

The Raw Materials Challenge

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SUSTAINABILITY STARTS WITH EUROPE'S RESOURCE POTENTIAL







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THE DEMAND FOR MINERALS AND METALS WILL INCREASE IMMENSELY IN THE NEXT 30 YEARS

	2015	2030	2050
Electric passenger cars	1.2 million	200 million	965 million
Battery storage capacity	0.5 GW	175 GW	12 380 GW
Solar photovoltaic capacity	223 GW	2840 GW	8519 GW

Data from IRENA (International Renewable Energy Agency) 2018

RAW AND ADVANCED MATERIALS ARE THE KEY ENABLERS FOR THE ENERGY TRANSITION





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Connecting matters

*A*aterials

EIT,

STATUS QUO



- 4 Iron and Ferro-Alloy Metals: Mo, Ti, W, V
- 14 Non-Ferrous Metals: Al, Sb, As, Bi, Cd, Ga, Ge, In, Pb, Hg, REE, Te, Sn, Zn
- 1 Precious Metal: Au
- 11 Industrial Minerals: Baryte, Bentonite, Fluorspar, Graphite, Gypsum, Kaolin, Magnesite, Phosphates, Salt, Sulfur, Talc
- 2 Mineral Fuels: Steam Coal, Coking Coal



+27.6%

World Mining Data, 2020

+22.0%





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+135.0%



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WICKED PROBLEMS

- Highly complex and interconnected
- Many stakeholders
- Large economic impact
- Incomplete or contradictory information

Collective problems require collective actions!







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COLLECTIVE ACTIONS

- Highly complex and interconnected
- Many stakeholders
- Large economic impact
- Incomplete or contradictory **information**

Geological information on local, regional, national and European level.



Christmann 2017





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BUILDING MOMENTUM









Action Plan on **Critical Raw** Materials

#EUGreenDeal #EUIndustrialStrategy





EUROPEAN RAW MATERIALS ERMA ALLIANCE



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EUROPEAN RAW MATERIALS ALLIANCE VISION & GOALS

Vision

ERMA will secure a sustainable supply of raw materials, advanced materials and processing know how for the EU industrial ecosystems.

ERMA has four interconnected goals:

- Bolster the creation of environmentally sustainable and socially equitable innovations and infrastructure
- Implement a Circular Economy of complex products
- Support Europe's raw materials industry capability, to extract, design, manufacture and recycle materials
- Promote innovation, strategic investment, and industrial production across specific value chains



DIGITAL TRANSFORMATION

Europe's current and future sustainable

economic growth and societal wellbeing

increasingly draw on value created by

data.

European Commission White Paper on Artificial Intelligence, 2020







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SCALES OF OBSERVATION







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Primary Mineral Resources





Mineral Belts

Central European

Granite related W-Sn(Nb-Ta-Li-Au) Kupferschiefer type Cu(-Ag-PGE) Pegmatites (Li-REE)

Fennoscandian

magmatic Ni-Cu-PGE

Orogenic Au(Co-Bi-Te)

Kiruna-type Fe-P

Carbonatites (REE)

Tethyan

Porphyry Cu-Au-Ag Epithermal Au-Ag Skarns (base metals)

Iberian

Volcanic-hosted massive sulfide Cu-Zn(Co-In-TI-Ga-Sn-Ag) Orogenic Au(Co-Bi-Te)





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