



Supply chain analysis and material demand forecast in strategic technologies and sectors in support of EU critical raw material policies

RGI Webinar 'Wired for Circularity – Securing the Power Grids of the Future'

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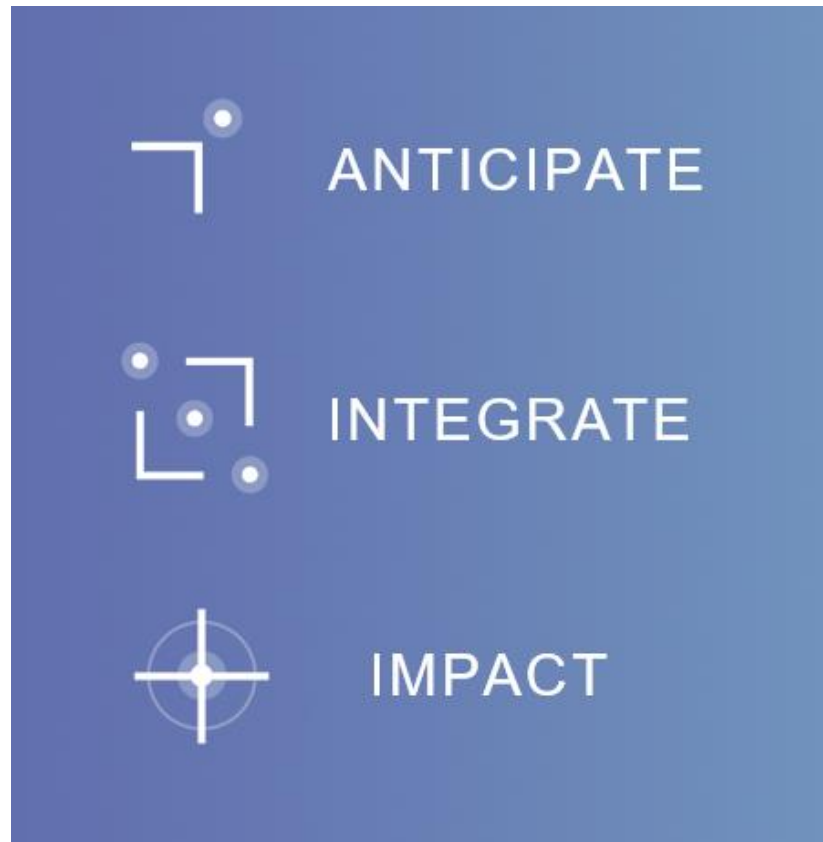
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Unit C.7: Energy Transition Insights for Policy

Petten, the Netherlands

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Role of materials and their supply in the Energy Transition

Rapid deployment of renewables to meet climate targets
Shift from *fuels* to *technologies, manufacturing, materials*

➤ The **energy transition** is a **materials transition**



Manufacturing electric vehicles, deploying renewable energy plants, expanding the power grid etc. require **raw materials** and a whole **supply chain** up to the final technology

The EU Critical Raw Materials Act

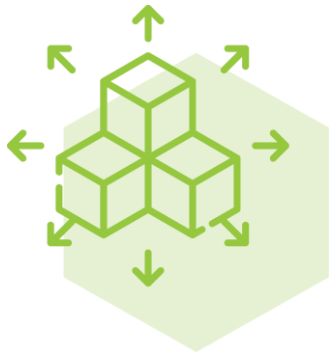
Ensuring a secure and sustainable supply of critical raw materials



Strengthen all stages of the European CRM value chain



Improve EU capacity to monitor and mitigate risks of disruption to CRM supply



Diversify EU CRM imports to reduce strategic dependencies



Improve CRM circularity and sustainability

Defining critical and strategic raw materials

Critical Raw Materials (CRM)

For the whole EU economy,
based on:

- supply risk
- economic importance

Strategic Raw Materials (SRM)

A subset of CRM with:

- Key role in strategic technologies (energy, digital, defence, space)
- Strong projected demand growth (risks outstripping supply)

Critical and strategic raw materials

- Antimony
- Arsenic
- **Bauxite/Aluminium**
- Baryte
- Beryllium
- **Bismuth**
- **Boron**
- **Cobalt**
- Coking Coal
- **Copper**
- Feldspar
- Fluorspar
- **Gallium**
- **Germanium**
- Hafnium
- Helium
- **Rare Earth Elements**
- **Lithium**
- **Magnesium**
- **Manganese**
- **Graphite**
- **Nickel**
- Niobium
- Phosphate rock
- Phosphorus
- **Platinum Group Metals**
- Scandium
- **Silicon metal**
- Strontium
- Tantalum
- **Titanium metal**
- **Tungsten**
- Vanadium

