



The European Mining Industry – An Outlook

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FRAMTIDENS 2015
GRUV & MINERAL



Steel and concrete Architecture

Aluminium

Iron ore

Chromium

Concrete

Nickel

L'Hemisfèric – IMAX Cinema, planetarium and laserium

- Planetarium is a half-sphere composed of concrete 110 meters long and 55.5 meters wide.
- The shutter is built of elongated aluminum awnings that fold upward collectively to form a brise soleil roof that opens along the curved axis of the eye.

Before it's yours, we mine it.

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Automotive Industry

Diesel and petrol driven cars

Aluminium

Iron

Platinum

Palladium

Rhodium

Diesel and petrol driven cars

- High-strength steel is used to improve crash protection while at the same time lower the weight.
- Aluminium can be used for body panels, engine blocks, roofs and wheels.
- Catalytic converters require to use of precious metals such as platinum, palladium and rhodium.

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Skyscraper Architecture

Carbon fiber

Iron ore

Lift technology – KONE UltraRope™

Super-light rope technology
Carbon fiber core and special high-friction coating

- 2x longer lifetime,
- 60% reduction in moving masses,
- 15% reduction in energy consumption,
- Less sensitive to building sway.

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Aerospace Industry

Aluminium

Copper

Carbon fiber

Titanium minerals

Superjumbo Aircraft

- To minimise the unladen weight, the Airbus A380 structures incorporate a range of new materials.
- The aluminum and fiberglass layers of Glare (new material, highly resistant to fatigue) do not allow propagation of cracks.

- Carbon fiber-reinforced plastic is used for the central box of the wings, the horizontal stabilisers, the fin, the rear fuselage section and for ceiling beams.

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Automotive Industry

Electric cars

Terbium

Iron

Lithium

Neodymium

Dysprosium

Cerium

Copper

Aluminium

Plug-in hybrid sports car by BMW

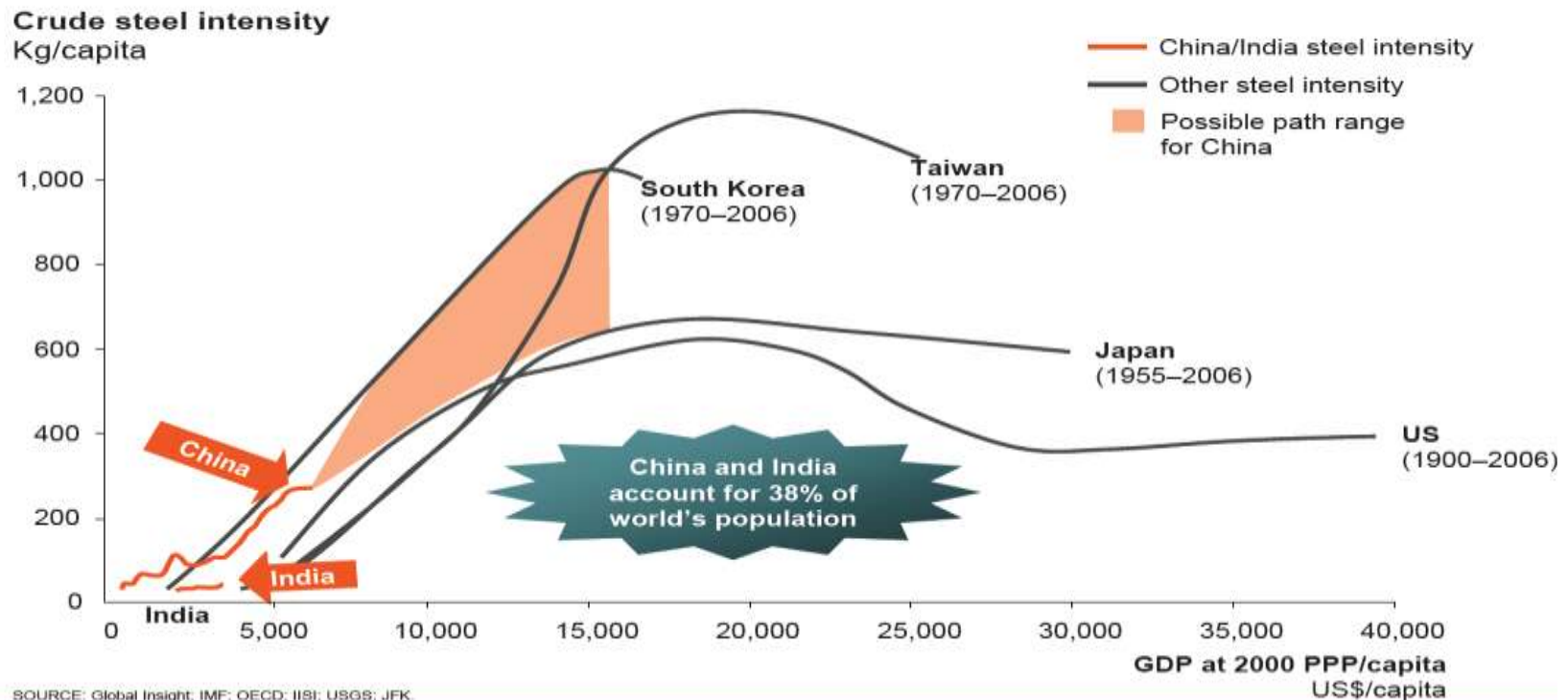
- The BMW i8, first introduced as the BMW Concept Vision Efficient Dynamics.
- The 2015 model year BMW i8 has a 7.1 kWh lithium-ion battery pack that delivers an all-electric range of 37 km (23 mi) under the New European Driving Cycle (NEDC).

