Circular Economy and Raw Material EU Policies

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Unit C2 - «Resource Efficiency and Raw Materials»
• **State of play EU policy on transitions to a circular economy**

• **Links with the EU policy on Raw Materials:**

• **Secondary Critical Raw Materials – sectoral approach:**
  Supply side: mining primary RMs, re-mining of secondary RMs from mining waste, landfills.
  Demand side: EEE, batteries, automotive sector, renewable energy, defence industry, chemicals and fertilisers
2050-strategy for climate neutral Europe


A Clean Planet for all
A European strategic long-term vision for a prosperous, modern, competitive and climate neutral economy

...more and better re-use and recycling will improve competitiveness...

...raw materials indispensable enablers for carbon-neutral solutions across sectors...

...recovery and recycling particularly important in sectors/technologies depending on critical materials like cobalt, rare earths and graphite...
Main drivers for demand raw materials

- Demography
- Decarbonisation
- Urbanisation
EU Raw Materials Strategy

- keep the EU industry competitive on the way to a low-carbon and circular economy;
- help the EU industry to master: digitalisation, sustainability and innovation;
- strengthen domestic production and EU industrial value chains, all starting with raw materials, particularly critical raw materials (e.g. EU Battery Alliance);
- strengthen partnerships between the EU, Member States and regions;
- attract young generation and develop relevant skills, build knowledge and engage society.

Raw Materials Initiative = EU policy

- H2020 funding
- Raw Materials Scoreboard

European Innovation Partnership (EIP) Raw Materials Strategic Implementation Plan
Horizon 2020
Context and overview

1. EU Policy background
Raw Materials in Horizon 2020

Excellent science
(€ 24 billion)

Industrial leadership
(€ 17 billion)

Societal challenges
(€ 31 billion)

SC5. Climate action, environment, resource efficiency and raw materials

Raw materials innovation for the circular economy:
Sustainable processing, reuse, recycling and recovery schemes
19 Feb 2019!
Circular Economy – Raw Materials
"Closing the loop. An EU action plan for the Circular Economy"
Commission's Communication COM(2015) 614 final

- Transition towards a Circular Economy
  - The value of products, materials and resources is maintained in the economy for as long as possible
  - Waste generation is minimised
  - Brings economic, social and environmental gains
Critical raw materials and circular economy
Circularity of raw materials (recycling input rate)
• < 10%

Circularity of critical raw materials
• High for some... (Vanadium, Tungsten, Cobalt, Antimony - between 44% - 28%)
• But low for most... (Light – and heavy rare earth metals around 6%)
Objectives:

- Analyse the supply and demand side of CRMs in the EU with regard to the use of secondary raw materials.

- 6 sectors: EEE, batteries, automotive, renewables, defence, chemicals and fertilisers.

- Provide key data sources and identify best practices and possible further actions.

- Help Member States implement the new provisions on critical raw materials in the Waste Framework Directive – i.e. in relation to waste prevention and waste management.
Critical raw materials and circular economy

Figure 12: Share of CRMs used in the electric and electronic sector according to the 2017 CRM assessment

* Only a subset of CRMs used in the EEE sector are included. Additional CRMs linked to the EEE sectors include Ce, Co, Fluorspar, Hf, He, La, Mn, Natural rubber, Pd, Pt, Pr, Rh, Sm, Si, W, and V.
**Average share for Er, Eu, Gd, and Y
Critical raw materials and circular economy

Figure 13: Simplified Sankey diagrams for materials used predominantly in the EEE sector: (a) Gallium (b) Germanium (c) Indium and (d) Dysprosium. Values for the EU-28 expressed in t/year for the year 2012 based on the 2015 MSA study.

- **Gallium**
  - Imports:
    - Primary material: 774,900 kg
    - Secondary material: 5,200 kg
    - Processed material: 41,500 kg
    - Waste: 427 kg
  - Exports:
    - Processed material: 63,000 kg
    - Product: 27,400 kg
    - Waste: 204 kg
  - Extraction: 94,200 kg
  - Additions to in-use and end of life stock: 29,700 kg
  - Additions to landfill and tailings: Waste: 6,936 kg
  - Losses:
    - Non-functional recycling: 1,280 kg

- **Germanium**
  - Imports:
    - Primary material: 50,500 kg
    - Secondary material: 30,700 kg
    - Processed material: 17,500 kg
    - Waste: 158 kg
  - Exports:
    - Processed material: 10,300 kg
    - Product: 21,100 kg
    - Waste: 9,230 kg
  - Functional recycling:
    - Secondary material: 5,500 kg
  - Additions to in-use and end of life stock: 5,510 kg
  - Additions to landfill and tailings: Waste: 30,900 kg
  - Losses:
    - Non-functional recycling: 2,140 kg
Critical raw materials and circular economy

Diagram showing the flow of materials and waste in the circular economy, focusing on indium. The graph illustrates the inputs, outputs, and recycling processes within the EU-28 boundary.
Critical raw materials and circular economy

Dysprosium (heavy REE)

Imports:
- Primary material: 40,200 kg
- Processed material: 136,000 kg
- Product: 58,700 kg
- Waste: 798 kg

Exports:
- Processed material: 17,200 kg
- Product: 83,600 kg
- Waste: 1,270 kg

Addition to in-use and end of life stock:
- Product: 134,000 kg

Addition to landfill and tailings:
- Waste: 10,400 kg

Losses:
- Non-functional recycling: 32,000 kg

Legend:
- Green: Primary material [t]
- Purple: Secondary material [t]
- Yellow: Processed material [t]
- Red: Product [t]
- Blue: Waste [t]
- Red-brown: Output from the value chain [t]
- Gray: In use dissipation [t]
- Orange: Non-functional recycling [t]
Critical raw materials and circular economy

Main findings:

- EEE: Ecodesign directive/enterprise server product group/material efficient recycling of CRMs

- Circularity depends on recycling infrastructure, market prices of materials, possibility to disassemble products, and the amount of material becoming available from products reaching their end-of-life

- Only a small fraction of CRMs remains inside Europe’s socio-economic system through functional recycling
Critical raw materials and circular economy

For improved recycling of CRMs:

- Research/innovations on efficiency of use of CRMs in key sectors

- Use ecodesign/labelling requirements to facilitate extraction of key components containing CRMs

- Supply side: improve data on mining waste and extraction of CRMs

- Develop recycling technologies focusing on materials

- Develop European standards on material-efficient recycling of CRMs
To conclude...
Raw Materials Week 2019
18-22 November
Thank you!

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EU Raw Materials Week 2018

Policy and strategy for raw materials

EIP on raw materials

Policy and strategy for circular economy
https://ec.europa.eu/growth/industry/sustainability/circular-economy_en
- **78 raw materials** evaluated with fact sheets available, revised methodology published – CRM website

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<thead>
<tr>
<th>2017 CRMs (27)</th>
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<tbody>
<tr>
<td>Antimony</td>
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<td>Baryte</td>
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<td>Beryllium</td>
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<td><strong>Bismuth</strong></td>
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<td>Cobalt</td>
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<td>Coking coal</td>
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*HREEs=heavy rare earth elements, LREEs=light rare earth elements, PGMs=platinum group metals