The need for a comprehensive management system for resources in the EU

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Peter Handley
Head of Unit C2 - "Resource Efficiency and Raw Materials"
European Commission. Directorate-General for Internal Market, Industry, Entrepreneurship and SME's (DG GROW)
peter.handley@ec.europa.eu
Resources for SDGs
Global material extraction trends

Source: UNEP (2017) and Dodds-Hatfield et al. (2017), in 2018 Raw Materials Scoreboard
Materials flows in the EU

- high complexity
- high import dependency
- low circularity
- growing waste streams and waste exports
- limited collection and reuse

Source: Mayer et al., 2018, in 2018 Raw Materials Scoreboard
Study on the review of the list of critical raw materials 2017

Biggest suppliers of CRM to the EU

- Russia: Scandium 67%, Tungsten 50%, Vanadium 60%
- China: Antimony 90%, Baryte 44%, Bismuth 84%, Cerium 62%, Dysprosium 40%, Europium 40%, Gadolinium 40%, Gallium 36%, Germanium 43%, Holium 40%, Indium 28%
- USA: Erbium 40%, Helium 51%, Samarium 40%
- Morocco: Phosphate rock 27%
- Turkey: Borate 98%
- Kazakhstan: Phosphorus 77%
- Indonesia: Natural rubber 32%
- Finland: Cobalt 65%, Silicon metal 23%
- Norway: Hafnium 43%
- Nigeria: Tantalum 43%
- Mexico: Fluorspar 27%
- Brazil: Niobium 71%
EMBRACING CLEAN, SAFE AND CONNECTED MOBILITY
Decarbonising the transport sector by using alternative means of transport, connected and automated driving combined with the roll-out of electric vehicles and enhanced use of alternative fuels.

PUTTING INDUSTRIAL MODERNISATION AT THE CENTRE OF A FULLY CIRCULAR ECONOMY
Reaping first mover benefits by modernising existing installations and investing in new carbon neutral and circular economy-compatible technologies and systems.

FULLY DECARBONISING EUROPE’S ENERGY SUPPLY
Large scale electrification of the energy system coupled with deployment of renewables will decarbonise our energy supply and significantly reduce our dependency on third country suppliers.
Materials needed for renewable energy

Import dependency for raw materials, as well as for selected materials used in wind, PV and battery technologies

EU competitiveness at stake as China leads on supply of most materials and components needed for renewables

Share of global production of different processed and finished materials used in wind turbines, solar photovoltaic panels and batteries, in % of total

Source: Joint Research Centre
EU Raw Materials Strategy and Commission priorities

1. Jobs, Growth and Investment
   - circular economy and green growth

3. Energy Union
   - transition to a climate neutral economy (renewables, electricity market, transport...)

4. Internal Market
   - unlock the full potential of the single market
   - a renewed EU Industrial Policy Strategy

6. Trade policy to harness globalisation
   - economic diplomacy
   - raw materials chapters in FTAs

9. A stronger global actor
   - international cooperation and development

Raw Materials Initiative = EU policy
EIP on Raw Materials
Strategic Implementation Plan
- CRM list
- H2020 funding

Ensure level playing field in access to resources in third countries
Foster sustainable supply from European sources
Boost resource efficiency and recycling
Raw materials knowledge and management

- European Innovation Partnership on Raw Materials
- Batteries action plan
- Circular Economy Action Plan
- Critical Raw Materials 2020
- Framework conditions for primary raw materials
- Raw Materials Scoreboard
- Research and Innovation
- Trade
- A clean planet for all – vision 2050
- RMIS
Global supply and demand of Li-ion batteries, EU share

**Source:** JRC

**Battery alliance Action Plan on Batteries**

<table>
<thead>
<tr>
<th>Year</th>
<th>Electric Vehicles on the Road</th>
<th>Lithium-Ion Battery Cell Sales</th>
<th>European Share of Global Cell Manufacturing</th>
</tr>
</thead>
<tbody>
<tr>
<td>2018</td>
<td>&gt;4 million</td>
<td>&gt;77 GWh</td>
<td>3%</td>
</tr>
<tr>
<td>2028</td>
<td>50 to 200 million</td>
<td>250 to 1100 GWh</td>
<td>7 to 25%</td>
</tr>
<tr>
<td>2040</td>
<td>up to 900 million</td>
<td>600 to 4000 GWh</td>
<td>can we do better?</td>
</tr>
</tbody>
</table>
Supply dependency on battery raw materials

Source: JRC
Batteries – example of the strategic EU industrial value chains

The objective is:
- To create a competitive manufacturing value chain in Europe with sustainable battery cells at its core.
- To capture a battery market of up to €250 billion a year from 2025 onwards. Covering the EU demand alone requires at least 10 to 20 ‘gigafactories’ (large-scale battery cell production facilities).

