The EU criticality analysis: a pragmatic approach

Workshop « Criticality and the EU Raw Materials Initiative»
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European Commission
Enterprise and Industry

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Importance of (critical) raw materials

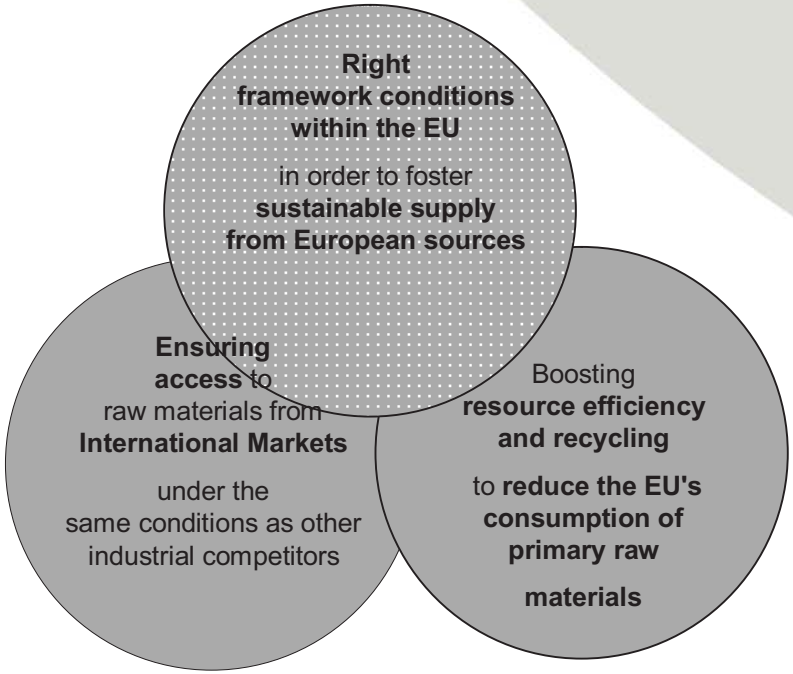
- Importance for economic value chain and emerging technologies
- Renewable energy: solar cells, wind turbines
- Energy efficiency: hybrid and electric cars, LED lighting, batteries
- Electronics: flatscreens, mobile phones
- Aerospace: light weight alloys

Main challenges

- EU highly dependent on imports of important raw materials which are increasingly affected by **market distortions**
- Still potential in Europe, but exploration and extraction face **increased competition** for different land uses and a highly regulated environment

The Raw Materials Initiative

An integrated strategy based on three pillars



Developments following the financial and economic crisis

- Economic and financial crisis led to slowdown in growth, but continued growth by **emerging countries** will keep pressure on demand for raw materials
- Raw materials as essential component of **Europe 2020 Strategy**

Implementation of the Raw Materials Initiative

1. Progress in different lines of action
2. A first action: establishing a list of critical raw materials for the EU in close cooperation with Members states and stakeholders
3. A group of experts active from April 2009 till June 2010
4. Final report on Commission website: http://ec.europa.eu/enterprise/policies/raw-materials/

Is geological scarcity an issue for criticality?

- Over the past 50 years, reserves constantly replenished
- The special case of by-products and coupled products
- Conclusion:
  - criticality assessment to be based on a geopolitical-economic analysis
  - Importance of technological development in exploring, mining and processing

Methodology

- 41 raw materials analysed
- Time horizon: 10 years
- A pragmatic approach
- Three main aggregated **indicators**
  - economic importance
  - supply risks
  - environmental country risks

