
European
Technology
Platform
on Sustainable
Mineral Resources

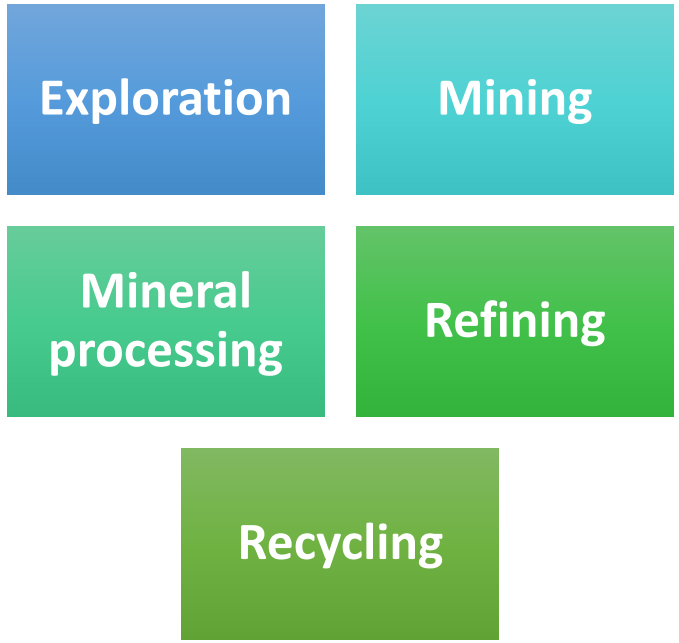
ETP SMR Strategic Research and Innovation Agenda (SRIA)

European Technology Platform on Sustainable Mineral Resources

ETP SMR - What is it?

The European Technology Platform on Sustainable Mineral Resources (ETP SMR) is an **association of entities operating in the Mineral Resources R&I sector across the whole value chain**

Our mission is to develop long-term European Minerals Industries Research and Innovation agendas and roadmaps for actions at EU and national level.



European Technology Platform on Sustainable Mineral Resources

Members

- Raw materials Industry
- Technology providers
- Geological Surveys
- Academia and Research Institutes
- Industry & Stakeholder Associations
- International partners

European Technology Platform on Sustainable Mineral Resources

Update of the ETP SMR Strategic R&I Agenda

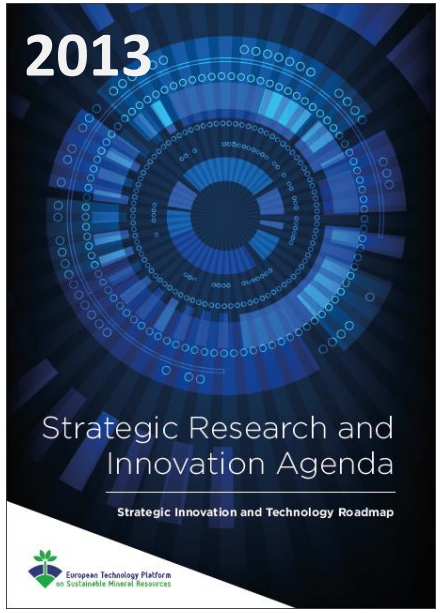
- **Update ambitions to match current needs**
  Two workshops, Dec 2022 and March 2023,
  + consultation procedure on a first and second draft

- **The World's climate ambitions increase the need for metals and minerals and also highlights also the need for climate neutral mining-, processing/refining-, and recycling operations**

