EU raw materials strategy - critical raw materials

2017 E-MRS Fall Meeting, Symposium: Solutions for CRMs Under Extreme Conditions
Warsaw, 19 September 2017

Lidia Godlewska, Policy Officer
European Commission
Directorate-General for Internal Market, Industry, Entrepreneurship and SMEs (DG GROW)
Resource Efficiency and Raw Materials Unit
EU Raw Materials Strategy => COM priorities 2015-19

Commission priorities 2015-19

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

3. Energy Union
   - transition to a low-carbon 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 raw materials policy

• **Aim:** securing sustainable supplies of raw materials

• **Launched in 2008, consolidated in 2011**

• **Non-energy, non-agricultural raw materials**

• **Integrated strategy (3 pillars)**

• **Introduced a list of Critical Raw Materials (CRMs) in 2011 and updated lists in 2014 and 2017**
A Critical Raw Material is one with high risk of a supply disruption and, at the same time, with high economic importance to the EU economy.

**Economic importance**
- Importance of a raw material per economic sector & importance of the sector in the EU economy (value added)
- Substitution (technical and cost performance)

**Supply risk**
- Global supply and EU sourcing
- Market concentration (HHI)
- Governance performance (WGI)
- Import reliance
- Trade agreements and restrictions
- Substitution (production, criticality, co/by-production)
- End-of-Life Recycling Input Rate
Example: global supply of magnesite (left) and actual EU sourcing (right).

Example: global supply of tungsten (left) and actual EU sourcing (right).
End-Of-Life recycling Input Rate (EOL-RIR) – DG JRC elaboration
Revised methodology for establishing the EU list of CRMs published in summer 2017.

- **Guidelines:**

- **Background report:**
### EU critical raw materials

#### 2017 criticality assessment

**Study on the review of the list of critical raw materials 2017 (published in September 2017)**

78 raw materials under evaluation
(58 individual + 3 grouped materials: HREEs, LREEs and PGMs)

For the first time, individual assessment results are available for the HREEs, LREEs and PGMs.

### Individual abiotic materials

<table>
<thead>
<tr>
<th>Category</th>
<th>Material</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aggregates</td>
<td>Hafnium</td>
<td>Rhenium</td>
</tr>
<tr>
<td>Aluminium</td>
<td>Helium</td>
<td>Scandium</td>
</tr>
<tr>
<td>Antimony</td>
<td>Indium</td>
<td>Selenium</td>
</tr>
<tr>
<td>Baryte</td>
<td>Iron Ore</td>
<td>Sulphur</td>
</tr>
<tr>
<td>Bauxite</td>
<td>Lead</td>
<td>Potash</td>
</tr>
<tr>
<td>Bentonite</td>
<td>Limestone</td>
<td>Silica Sand</td>
</tr>
<tr>
<td>Beryllium</td>
<td>Gold</td>
<td>Silicon Metal</td>
</tr>
<tr>
<td>Bismuth</td>
<td>Gypsum</td>
<td>Silver</td>
</tr>
<tr>
<td>Boron (Borates)</td>
<td>Lithium</td>
<td>Talc</td>
</tr>
<tr>
<td>Chromium</td>
<td>Magnesite</td>
<td>Tantalum</td>
</tr>
<tr>
<td>Kaolin clay</td>
<td>Magnesium</td>
<td>Tellurium</td>
</tr>
<tr>
<td>Cobalt</td>
<td>Manganese</td>
<td>Tin</td>
</tr>
<tr>
<td>Coking coal</td>
<td>Molybdenum</td>
<td>Titanium</td>
</tr>
<tr>
<td>Copper</td>
<td>Natural Graphite</td>
<td>Tungsten</td>
</tr>
<tr>
<td>Diatomite</td>
<td>Nickel</td>
<td>Vanadium</td>
</tr>
<tr>
<td>Feldspar</td>
<td>Niobium</td>
<td>Zinc</td>
</tr>
<tr>
<td>Fluorspar</td>
<td>Perlite</td>
<td></td>
</tr>
<tr>
<td>Gallium</td>
<td>Phosphorus</td>
<td></td>
</tr>
<tr>
<td>Germanium</td>
<td>Phosphate rock</td>
<td></td>
</tr>
<tr>
<td><strong>Platinum group metals (PGMs)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Iridium</td>
<td>Platinum</td>
<td>Ruthenium</td>
</tr>
<tr>
<td>Palladium</td>
<td>Rhodium</td>
<td></td>
</tr>
<tr>
<td><strong>Rare earth elements (REEs)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light rare earth elements (LREEs)</td>
<td>Heavy rare earth elements (HREEs)</td>
<td></td>
</tr>
<tr>
<td>Cerium</td>
<td>Dysprosium</td>
<td>Lutetium</td>
</tr>
<tr>
<td>Lanthanum</td>
<td>Erbium</td>
<td>Terbium</td>
</tr>
<tr>
<td>Neodymium</td>
<td>Europium</td>
<td>Thulium</td>
</tr>
<tr>
<td>Praseodymium</td>
<td>Gadolinium</td>
<td>Ytterbium</td>
</tr>
<tr>
<td>Samarium</td>
<td>Holmium</td>
<td>Yttrium</td>
</tr>
<tr>
<td><strong>Biotic materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Natural Rubber</td>
<td>Natural cork</td>
<td></td>
</tr>
<tr>
<td>Sapele wood</td>
<td>Natural Teak wood</td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**
- Green boxes = Materials covered in 2014 but not in the 2011 assessments
- Orange boxes = New materials covered in the 2017 assessment
**Commission's Communication on the 2017 list of Critical Raw Materials for the EU, COM(2017)490, 13 September 2017**