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The demand for base metals and minerals is certain

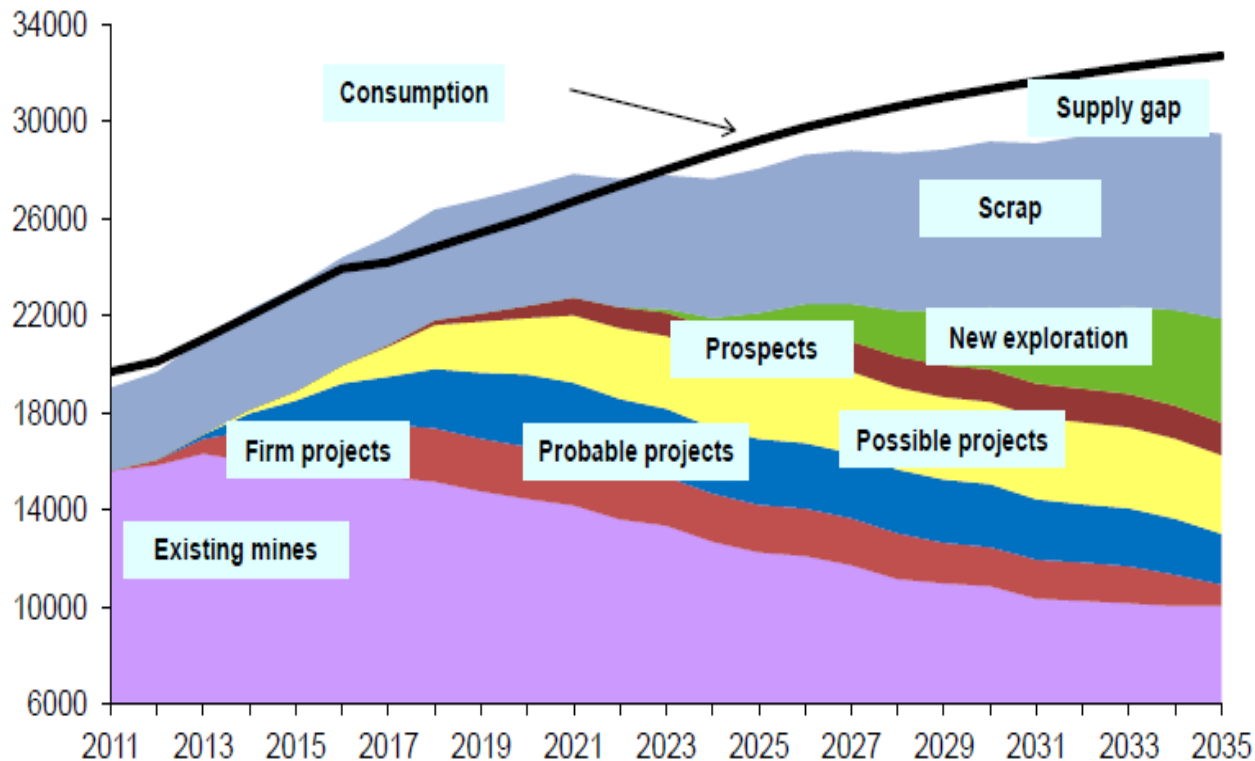
Future demand for our minerals is assured