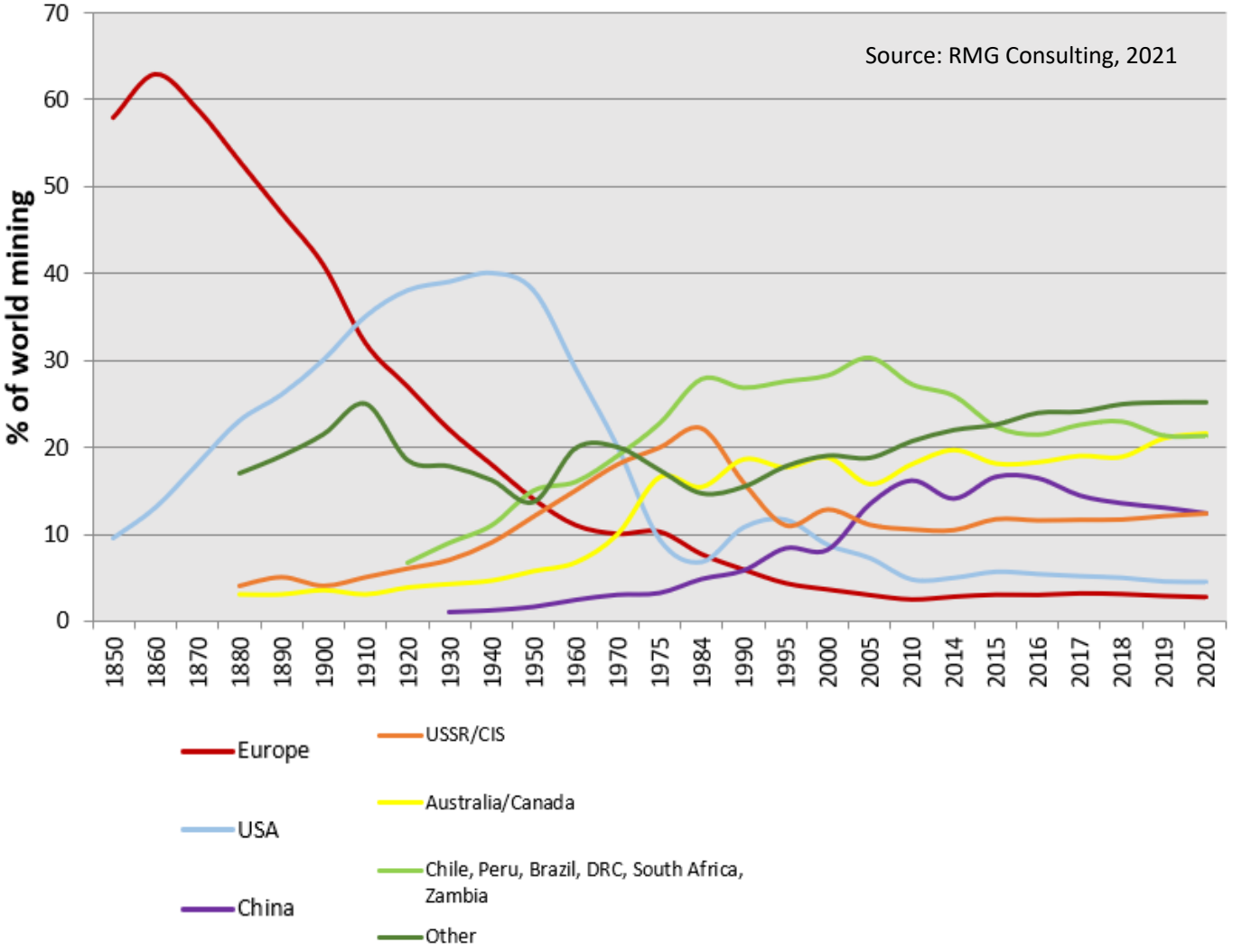
- **Changed geopolitical context – security of supply cannot be taken for granted**

- **New RM for emerging technologies the EU aims for leadership**

- **Advise the European Commission on relevant R&I needs for the mineral raw materials industries to enable secure and sustainable raw materials for the EU industries in line with the ambitions of the CRMA.**



Share of world's metal mining (1850-2020)



The EU consumes about a quarter of the world's raw materials but produce only 3 %

What is needed to reach the benchmarks of the CRM Act (by 2030)?

How can R&I contribute to the industrial competitiveness of the raw materials industry?