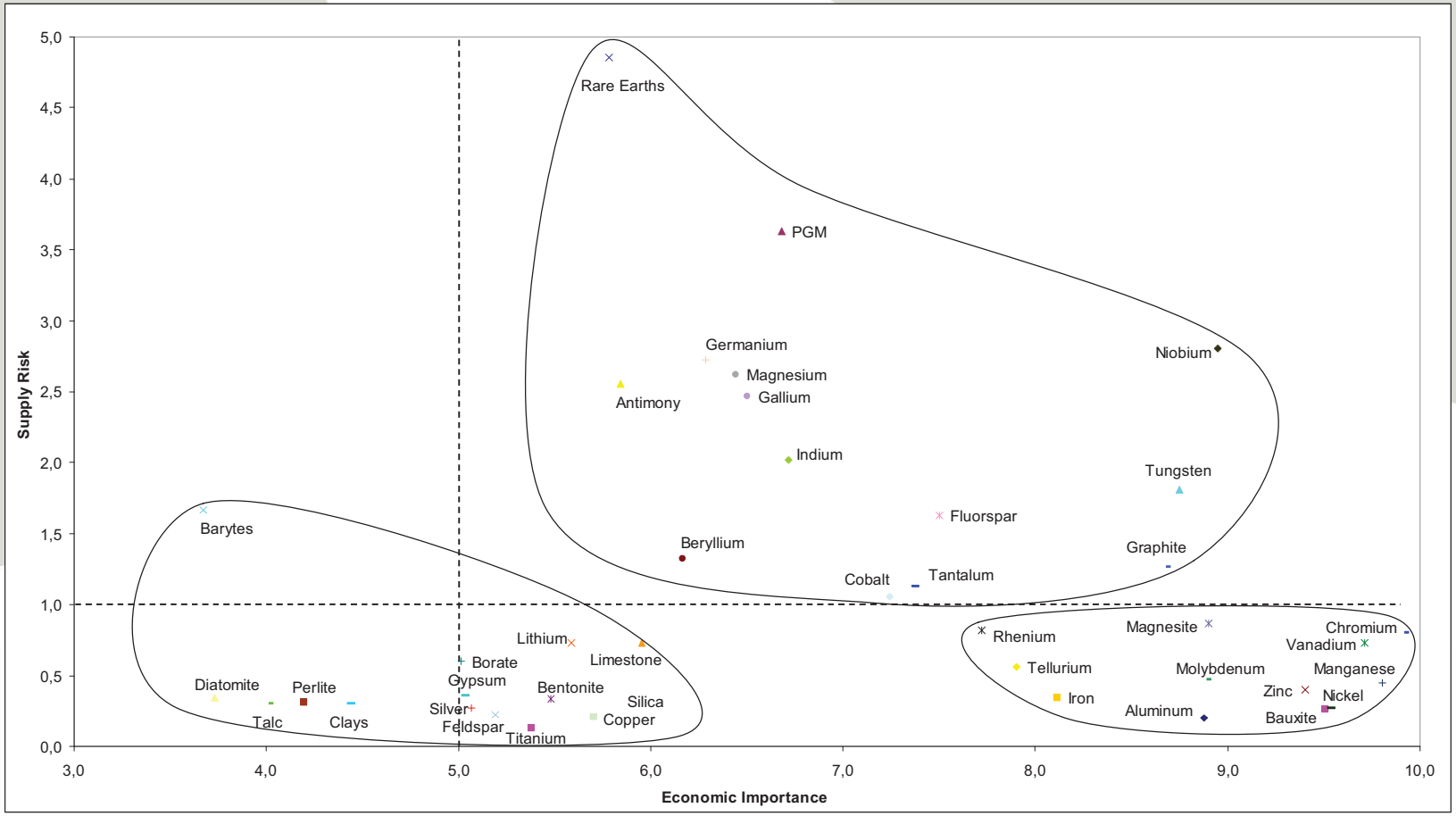
41 raw materials analysed

- Aluminium Antimony Barytes Bauxite
  Bentonite Beryllium Borates Chromium
  Clays (and kaolin) Cobalt Copper
  Diatomite Feldspar Fluorspar Gallium
  Germanium Graphite Gypsum Indium
  Iron ore Limestone Lithium Magnesite
  Magnesium Manganese Molybdenum Nickel
  Niobium Perlite PGMs Rare earths
  Rhenium Silica sand Silver Talc
  Tantalum Tellurium Titanium Tungsten
  Vanadium Zinc

Methodology (2)

- Substitutability
- Primary and secondary raw materials
- A logical way of aggregating indicators
- **Transparency**