<table>
<thead>
<tr>
<th>2017 CRMs (27)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Antimony</strong></td>
</tr>
<tr>
<td><strong>Baryte</strong></td>
</tr>
<tr>
<td><strong>Beryllium</strong></td>
</tr>
<tr>
<td><strong>Bismuth</strong></td>
</tr>
<tr>
<td><strong>Borate</strong></td>
</tr>
<tr>
<td><strong>Cobalt</strong></td>
</tr>
<tr>
<td><strong>Coking coal</strong></td>
</tr>
</tbody>
</table>

*HREEs=heavy rare earth elements, LREEs=light rare earth elements, PGMs=platinum group metals*
**EU critical raw materials**

**Biggest global suppliers of CRMs**

- **USA**
  - Beryllium: 90%
  - Helium: 73%

- **Russia**
  - Palladium: 46%

- **France**
  - Hafnium: 43%

- **Turkey**
  - Borate: 38%

- **DRC**
  - Cobalt: 64%

- **South Africa**
  - Iridium: 85%
  - Platinum: 70%
  - Rhodium: 83%
  - Ruthenium: 93%

- **China**
  - Antimony: 87%
  - Baryte: 44%
  - Bismuth: 82%
  - Coking coal: 54%
  - Fluorspar: 64%
  - Gallium: 73%
  - Germanium: 67%
  - Indium: 57%
  - Magnesium: 87%
  - Natural graphite: 69%
  - Phosphate rock: 44%
  - Phosphorus: 58%
  - Scandium: 66%
  - Silicon metal: 61%
  - Tungsten: 84%
  - Vanadium: 53%
  - LREEs: 95%
  - HREEs: 95%

**Thailand**
- Natural rubber: 32%

**Brazil**
- Niobium: 90%

**Study on the review of the list of critical raw materials 2017**
Study on the review of the list of critical raw materials 2017

Biggest suppliers of CRMs to the EU
Critical raw materials list as a policy tool:

- Strengthen the competitiveness of European industry in line with the renewed industrial strategy for Europe
- Stimulate the production of critical raw materials by enhancing new mining and recycling activities in the EU
- Monitor issues of critical raw materials to identify priority actions (trade, international relations, research & innovation, circular economy, knowledge base)
- Foster efficient use and recycling of critical raw materials, a priority area in the EU Circular Economy Action Plan
- Increase awareness of potential raw material supply risks and related opportunities among EU Member States, companies and investors, on a voluntary basis
- List as source of inspiration and/or similar criticality initiatives ongoing e.g. DE, FR, NL, FI or UK
- EU policy actions not limited to critical raw materials exclusively
123 Raw Materials Commitments:

- 980 partners, indicative budget ± EUR 2 billion

European Commission:

- Horizon 2020 (2014-2016):
  - ca. 40 Projects on Raw Materials under SC5. EU contribution of over EUR 200 M
  - More under NMPB, SC5, SC2 etc.
- Actions in Circular Economy Package
- RM Scoreboard
- Studies, reports, conferences, dialogues etc.