Secondary metals and minerals will not be sufficient

World production and demand 2011-2035

('000t contained copper in concentrates, SXEW cathode and secondary materials)



Data: CRU

Growing uses

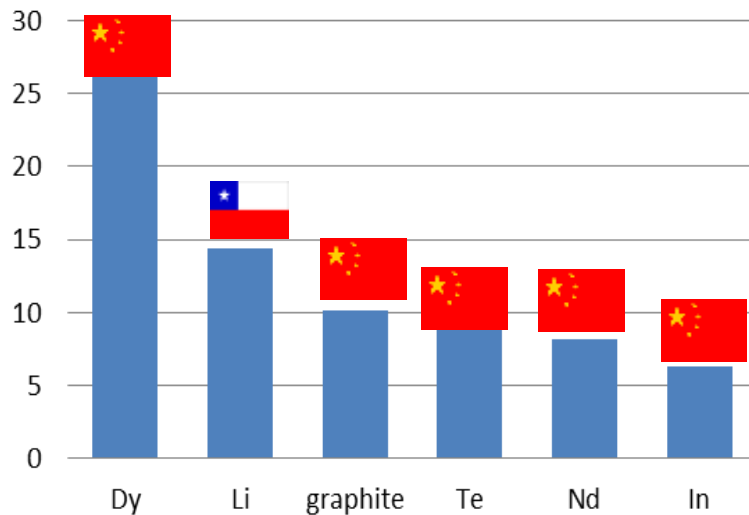
- Wind energy - In large turbines one tonne of copper
- Solar energy - technology that uses copper in the manufacture of solar cells developed
- Copper motors in hybrid electric vehicles
- In motors and cables of light rail vehicles
- Use in data transmission growing



