

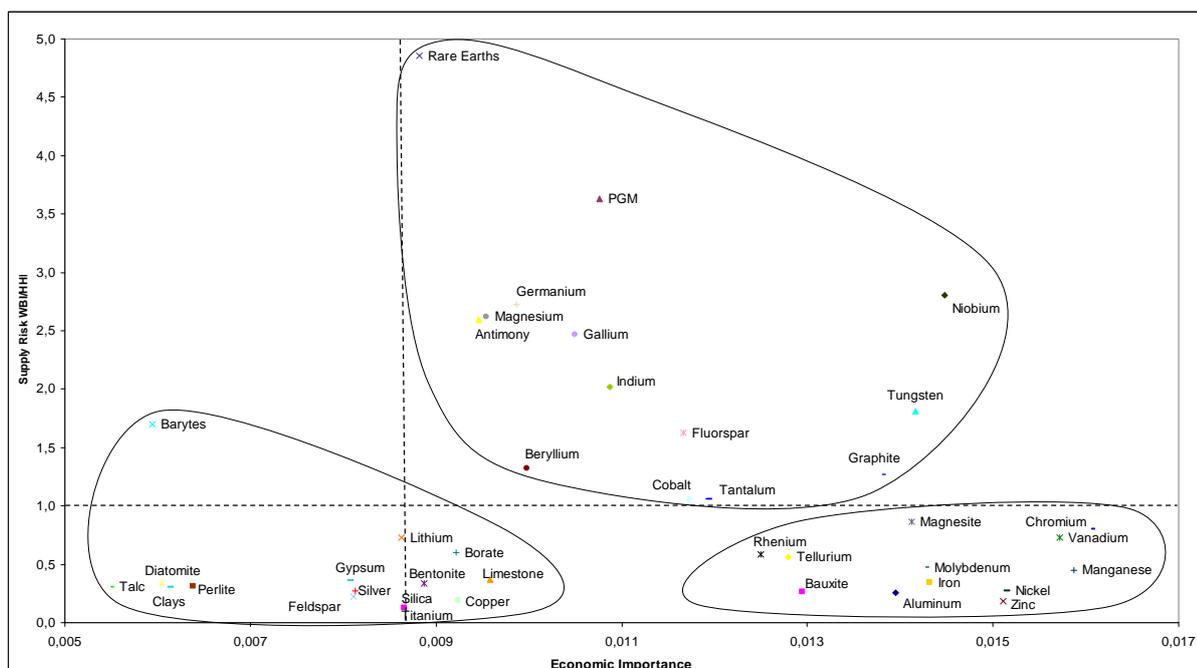
Brussels, 17 June 2010

## Report lists 14 critical mineral raw materials

This report analyses a selection of 41 minerals and metals. In line with other studies, the report puts forward a **relative concept of criticality**. This means that raw material is labelled “critical” when the risks for supply shortage and their impacts on the economy are higher compared with most of the other raw materials. **Two types of risks** are considered: a) the **"supply risk"** taking into account the political-economic stability of the producing countries, the level of concentration of production, the potential for substitution and the recycling rate; and b) the **"environmental country risk"** assessing the risks that measures might be taken by countries with weak environmental performance in order to protect the environment and, in doing so, jeopardise the supply of raw materials to the EU. Building on existing approaches, this report sets out an innovative and pragmatic approach to determining criticality. In particular,

- It takes into **account the substitutability between materials**, i.e. the potential for substitution of a restricted raw material by another that does not face similar restrictions.
- It deals with **primary and secondary raw materials**, the latter being considered as similar to an indigenous European resource.
- It introduces a **logical way to aggregate indicators** and makes use of widely-recognised indexes.
- It presents a **transparent methodology**.

Based on a criticality methodology, calculations are made regarding the economic importance and supply risk of the 41 materials.