Launch of the EIT Raw Materials
Purpose

- Follow up on the objectives of the EIP on RM
- Keep an overview on the competitiveness of the EU’s raw materials sector
- Provide relevant and reliable information for policymaking processes

Based on a set of accepted 24 indicators, the Raw Materials Scoreboard clearly pictures the current and future challenges related to raw materials, e.g.:

- future global resource use could double between 2010-2030
- increasingly distorted international commodity markets
- under-exploration of the EU’s mineral potential
- relatively low recycling rates for many raw materials

The Raw Materials Scoreboard 2016 will contribute to the monitoring of the Circular Economy and will be updated in 2018.
Promote recycling of critical raw materials

Improve exchange of information between manufacturers and recyclers on electronic products

European standards for material-efficient recycling

Best practices for the recovery of critical raw materials from mining waste and landfills

Report on critical raw materials and the Circular Economy
• To be issued in 2017

• Provide key data sources and identify best practices and options for further action

• Covering
  • Background and global situation of CRMs
  • Current circular use of CRMs and benefits
  • EU policy measures
  • Key actors in the EU
  • Data sources and monitoring
  • Key sectors
EU critical raw materials

- Excellent science (€ 24 billion)
- Industrial leadership (€ 17 billion)
- Societal challenges (€ 31 billion)

Horizon 2020

SC5 - Raw materials
(~€600 million for 7 years)
26 out of 40 projects related to CRMs launched so far

Circular Economy
SC2 - Bioeconomy
SC3 - Energy

+ ERA-MIN 2
+ EIT Raw Materials
ERECON (European Rare Earths Competency Network) working groups focused on:
• opportunities and roadblocks for primary supply of rare earths in Europe;
• European rare earths resource efficiency and recycling;
• European end-user industries and rare earths supply trends and challenges. The network delivered their final report in 2014.

CRM_InnoNet "Critical Raw Materials Innovation Network", the FP7 funded project, focused on substitution of CRMs and developed research and innovation roadmaps of CRM substitution strategies.

A Joint Research Centre study "Substitution of critical raw materials in low-carbon technologies: lighting, wind turbines and electric vehicles" evaluated the substitution options of nine critical raw materials (Eu, Tb, Y, In, Ga, Ge, Nd, Pr and Dy) in 2016.

SCRREEN project (Solutions for Critical Raw materials, a European Expert Network), launched in 2016 under the R&I programme Horizon 2020, with the aim to form an EU Expert Network covering the whole value chain for present and future critical raw materials.
The SCRREEN project aims at gathering European initiatives, associations, clusters, and projects from the Critical Raw Materials (CRM) sector into a long-lasting expert network, with a view to improve Europe’s CRM strategy.

The Network, built as a two tier layer structure (the Consortium and External Experts) includes industry, research, public authorities and civil society representatives, in order to allow a multi-stakeholder dialogue on a topic with potentially wide-ranging societal, economic, geopolitical and environmental implications.

http://scrreen.eu/
- Trilateral EU-US-Japan conferences on CRMs started in 2011 (concomitant with the supply crunch in China).

- Main areas of cooperation: collection of raw materials data and analysis of trade, e-waste recycling, and substitution.


- Next trilateral conference to be held in the US, Pittsburgh, on 12 October 2017.
EU critical raw materials

http://rmis.jrc.ec.europa.eu
7 November:
EU advanced mining country raw materials diplomacy dialogue

EU critical raw materials event

8 November:
5th annual High Level Conference of European Innovation Partnership (EIP) on raw materials

9 November:
Horizon 2020: societal challenge 5 infoday & and brokerage event 
Reconciling biodiversity protection and extractive activities within Natura 2000 Network 
The EU Raw Materials Knowledge Base in support of EU raw materials policy


If you would like to add your event to the program, please contact GROW-EIP-RAW-MATERIALS@ec.europa.eu
EU raw materials policy:

Critical raw materials for the EU:

Study on the review of the list of critical raw materials 2017:

EIP on Raw Materials:

Horizon 2020 - raw materials:

Horizon 2020 – experts:
EU raw materials strategy – critical raw materials

Thank you for your attention!

2017 E-MRS Fall Meeting, Symposium: Solutions for CRMs Under Extreme Conditions
Warsaw, 19 September 2017

Lidia Godlewska – Policy Officer
Unit C2 «Resource Efficiency and Raw Materials»
Directorate-General for Internal Market, Industry, Entrepreneurship and SME's (DG GROW)
European Commission