Creating secure and resilient supply chains

- Streamline permitting procedures for critical raw materials projects
- Better access to finance and shorter timeframes for selected strategic projects
- Supply chain monitoring and stress-testing
- Risk preparedness obligation for large companies producing strategic technologies

2030 Benchmarks

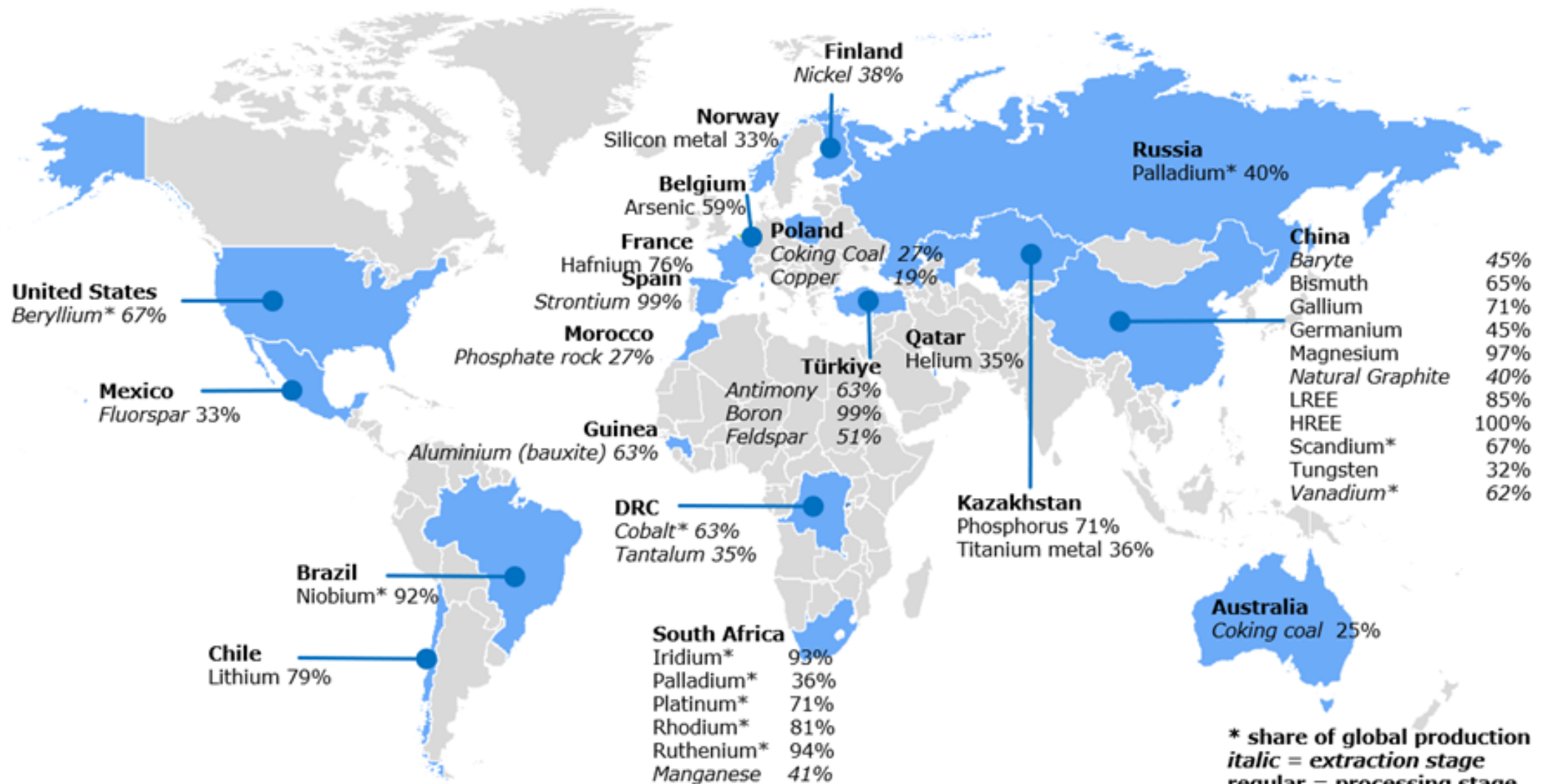
Towards more SRM supply security

- EU's extraction capacity cover at least **10%** of the EU's SRM consumption
- EU's processing capacity cover at least **40%** of the EU's SRM consumption
- EU's recycling capacity cover at least **25%** of the EU's SRM consumption