- **At least 10%** of the EU's annual consumption for **extraction** of **SRM**,
- **At least 40%** of the EU's annual consumption for **processing**,
- **At least 15%** of the EU's annual consumption for **recycling**,
- **Not more than 65%** of the Union's annual consumption of each **SRM at any relevant stage of processing from a single third country**

Need for Research and Innovation in Exploration

- **No new mines without exploration**
- **< 2% of investments in exploration** are allocated to **EU Member States**
- **CRM Act – Member States** shall draw up **national exploration programmes**
- Mineral potential - **Europe is underexplored**

Challenges

- **Skills shortage**
- Need:
  - **R&I** to **discover** and **understand ore deposits** in Europe
  - **Technology** to **process**, **extract** and **recycle** CRM/SRM
  - **Collaboration** with strong exploration & mining jurisdiction

Credit: GKZ Freiberg

R&I – Mineral potential

✓ Strengthen efforts to **improve the EU's exploration capabilities by linking R&I actions to the Member States Exploration Programs** (actions needed now, however long term effects)

✓ **Improved knowledge base** on the **vast variety of European ore types** (not limited to MS Exploration Programs) and **cost-effective exploration technology.**

R&I – Policy

✓ **Examination of policy and legislative barriers to the EU's ability to increase domestic production from both primary and secondary sources.**

Need for Research and Innovation in Mineral Processing

Developed | **Improved** | **New** | **Efficient** | **Methods** | **Technologies**

Traceability and industry integration

- **Global Passport** - traceability through the value chain

Process optimization

- **Comminution technologies**
  - ✓ Measurement technology
  - ✓ Models for optimizing design
  - ✓ Control of comminution and separation circuits
- **Efficient wet and dry separation processes / technologies**
  - ✓ Treating polymetallic and complex ores
  - ✓ Removing impurities
  - ✓ Improving recovery of low-grade
- **Geometallurgical modelling**
  - ✓ Process mineralogy
  - ✓ Analytics for resources characterization
  - ✓ Economical optimisation
  - ✓ Ore traceability
- **New** and **smart process design and methods**
- **Model-predictive control concepts and data-driven models** (digital twins)

Environmental performance

- **Flotation reagents** (effects on downstream processing, water recirculation, and health and safety)
- **Water treatment methods**
- **Feasibility of dry stacking in wet climates**

Recycling and secondary feed streams

- Design for **end-of-life products**
- **Automation**
  - ✓ Identification of the source
  - ✓ Dismantling and separation

System integration

- **Digitised processing plants** (advanced online characterization, sensor technology, and data analytics)
- **Integration with upstream and downstream processes** (geology/mining and smelter processes)
- **Coupling of business sectors and development of new business models**

(Credit: Boliden)

What are the expected impacts?

Reduced:

- ✓**energy consumption**
- ✓**losses of valuable minerals** (including CRMs)
- ✓**cost** (less energy consumption and wear)

Increased:

- ✓**revenue** through **cost-effective production of by-products**
- ✓**security of supply** of raw materials

Improved:

- ✓**environmental performance** (e.g., climate impact, water management, emissions, tailings)
- ✓**social acceptance of mineral processing plants** due to higher resource efficiency, lower emissions, and less waste

Developed intelligent production systems

European Technology Platform on Sustainable Mineral Resources

Need for Research and Innovation in Metallurgy/Metals recovery & Recycling

New materials for emerging technologies
(procurement/production/recycling)

Traceability and industry integration

- **EU's digital product passport** in the recycling industry for circular economy

Decarbonisation

- **Climate neutral processing** & **refining technologies** (incl. use of reagents with no carbon footprint)
- **Alternative carbon free reduction agents** (technically & economically viable)
- **Decarbonisation of energy intensive** metallurgical processes

Environmental performance

- **Methods** for **optimized use** of **energy** & **water**
- **Development** of **technologies** with **low atmospheric** & **water emissions** with **minimal impact on the environment**

Process- and resource optimisation (primary- and secondary resources)

- **Process design optimization** using **thermodynamic data,** considering **efficiency in the process route** (new measurement technology, process modelling & automation)

- **Knowledge & technology** to **increase recovery yields** and **extract additional elements** (primary/secondary materials streams)

- **Technology** to ensure the **quality of by-products for use in new applications** (e.g., process control of slag properties / slag composition)

- **Methods & business models** to **use secondary materials or side streams** from **internal processes or across business sectors** to enhance efficiency and recovery of metals.

