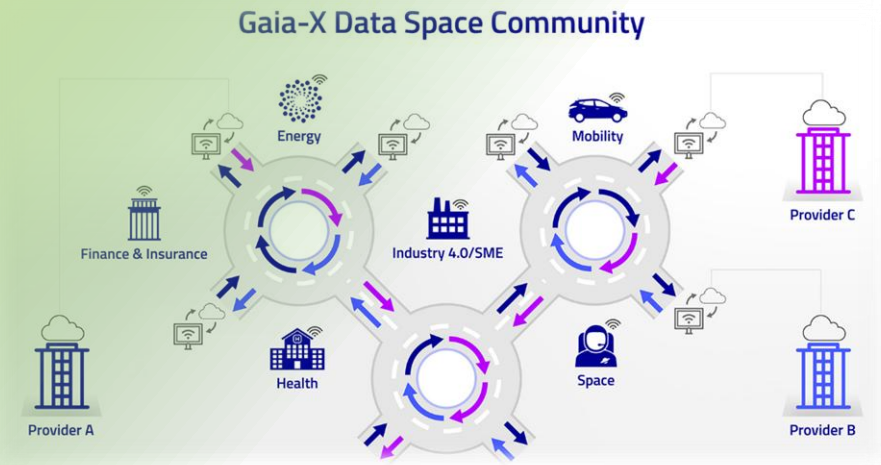

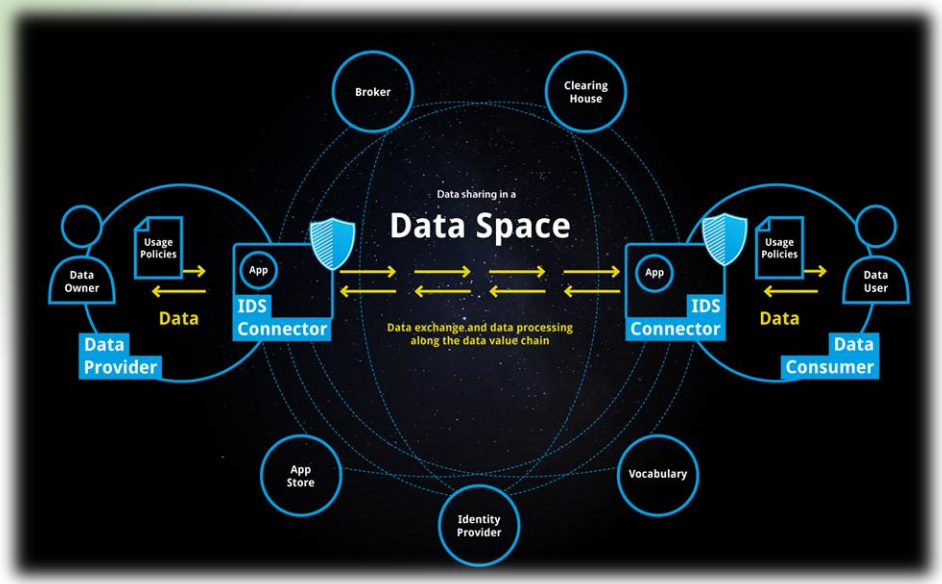

1. **Data Capture** — Digitization of geological, mining, and environmental information from primary and secondary deposits across Europe.
2. **Characterization and Laboratory** — Geochemical analysis and classification of resources and available reserves according to UNFC-2009.
3. **Harmonized Catalogues** — Centralized registry of normalized, interoperable, and reusable data according to ISO/OGC standards.
4. **Central Data Space** — A unique platform that integrates, manages, and distributes information to authorized users.
5. **Final Applications** — AI tools, dashboards, APIs, and services for mining, recycling, and energy policy.

Expected Impacts

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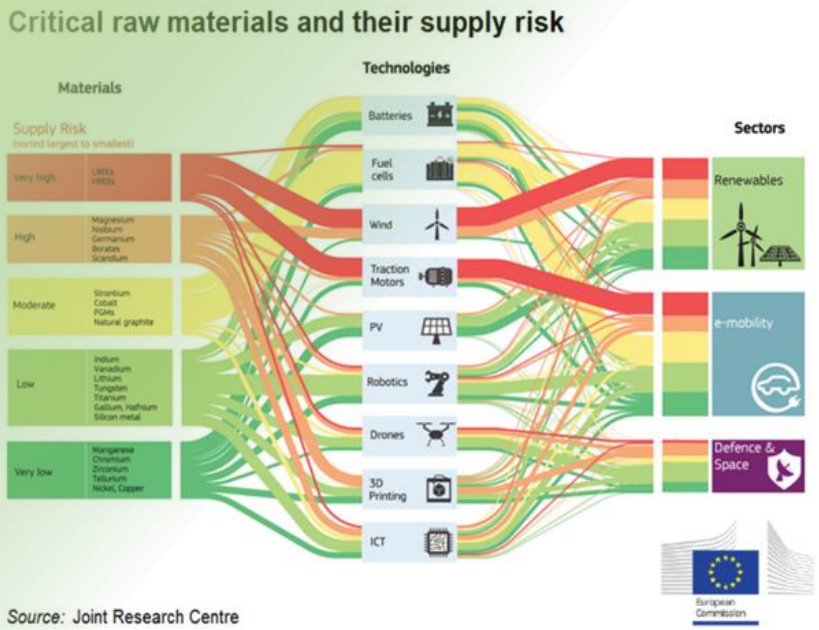

Strategic Value of Data Space

CRMsDataSpace transforms data into a key asset for mineral sovereignty, efficiency, and sustainability.

Economic Impact

· Reduced exploration costs.
· New markets for data and services.
· Attracting investment in sustainable mining.

Environmental Impact

· Full life-cycle traceability.
· Optimization of water and energy consumption.
· Identification of sustainable alternatives.

Technological Impact

A digital ecosystem that accelerates innovation in AI, blockchain, and digital twins

Digital Sovereignty

European control of critical data and independence from external providers.

Open Collaboration

Inclusive access for SMEs, researchers, and public authorities.

Dissemination and Innovation

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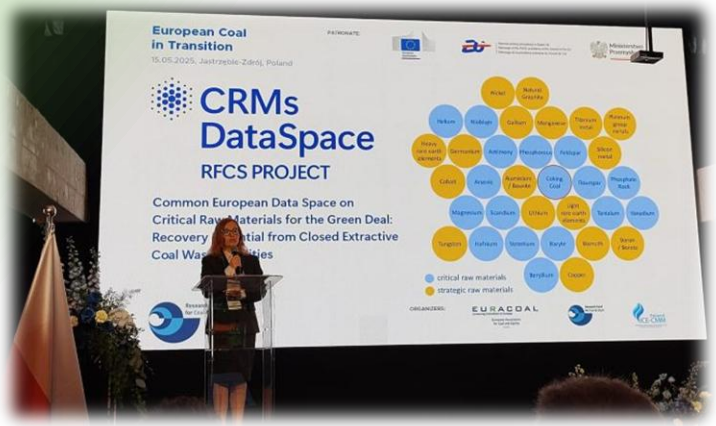

Web Portal & Communication

A public platform democratizing access to data on European mineral resources.

- Interactive dashboard with resource maps.
- Scientific publications and policy reports.
- Videos and educational material for stakeholders.

APIs & Open Ecosystem

Technical interfaces enabling integration with third-party systems and developers.

- RESTful and GraphQL APIs for data access.
- International workshops and technology bootcamps.
- Collaboration with innovative startups and spin-offs.

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Thank you for your attention!!

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