Towards more diversification of supply

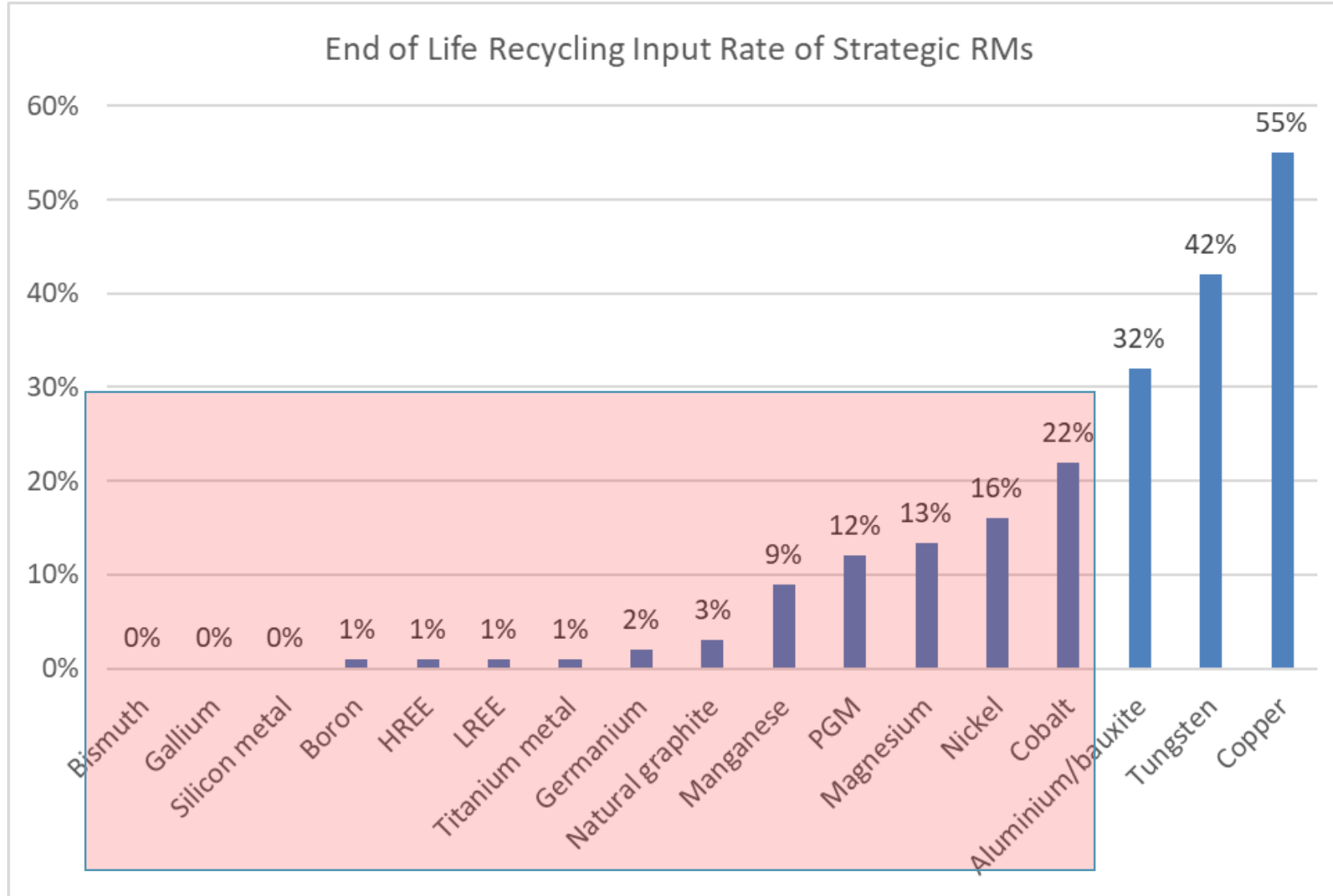
- Not more than **65%** of EU consumption of each SRM should come from a single third country.