- Raw and processed materials:
  - cobalt, lithium, natural graphite, nickel; but also manganese, silicon metal,
Actions relevant to raw materials:

- **Map** the current and future primary RM for batteries.

- **Assess** the potential within the EU for sourcing battery RM materials: Cobalt, Lithium, Natural Graphite, and Nickel.

- **Dialogue with Member States** to determine the fitness of their raw materials policies, mining codes and incentives for exploration to address the strategic needs of materials for batteries.

- **Promote ethical sourcing** of raw materials for the batteries industry.

- **Member States survey 2018-2019 via RMSG**

## Exploration activities

### Commercial projects (E1;F1; G1,2,3)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>3 SE(3)</td>
</tr>
<tr>
<td>Lithium</td>
<td>3 FI(1), PT(2)</td>
</tr>
<tr>
<td>Natural graphite</td>
<td>1 SE(1)</td>
</tr>
<tr>
<td>Nickel</td>
<td>-- 3 SE(3)</td>
</tr>
</tbody>
</table>

### Potentially commercial projects (E2;F2;G1,2,3)

<table>
<thead>
<tr>
<th>Resource</th>
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</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>10 ES(1), FI(5), SE(4)</td>
</tr>
<tr>
<td>Lithium</td>
<td>7 AT(1), CZ(1), DE(1), ES(1), FI(1), PT(2)</td>
</tr>
<tr>
<td>Natural graphite</td>
<td>2 SE(1), SK(1)</td>
</tr>
<tr>
<td>Nickel</td>
<td>6 FI(3), SE(1), UK(2)</td>
</tr>
</tbody>
</table>

### Non-Commercial projects (E3;F2;G1,3)

<table>
<thead>
<tr>
<th>Resource</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cobalt</td>
<td>25 AT(2), CY(3), CZ(1), ES(7), FI(1), IE(1), NO(1), PL(1), SE(5), SK(2), UK(1)</td>
</tr>
<tr>
<td>Lithium</td>
<td>16 (40) AT(1), ES(1), UK(1), CZ(1), DE(2), ES(2), FI(1), FR(2), GR(1), IE(3), NO(1), SE(3), PT(40)</td>
</tr>
<tr>
<td>Natural graphite</td>
<td>28 CZ(3), DE(1), FI(10), ES(4), SE(2), NO(8)</td>
</tr>
<tr>
<td>Nickel</td>
<td>21 AT(2), CY(3), DE(1), ES(5), FI(4), LV(1), SK(2), SE(3)</td>
</tr>
</tbody>
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### Exploration projects (E3;F3;G4)

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<td>Nickel</td>
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**Note 1** – UNFC, Definition of categories (see United Nations Framework Classification (ECE ENERGY SERIES No. 42):
E axis: E1, extraction and sale has been confirmed to be economically viable; E2, expected to become economically viable; E3, not expected to become economically viable or evaluation is at too early a stage.
F axis: F1, feasibility of extraction by a development project or mining operation has been confirmed; F2, feasibility is subject to further evaluation; F3, feasibility cannot be evaluated due to limited technical data.
G axis: G1, quantities associated with a known deposit that can be estimated with a high level of confidence (G1), moderate level of confidence (G2), a low level of confidence (G3)

**Note 2** – Nine blocks have been defined for lithium exploration in the Centre and North of Portugal. Public tenders are going to be launched in 2019.

(Source: Survey Member States- RMSG, 2018-2019)
Key messages

Pressure on resources will increase

High tech metals will become oil and gas of tomorrow

Knowledge will be crucial for resources management.

There is a need for a comprehensive raw materials management system
Thank you!

**European Battery Alliance**

**Critical raw materials for the EU:**

**Raw Materials Information System:**

**EU Raw materials, metals, minerals and forest-based industries:**

**EIP on Raw Materials:**

**Horizon 2020 - raw materials and calls:**