Outcome



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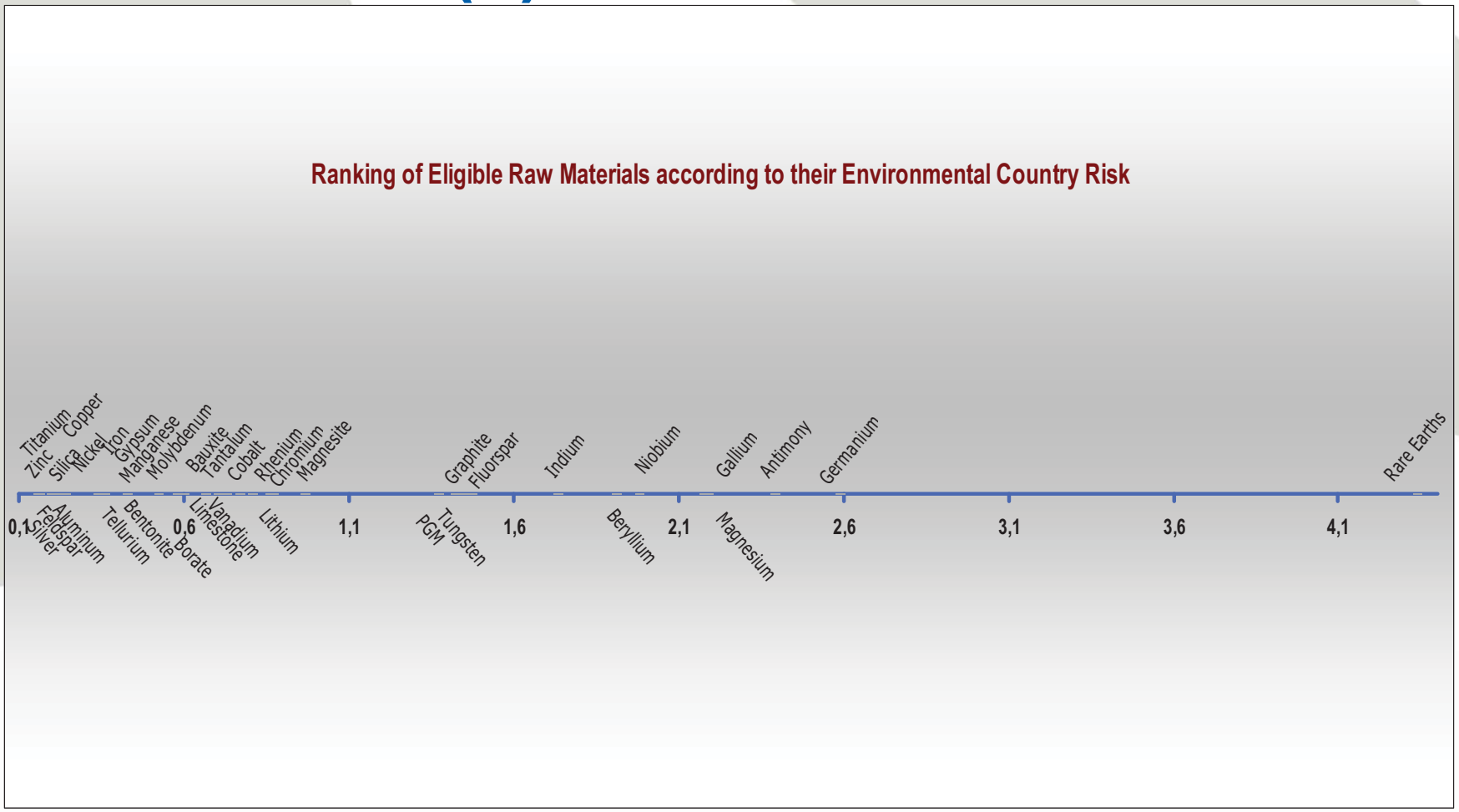
Outcome (2)


Ranking of Eligible Raw Materials according to their Environmental Country Risk
Titanium
Zinc
Silica
Copper
Nickel
Iron
Gypsum
Manganese
Molybdenum
Bauxite
Tantalum
Cobalt
Rhenium
Chromium
Magnesite
Graphite
Fluorspar
Indium
Niobium
Gallium
Antimony
Germanium
Rare Earths
Feldspar
Silver
Aluminum
Tellurium
Bentonite
Borate
Limestone
Vanadium
Lithium
Tungsten
PGM
Beryllium
Magnesium
0,1
0,6
1,1
1,6
2,1
2,6
3,1
3,6
4,1