Dependencies in EU CRM supply

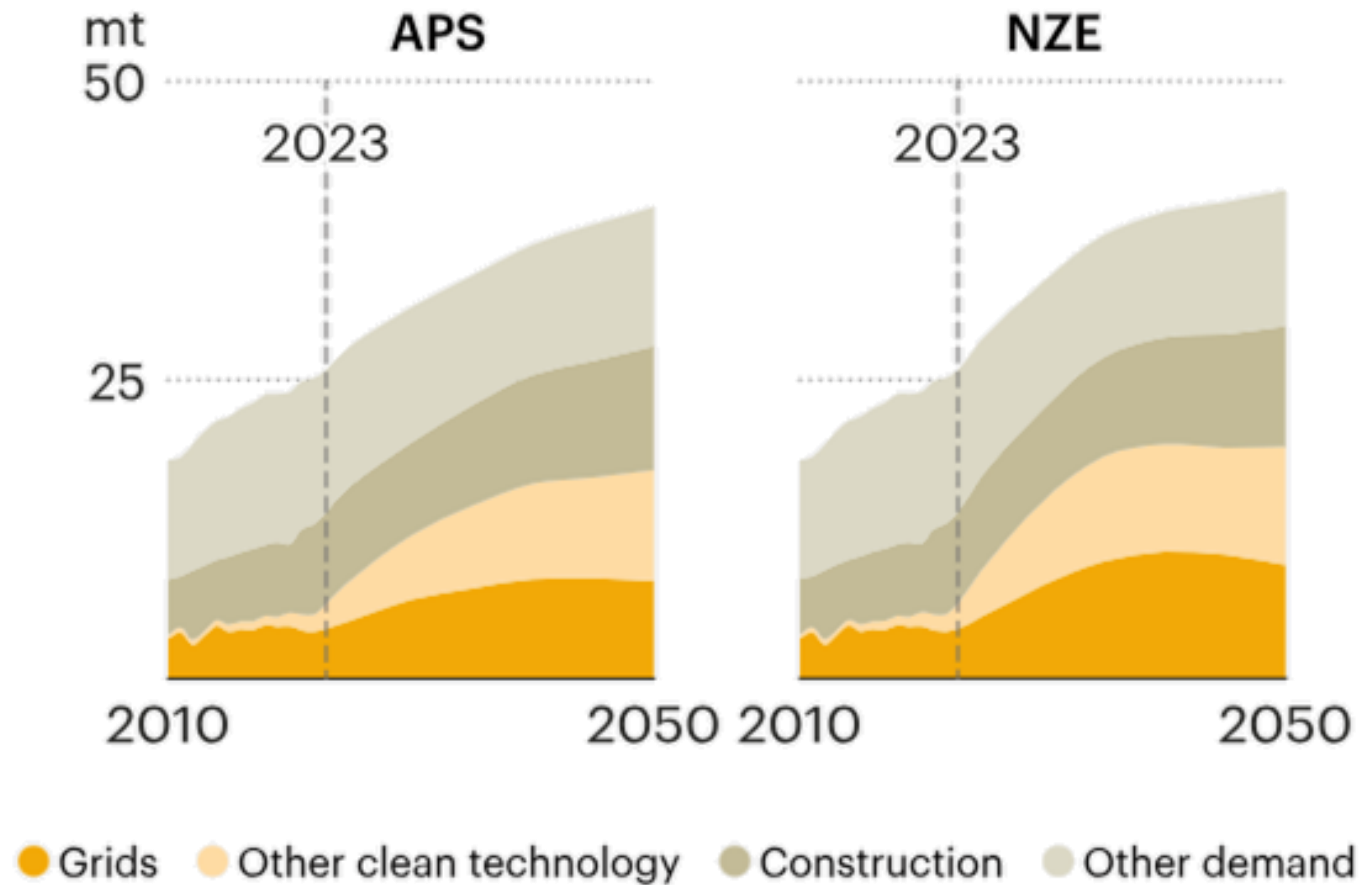


Source: "European Commission, Study on the Critical Raw Materials for the EU 2023– Final Report"