- **Mechanical & chemical processing** of **complex products** with minimal dissipation of CRMs.

- **Reuse** (compatibility: logistics / product optimization / reintegration into life cycle / safety / efficiency)

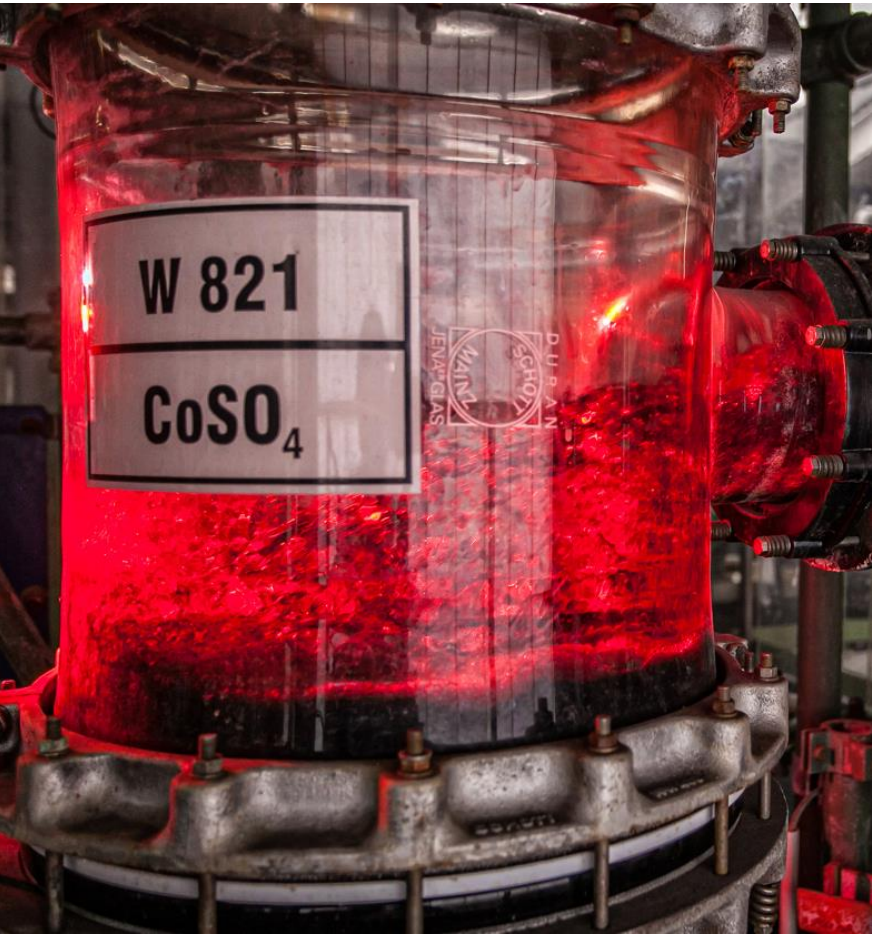
(Credits: Boliden)

What are the expected impacts?

- **Sustainable** & **climate neutral** **mineral / metal supply**
- **Optimized processes** for **competitive** & **sustainable processing / refining capacity**
- **Increased**:
  - ✓ **resource efficiency** by **increased minerals** & **metal recovery** (primary/ secondary)
  - ✓ **security of supply** of raw materials
- **Development:**
  - ✓ **circular economy hub in the EU** (cross-sectoral process streams)
  - ✓ **markets for by-products**
- **Maintain energy intensive industries in Europe**
- **Efficient energy** & **water use**
- **Reduced landfill/tailings**
- **Waste:**
  - ✓ **inventories** of depositories and dumps (municipal landfills, domestic waste streams)
  - ✓ **improvement** of their **use** (redirection of waste streams)