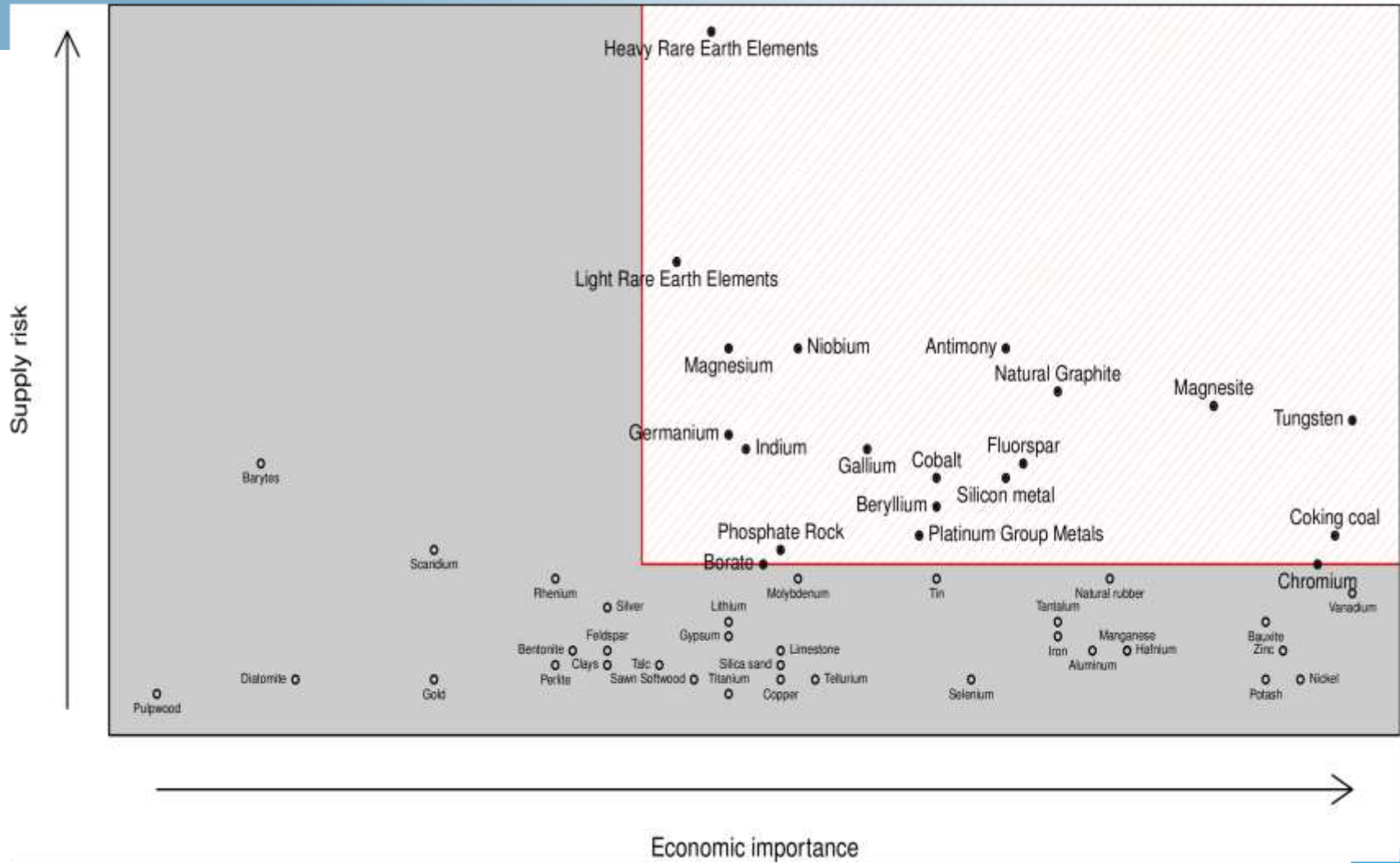
Policies create further demand: Critical Materials for Energy Technologies

Joint Research Centre - European Commission