Recycling input rate for SRM

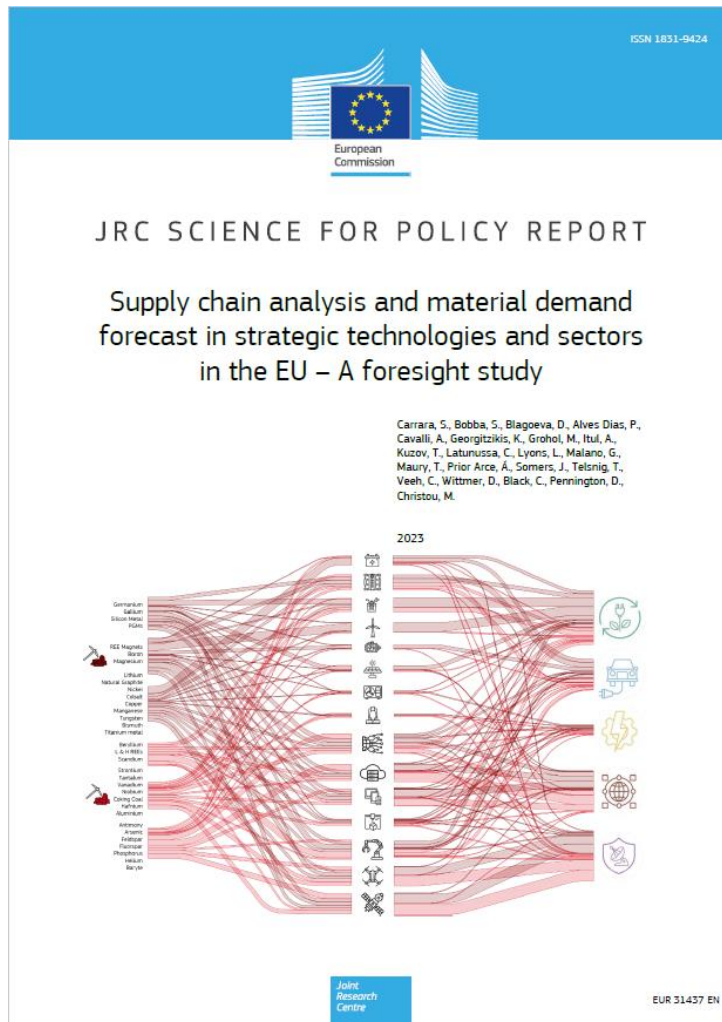


Global demand outlook: Copper



Source: IEA Global Critical Minerals Outlook 2024

Materials and supply chains – Foresight report



Two main dimensions:

- Supply chain analysis
- Demand forecast and supply/demand balance

15 technologies in 5 strategic sectors
(renewable energy, e-mobility, energy-intensive industry, ICT, aerospace & defence)

Supply chain analysis



What are the components, the processed and the raw materials used in clean energy technologies?



Is the EU exposed to vulnerabilities along the supply chains?



What actions can be taken to overcome bottlenecks?

Supply chain analysis – Wind: raw materials

Iron: as cast iron or in steel composition for tower, nacelle, rotor and foundation; in neodymium–iron–boron (NdFeB) permanent magnets

Chromium: essential for stainless steel and other alloys in rotor and blades

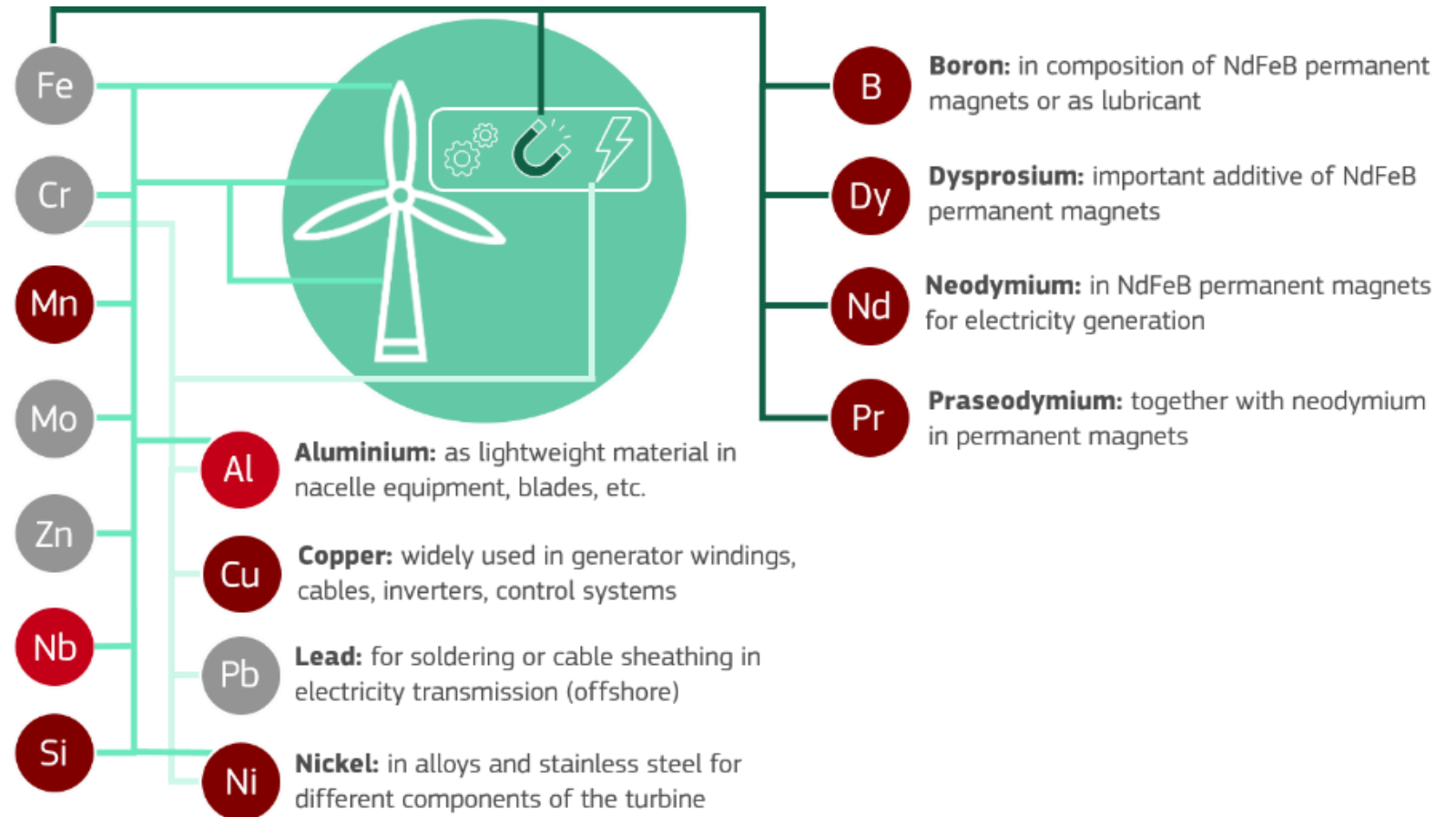
Manganese: essential for steel production used for many parts of a turbine