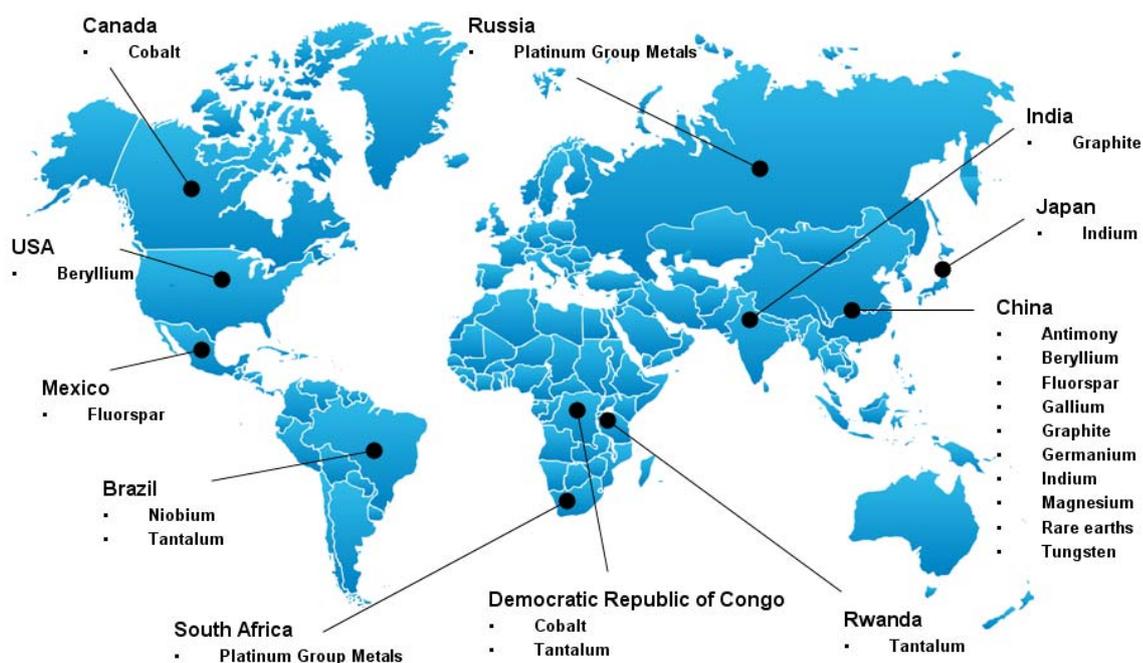
The Group considers that those **14 raw materials** falling within the top right cluster of the above diagram are critical. As noted, this is due to their high relative economic importance and to high relative supply risk. The 'environmental country risk' metric does not change this list of critical materials.

**List of critical raw materials at EU level (in alphabetical order):**

Antimony	Indium
Beryllium	Magnesium
Cobalt	Niobium
Fluorspar	PGMs (Platinum Group Metals) <sup>1</sup>
Gallium	Rare earths <sup>2</sup>
Germanium	Tantalum
Graphite	Tungsten

**Production concentration of critical raw minerals materials**

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<sup>1</sup> The Platinum Group Metals (PGMs) regroups platinum, palladium, iridium, rhodium, ruthenium and osmium.

<sup>2</sup> Rare earths include yttrium, scandium, lanthanum and the so-called lanthanides (cerium, praseodymium, neodymium, promethium, samarium, europium, gadolinium, terbium, dysprosium, holmium, erbium, thulium, ytterbium and lutetium)

For the critical raw materials, their **high supply risk** is mainly due to the fact that a high share of the worldwide production comes from China (antimony, fluorspar, gallium, germanium, graphite, indium, magnesium, rare earths, tungsten), Russia (PGM), the Democratic Republic of Congo (cobalt, tantalum) and Brazil (niobium and tantalum). This production concentration, in many cases, is compounded by low substitutability and low recycling rates.

Concerning the materials positioned in the sub-cluster in the bottom right corner, it has to be kept in mind that a small shift in one of the parameters of the supply risk metric may result in a sudden change upwards. In other words, a slight change in the underlying variables may result in one of these materials being reclassified as 'critical'. For several of the materials positioned in the sub-cluster in the left corner, notably the industrial minerals, the group considers that possible supply risks may occur within a longer time horizon should 'competition to land' continue to adversely affect production from quarries or mines in the EU.