List of critical raw materials for the EU

Antimony	Indium
Beryllium	Magnesium
Cobalt	Niobium
Fluorspar	Platinum Group
Gallium	Rare earths
Germanium	Tantalum
Graphite	Tungsten

Critical raw materials

- High supply risks due to high share of the worldwide production
  - China (antimony, fluorspar, gallium, germanium, graphite, indium, magnesium, rare earths, tungsten)
  - Russia (Platinum Group metals)
  - Congo (cobalt, tantalum)
  - Brazil (niobium, tantalum)
- And low substitutability and recycling rates

Emerging technologies

Raw material	Production 2006 (t)	Demand emerging tech. 2006 (t)	Demand emerging tech. 2030 (t)	Demand/prod 2006	Demand/prod 2030
Gallium	152	28	603	0.18	3.97
Indium	581	234	1.911	0.40	3.29
Germanium	100	28	220	0.28	2.20
Neodymium	16.800	4.000	27.900	0.23	1.66
Platinum	255	very small	345	0	1.35
Tantalum	1.384	551	1.410	0.40	1.02
Silver	19.051	5.342	15.823	0.28	0.83
Cobalt	62.279	12.820	26.860	0.21	0.43
Palladium	267	23	77	0.09	0.29
Titanium	7.211.000	15.397	58.148	0.08	0.29
Copper	15.093.000	1.410.000	3.696.070	0.09	0.24

Emerging technologies (2)

Raw material	Emerging technologies
Antimony	ATO, micro capacitors
Cobalt	Li-ion batteries, synthetic fuels
Gallium	Thin layer photovoltaics, IC, WLED
Germanium	Fibre optic cable, IR optical technology
Indium	Displays, thin layer photovoltaics
Platinum (PGM)	Fuel cells, catalysts
Palladium (PGM)	Catalysts, seawater desalination
Niobium	Micro capacitors, ferroalloys
Neodymium (RE)	Permanent magnets, laser technology
Tantalum	Micro capacitors, medical technology

Recommendations

Two types of recommendations

- follow-up and further support
- policy-oriented recommendations (areas where measures should be undertaken)

Follow up and further support

- Up-date the list every 5 years and enlarge the scope
- Improve the availability and quality of statistical information and prepare a Yearbook
- Carrry out further studies, e.g. competition to land, « cradle-to-grave » LCAs, emerging technologies
- Establish a sub-group of the Raw Material Supply Group on criticality

Policy-oriented recommendations

- Access to primary resources
  - Land use and permitting in the EU
  - Company exploration as research (fiscal issues)
  - Promote RTD
  - Promote good governance in developing countries
- Trade and investment
  - Maintain and strengthen the EU trade policy, pursue dispute settlement in WTO, engage in consultations
  - Raise awareness in multilateral fora
  - A new EU-wide policy on foreign investment
  - Coherence of EU policies with respect to raw materials

Policy-oriented recommendations (2)

- Recycling
  - Improve collection
  - Prevent illegal exports of End-of-Life products
  - Promote research
- Substitution
  - Promote research
- Material Efficiency
  - Minimise the raw material used
  - Minimise raw material losses

Media coverage

- Europe sounds alarm on minerals shortage, *New York Times*
- EU warns of key raw material shortage, *AP*
- Supply risks make 14 raw materials critical, *Reuters*
- EU technology industry faces mineral shortage, International Herald Tribune
- Technologies: risques de pénuries pour 14 matières premières « critiques » , *AFP*
- Angriff auf Chinas Rohstoffkartell, *Handelsblatt*
- La CE identifica 14 materials primas “fundamentales” en riesgo de escasez, *Radio Televisión Española*

Open consultation

The report on “Critical raw materials for the EU” and annexes “Profiles of 41 raw materials”

- Open consultation up to 19 September
- Input to the new Communication on raw materials (end 2010)

Further info:
http://ec.europa.eu/enterprise/policies/raw-materials/documents/index_en.htm

Way forward

- Council Conclusions of May and December 2009 as well as March 2010 **endorsed overall thrust and objectives** of RMI.
- **Implementation work** with Member States and stakeholders.
- **Communication** of the European Commission to Council **by end 2010**.