Molybdenum: in stainless steel composition for many components of the turbine

Zinc: in protective coatings against corrosion

Niobium: a microalloying element in high strength structural steel for towers of a turbine

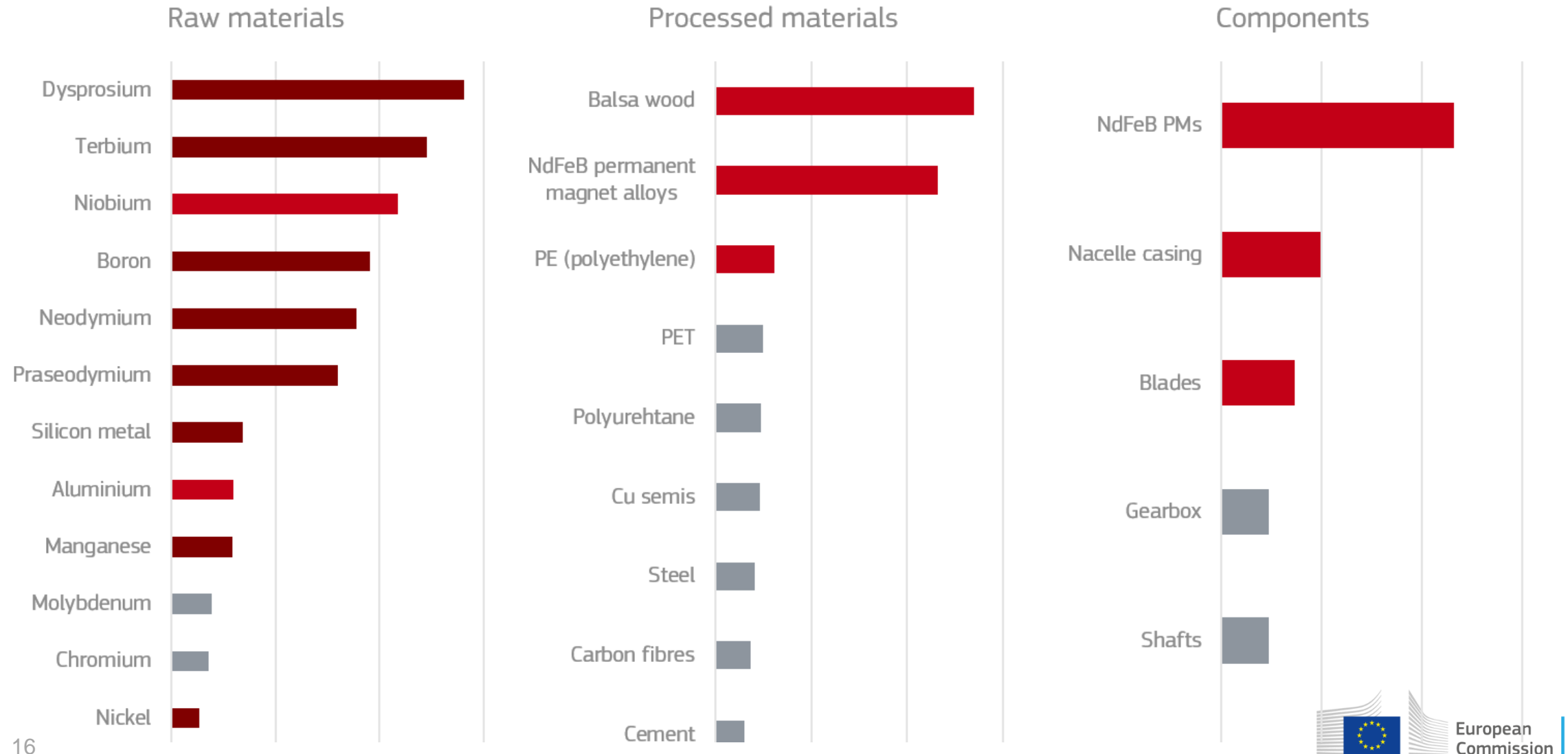
Silicon: as alloying element in high-performance steels and as silicone in polymers (sealants, adhesives, lubricants)