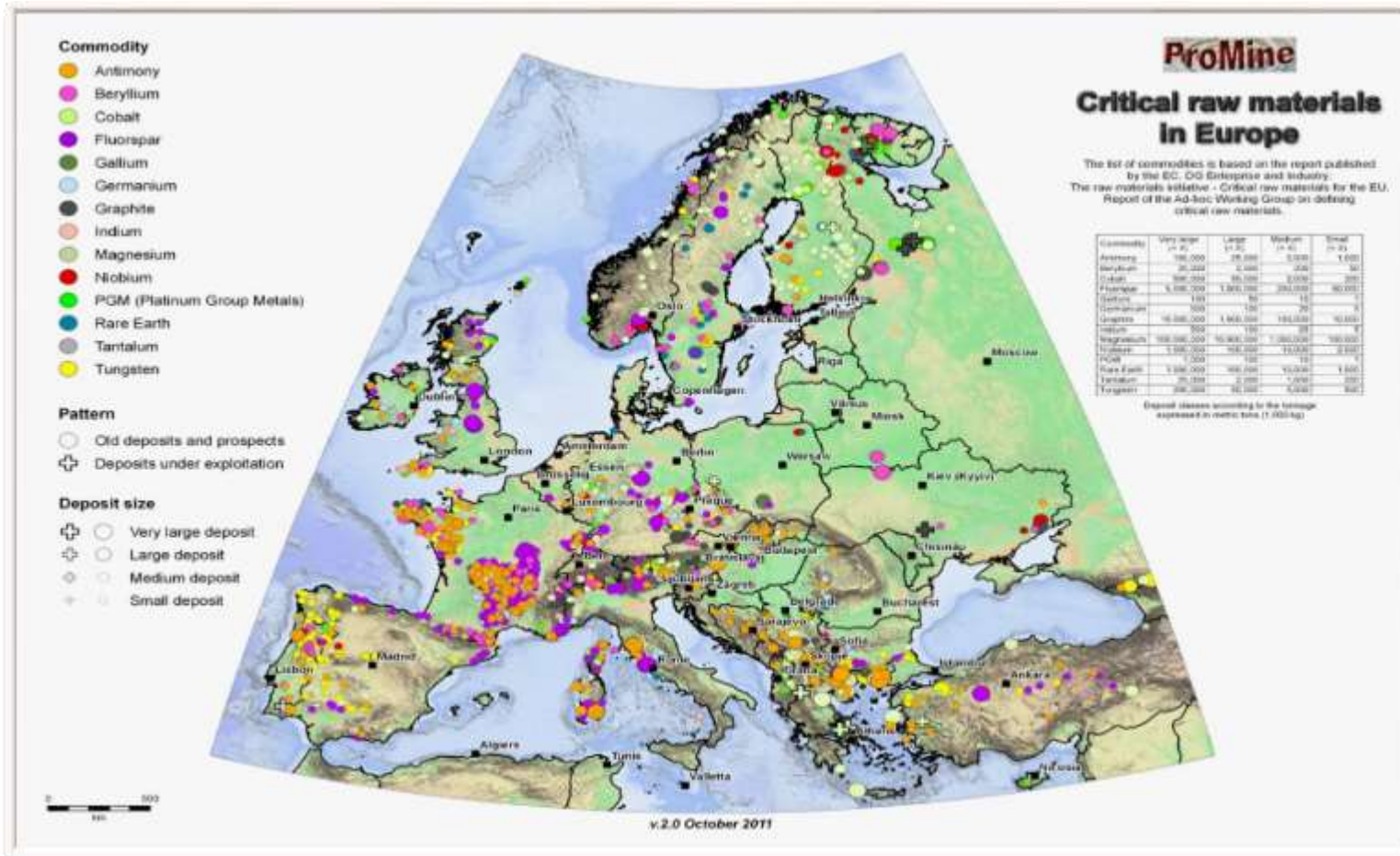
demand-to-supply figures (%) for the 6 most critical metals identified in energy technologies, indicating the dominant supplying country, with %-age of supply



