Critical Raw Materials:
Revision of the EU methodology

Jo Dewulf¹,², Gian Andrea Blengini¹,³
and David Pennington¹

Sustainability Assessment Unit (H08)
Institute of Environment and Sustainability

¹Joint Research Center, European Commission
²Ghent University
³Politecnico di Torino
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1. Introduction
The JRC inside the European Commission

Joint Research Centre (JRC) is the European Commission's in-house science service and the only DG executing direct research.

Institute for Environment and Sustainability (IES)

"The mission of the IES is to provide scientific-technical support to the European Union's policies for the protection and sustainable development of the European and global environment"
EU “Raw Materials Initiative”:

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

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

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

• **Connecting EU external and internal policies**

• **Integrated strategy (3 pillars)**

• **Introduced list of Critical Raw Materials (CRMs) in 2011 and 2014**
2. EU 2014 list of Critical Raw Materials
How to assess Critical Raw Materials?

**Economic importance**
- Importance of a raw material per economic sector & importance of the sector in the EU economy

**Supply risk**
- Political and economic stability
- Level of production concentration
- Potential for substitution
- Recycling rate

EU 2014
Supply risk

Supply risk = HHI x WGI x (1-R) x S

Source: Fraunhofer ISI.

EU 2014
EU 2014:

[Diagram showing the supply risk and economic importance of various elements, including Heavy Rare Earth Elements, Light Rare Earth Elements, and others such as Magnesium, Niobium, Antimony, Natural Graphite, Magnesite, Tungsten, etc.]

Supply risk

Economic importance
Context of EU 2014 list of Critical Raw Materials:

- 2014 is a follow-up the 2010 list of Critical Raw Materials
- As Criticality changes with time, updates foreseen every 3-4 years
- Next: EU 2017 list of Critical Raw Materials

Preparation of the EU 2017 list of Critical Raw Materials:

- Review of methodology by DG GROW- DG JRC (end early 2016):
  - Supply risk and economic importance
  - Role of export restrictions and import dependency
  - Reliable data for assessing criticality
  - Additional influences on criticality
  - Biotic materials
  - Uses of the list of Critical Raw Materials

- Improved methodology available to consultants in charge of EU 2017 list
3. Criticality methodology

Some currently investigated potential adjustments
* Working definition of criticality:

A **Critical Raw Material** is one with high risk of a supply disruption and, at the same time, with high economic importance. **High risk of supply disruption** means that supply might not be adequate to meet EU industry demand. **High economic importance** means that the raw material is fundamental in industry sectors to create added value and jobs, which are lost in case the raw material is not available and adequate substitutes cannot be used instead.
* Adjusting for export restrictions (trade barriers)

- Abrupt increase of export restrictions in minerals and metals sectors worldwide since 2009

![Figure 1: Year of introduction of export restriction measures present in 2012 (OECD database)](image)

- Supply risk may increase by these export restrictions (country-specific)
* Country concentration of supply: need to be specific?

- Global production versus specific supply: the example of Manganese

**Worldwide production**

- **South Africa**: 19%
- **Australia**: 19%
- **China**: 16%
- **India**: 10%
- **Gabon**: 10%
- **Brazil**: 6%
- **Kazakhstan**: 9%
- **Ukraine**: 3%
- **Malaysia**: 3%
- **Ghana**: 2%
- **Other**: 3%

**US supply**

- 100% import dependent
- Manganese ore: 72% Gabon
- Ferromanganese: 67% South Africa, China, Brazil

*Source: EC, 2014*

*Source: NRC-US, 2008*
* Concentration shifts along the supply chain
  “primary production”

Manganese

Mining stage

Refining stage

Source: EC, 2014
4. Supply risk influences and resilience

- Other additional influences on supply risk?
  - byproduct dynamics
  - land use: economic competition, regulation
  ...

  → no comprehensive structure

- Supply risk disruption versus resilience to supply disruption
TERP Concept:

- 4 groups of influences:
  - Tech/Phys/Geol.
  - Econ/Strategic/Market
  - Regulatory/Social
  - Political stability & Governance

- 17 particular influences:
Influences on supply risk or on resilience to supply disruption?
Thank you!

Jo Dewulf,
European Commission, DG JRC, IES-H08
Sustainability Assessment

European Platform on Life Cycle Assessment (EPLCA):
http://eplca.jrc.ec.europa.eu/

Raw Material Information System (RMIS):
http://rmis.jrc.ec.europa.eu/

Sustainability Assessment (H08):
http://sa.jrc.ec.europa.eu/

JRC Science Hub:
https://ec.europa.eu/jrc/