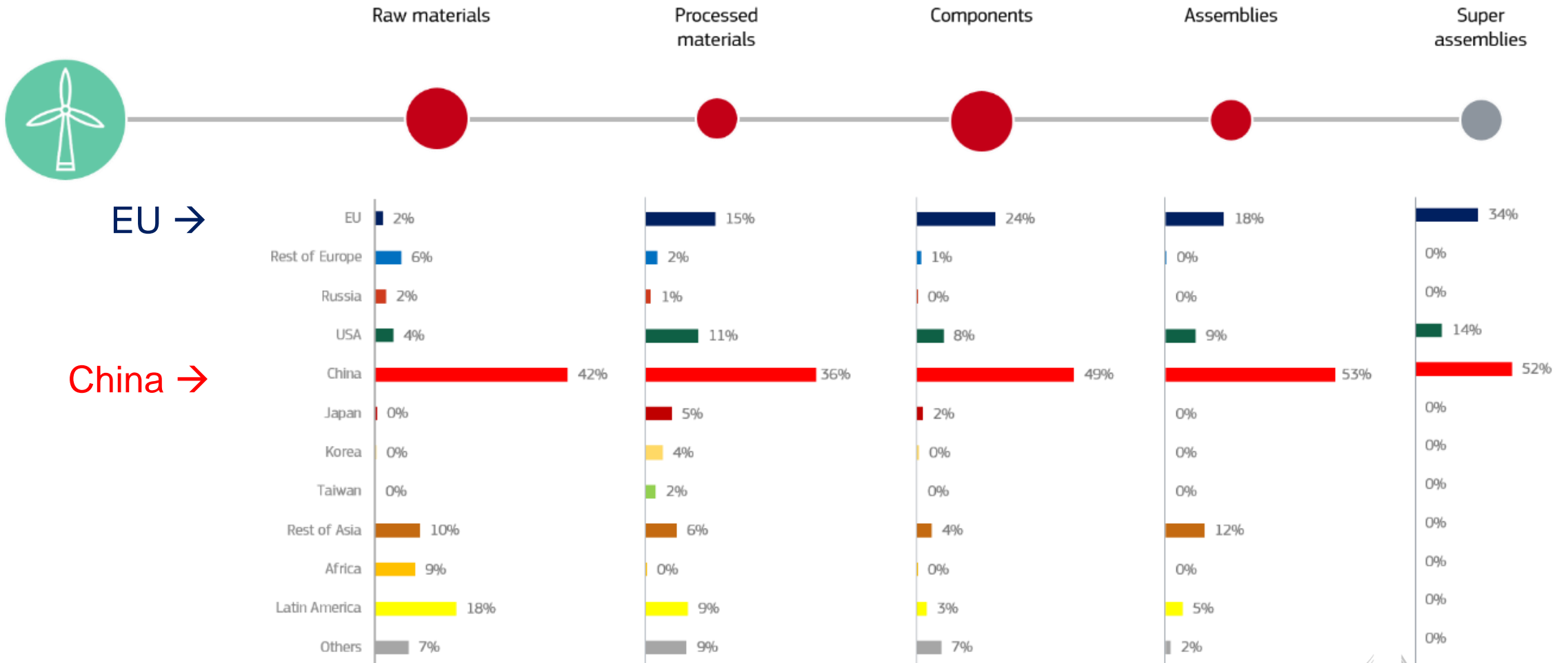
● Strategic Raw Material

● Critical Raw Material

Supply chain analysis – Wind: supply chain (I)



Supply chain analysis – Wind: supply chain (II)



Demand foresight and supply/demand balance



What will be the future demand of energy technologies, components, processed and raw materials?



How does future demand compare to supply?