EU critical raw materials assessment - Outcome 2014



Increasing the knowledge is key



Circular economy? Digital design and systems engineering

Primary production

Process efficiency

Material and structure designed for

- Substitution
- Performance
- Recycling

(SEMI-) FABRICATION

PRODUCT MANUFACTURING

Product manufacturing

- Production systems and automation
- New production concepts
- Digital and additive manufacturing

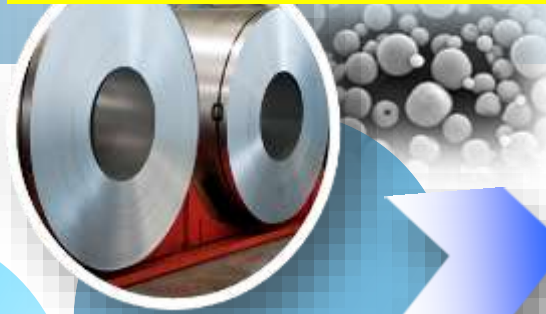
Product life time

- Asset management
- Maintenance strategies

RECYCLING

RAW MATERIAL

PRIMARY PRODUCTION



Optimal material streams

- End of life
- New recycling technologies
- Industrial symbiosis

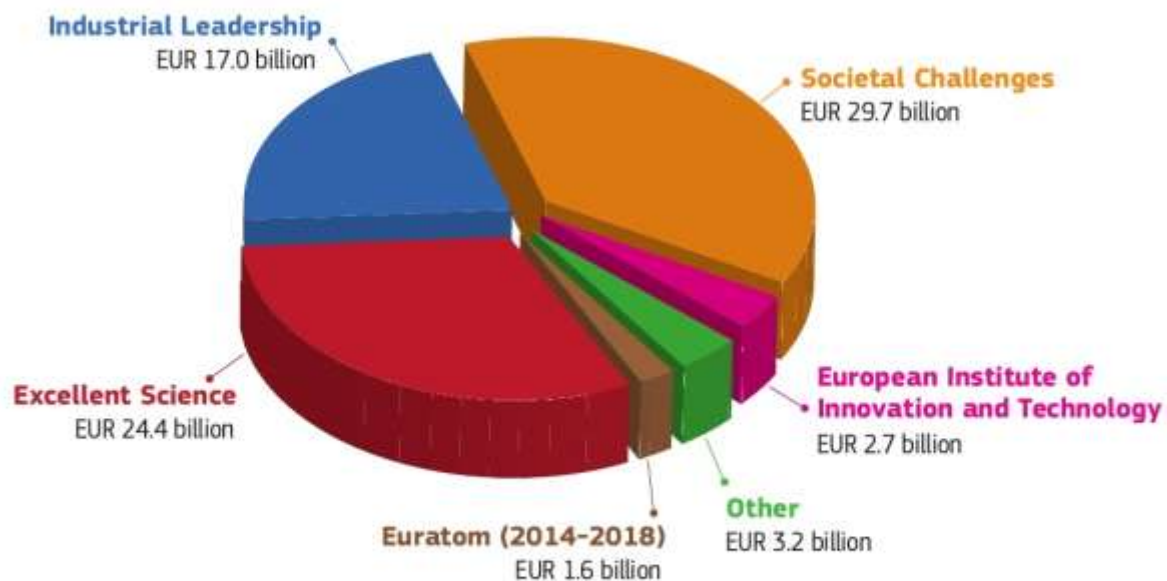


The European Innovation Partnership on Raw Materials - changing the policies



EU RTD funding

HORIZON 2020 BUDGET (in current prices)



- EIP-Horizon 2020 funding
- KIC on Raw materials
- Many calls on Raw materials
- National Platforms
- ERAMIN joint calls

Our Key Messages



RESOURCES

- ***We strongly believe that Europe has mineral resources.***

DEMAND

- ***The demand for raw materials is continuously increasing.***

STANDARDS

- ***Providing an enabling environment which provides highest standards, excellency and leadership of the European extractive industry.***



Euromines current priorities



- **European Innovation Partnership (EIP) on raw materials**
 - Strategic Implementation Plan for the EIP on raw materials
 - Competitiveness study, Critical raw materials study
- **Innovation/Research & Technical Development**
 - Horizon 2020
 - Extractive industry as a major contributor to innovation in EU raw materials supply
- **Communication**
 - Improve the image of the industry as more environmentally friendly, trustworthy and innovative
 - Establish and maintain good relationships with target audiences
 - Share Knowledge
 - Further strengthen Euromines as the voice for its membership and for the extractive industry in Europe

Vision for 2020 and beyond



By 2015

- = EIP on Raw Materials: research into new and more resource efficient resource access and management; review of regulatory requirements
- = Complete database by MS on old mine waste sites (EU Mine Waste Directive)
- = EU Standard methodology for prioritisation and economic assessment of such deposits
- = All Member States have new or revised Mineral Policies in place
- = All MS Land-planning policies include references to extractable mineral deposits
- = Revision of BAT note on mine waste management



Vision for 2020 and beyond

By 2020

- ≡ **Complete modern database and economic assessment of EU primary and secondary resources**
- ≡ **Revised regulatory framework facilitating sustainable management of resources and uptake of innovation**
- ≡ **EU Leadership in technology for all aspects of resource management (exploration, extraction, processing, re-processing, reuse, recycling, recovery, design, ...)**
- ≡ **EU resource diversification**



Vision for 2020 and beyond



By 2030

- = Only High tech mines in place in Europe
- = Technology proven and being exported
- = Optimised valorisation of available resources, i.e.
 - new technologies in place,
 - removal of legacy sites,
 - increased reuse, recovery and recycling rates,
 - material efficiency use in higher performance products