European Technology Platform on Sustainable Mineral Resources

Frontrunners in sustainability – climate neutral and circular metals systems



Cobalt recycling (credit: Nickelhütte Aue)

Accelerate technological developments: mineral processing, metal production & recycling to **stay competitive** while adopting to **climate neutral processes** (goal: **net zero GHG emissions by 2045**)

CRMA targets by 2030: **R&I to develop economically and environmentally viable processes for extracting SRM/CRMs as by-products** from existing mines/waste streams/EOL products, or from advanced exploration projects.

➡ **Access to piloting facilities is key**

Long term: **Metals recovery from new exploration targets and MS Exploration Programs** (increased knowledge base will attract investments)

European Technology Platform on Sustainable Mineral Resources

Frontrunners in sustainability – environmental & social performance

Wetland restoration (Credit: Kaunis Iron)

High environmental and social performance are key for achieving Social License to Operate and to attract a skilled work force

Examples of **R&I needs** on both **technical- and social science**:

- Water management
- Dam safety and tailings management
- Air emissions management
- Waste management
- Biodiversity status
- Corporate Social Responsibility
- Management of land-use conflict
- Gender equality and diversity
- Safety and needs of workers
- Non-destructive exploration technologies

European Technology Platform on Sustainable Mineral Resources

Recommendations

European Technology Platform on Sustainable Mineral Resources

The European Union and the Member States cannot rest on its laurels if we want to secure raw materials for our industries:

- **Dramatically strengthen the mineral resource R&I sector**

Create opportunities for research collaboration between industry, SMEs, academia, institute and public authorities

- **Encourage Member States to provide national R&I funding possibilities**

Prioritise a Cofund Partnership on Raw Materials

- **Enable R&I collaboration with other strong mining countries** giving access to a stronger, broader, more mature R&I community (e.g., Australia, Canada, the US)

- **Create instruments and tools** that support weak links along the raw materials value chain R&I gaps along the value chain hamper the build-up of robust value chains

- **Gain leadership** in strategic research in the raw materials ecosystem

Both basic and applied research are need if we are to rebuild a strong, competitive minerals industry

Why should you join the ETP SMR?

- ✓ **Meet with stakeholders from the minerals industry and metallurgy, technology and machinery providers, the research community, regulators, consumers, associations, and civil society centered around the major technological challenges of the raw materials sector.**
- ✓ **Gain visibility and recognition from the European Commission** (DG GROW), our key contact in defining research strategy priorities and innovation actions in the Mineral Resources sector, as well as the broader EU industry, research and policy community, particularly through our participation in strategic events such as EU Raw Materials Week, where ETP SMR is invited to participate and propose speakers.
- ✓ **Be a part of our ETP SMR Strategic Research and Innovation Agenda (SRIA)**, established and driven by our members and defining their common vision of the future challenges, highlighting current needs and gaps. The SRIA serves as an input to the European Commission's research programmes highlighting topics that need to be addressed within the multiannual work programme on raw materials, including calls and partnerships.
- ✓ **Engagement with strategic partners in the raw materials R&I sector**, including close cooperation with exploration and mining companies and other industries from the private sector across the raw materials value chain, as well as the public sector national Geological Surveys of Europe.
- ✓ **Access latest news in the raw material sector** concerning research and innovation projects and European policy developments.
- ✓ **Provide input into the framing of strategic Position Papers on issues of key relevance** to the Raw Materials sector and to the implementation of EU policy and legislation.
- ✓ **Preferential access to an established network of partners for collaboration in raw materials research and innovation projects**.
- ✓ **Become part of a larger community** and **gain visibility on the European stage**.

European Technology Platform on Sustainable Mineral Resources

Thank you
for your attention!

Follow us on

Access to the SRIA

Interested in joining? Visit our website (www.etpsmr.org) and contact the Secretariat for more information.

European Technology Platform on Sustainable Mineral Resources