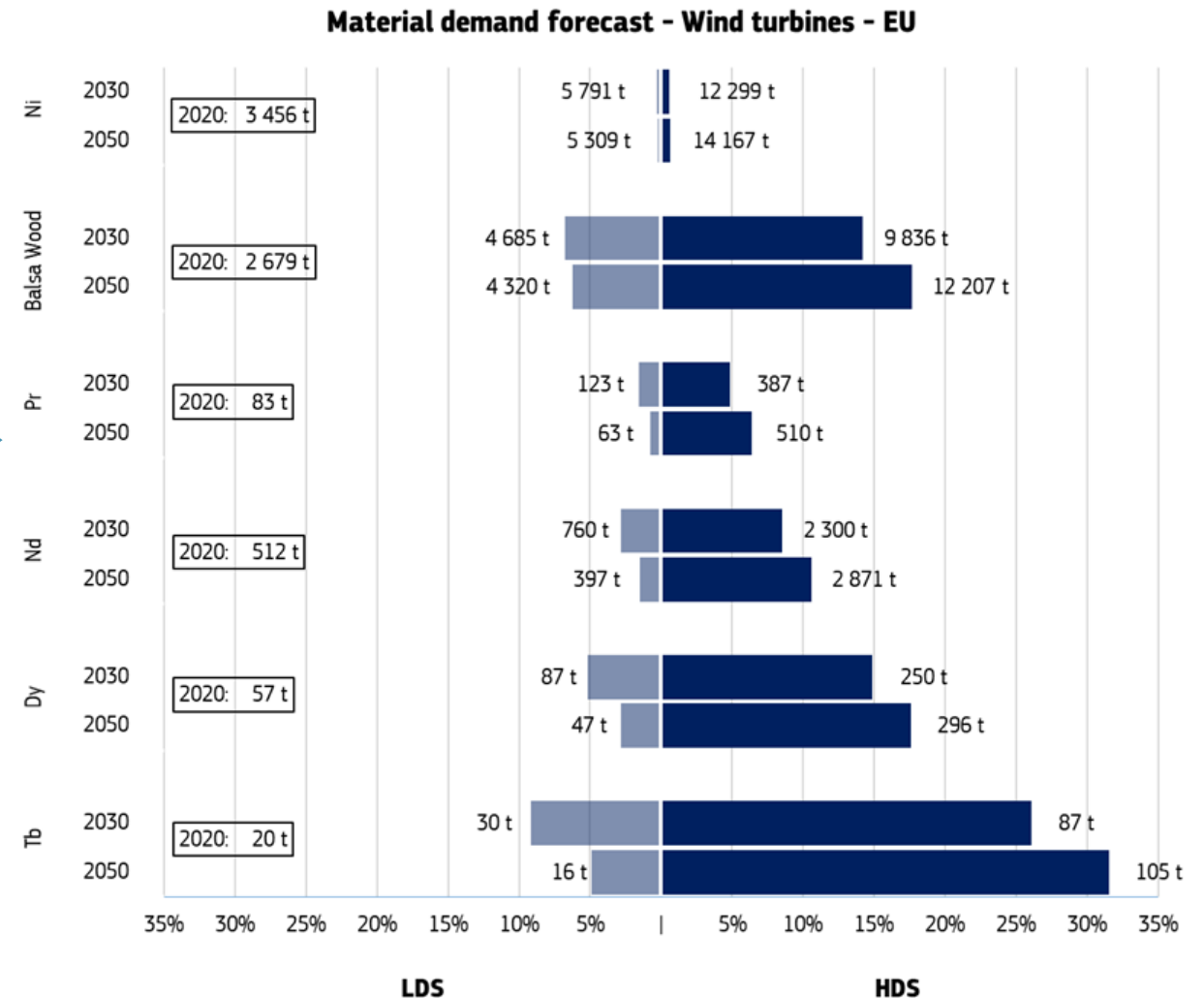
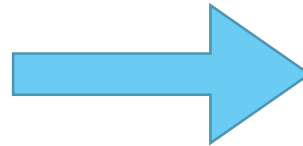


Which materials have a critical demand growth?

Forecast analysis – Material demand scenarios



- Deployed capacity
- Material intensity
- Technology shares



Conclusions

- **Dependencies and vulnerabilities are present in various steps of the value chain of strategic technologies in the EU:** in detail, the raw materials step is systematically critical for all technologies, while the EU is stronger in the manufacturing of the final technologies.
- Meeting the EU's ambitious policy targets will drive an **unprecedented increase in materials demand** in the run up to 2030 and 2050, which will be the case at global level as well. This raises concerns about a potential **gap between demand and supply** for many raw materials.
- Diversifying material supply sources, increasing domestic manufacturing capacity, enhancing recycling and reuse for a stronger circular economy, exploring substitution routes are among the **strategies to strengthen the supply chains** included in EU CRM policies.

Thank you and keep in touch



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