BEFORE RESTORATION



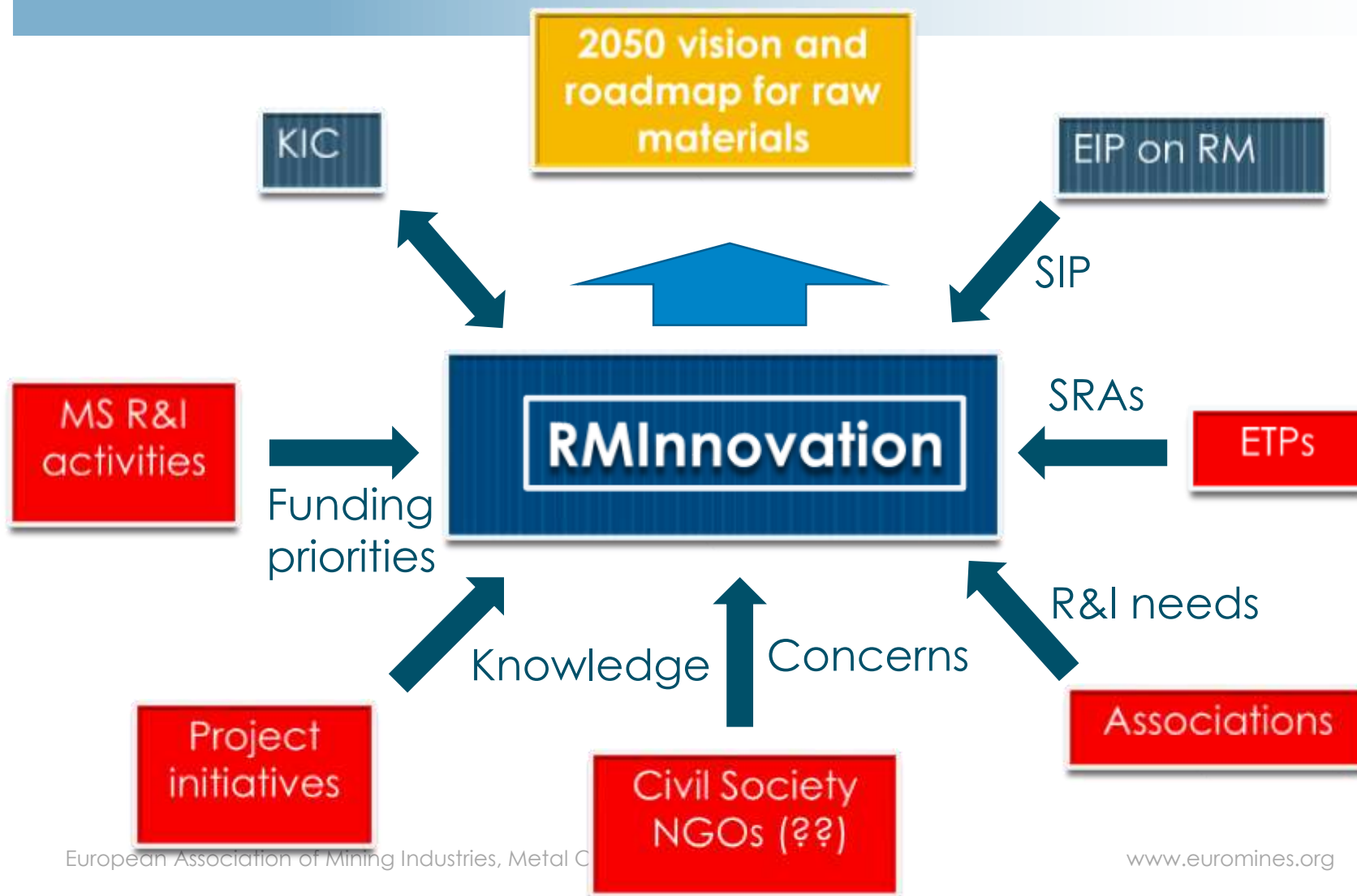
AFTER RESTORATION

EU Council of Ministers Conclusions



- ≡ “CONSIDERS that secure, sustainable and affordable access to natural resources and raw materials both inside and outside EU territory is crucial for ensuring the competitiveness of European industry as well as for innovation and employment; **CALLS ON the Commission to include access to natural resources and raw materials in the roadmap referred to above, as well as on Member States to take determined action to ensure such access;**”
- ≡ **EESC Regional Roundtables with support of Euromines approved for 2015 !!!**

RMInnovation – Strategic Approach



Technological challenges



Testing the longwall complex (ACT Caterpillar, USA) with continuous mining at a copper ore mine, KGHM; 2014



Electrified transport for ores and concentrates and related products

**We must shape the future of our
industry in Europe!**

Thank you for your kind attention

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