One of the most powerful forces influencing the economic importance of raw materials in the future is technological change. In many cases, their rapid diffusion can drastically increase the demand for certain raw materials. Based on a study commissioned by the German Federal Ministry of Economics and Technology, the demand from driving emerging technologies is expected to evolve sometimes very rapidly by 2030.

**Global demand of the emerging technologies analysed for raw materials** in 2006 and 2030 related to today's total world production of the specific raw material (Updated by BGR April 2010)

Raw material	Production 2006 (t)	Demand from emerging technologies 2006 (t)	Demand from emerging technologies 2030 (t)	Indicator <sup>1)</sup> 2006	Indicator <sup>1)</sup> 2030
Gallium	152 <sup>6)</sup>	28	603	0,18	3,97
Indium	581	234	1.911	0,40	3,29
Germanium	100	28	220	0,28	2,20
Neodymium (rare earth)	16.800	4.000	27.900	0,23	1,66
Platinum (PGM)	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 (PGM)	267	23	77	0,09	0,29
Titanium	7.211.000 <sup>2)</sup>	15.397	58.148	0,08	0,29
Copper	15.093.000	1.410.000	3.696.070	0,09	0,24

<sup>1)</sup>The indicator measures the share of the demand resulting from driving emerging technologies in total today's demand of each raw material in 2006 and 2030; <sup>2)</sup> Ore concentrate

## Recommendations

The Group recommends **updating the list of EU critical raw materials every 5 years** and enlarge the scope for criticality assessment.

The Group recommends:

- improving the availability of reliable, **consistent statistical information** in relation to raw materials;
- promoting the dissemination of this information, notably by preparing a **European Raw Materials Yearbook** with the involvement of national geological surveys and mining/processing industries. It should in particular aim at improving the knowledge on the availability of resources and on their flow into products through the value-added chains of the EU economies;
- establishing indicators of **competition to land** in the Member States;
- encouraging more research into **life-cycle assessments for raw materials** and their products on a “cradle-to-grave” basis;
- creating a working group(s) to continue **analysing the impact of emerging technologies on demand of raw materials**.

The Group recommends the establishment of a **sub-group** of the Raw Material Supply Group of the European Commission to ensure the follow-up of the report on critical raw materials.

The Group recommends **policy actions** to improve **access to primary resources** aiming at:

- supporting the findings and recommendations resulting from the work carried out by the ad hoc working group on "Best practices in the area of land use planning and permitting" with the view to **securing better access to land**, fair treatment of extraction with other competing land uses and more streamlined permitting processes;
- **promoting exploration**, and ensuring that exploration by companies is regarded as research activities;
- **promoting research on mineral processing**, extraction from old mine dumps, mineral extraction from deep deposits, and mineral exploration in general, notably under EU RTD Framework Programmes;
- **promoting good governance**, capacity-building and transparency in relation to the extractive industries in developing countries, notably in the area of critical raw materials;
- **promoting sustainable exploration** and extraction inside and outside of the EU.

The Group recommends that the following policy actions, with regard to **trade and investment** as defined in the trade raw materials strategy, be pursued:

- **maintain current EU policy choices** in the negotiation of bilateral and regional trade agreements;
- consider the merits of **pursuing dispute settlement initiatives at WTO level** so as to include in such initiatives more raw materials important for the EU industry; such actions may give rise to important case law so long as existing GATT rules lack clarity and are limited in scope;
- engage without reservation in **consultations with third countries** whose policies are causing distortions on international raw materials markets in order to discourage certain policy measures and to request adherence with market forces;

- foster an effective **exchange-of-views** on certain policies made within the institutional framework of EU economic cooperation agreements (e.g. with China on the latter country's NFM recycling plan to year 2015);
- continue to raise **awareness on the economic impact of export restrictions** on developing and developed countries in various multilateral fora, such as WTO or the OECD;
- consider shaping a new EU-wide policy on **foreign investment agreements** in such a manner as to better protect EU investments in raw materials abroad and ensure a level playing-field with other foreign investors who benefit from the backing of State funds;
- continue to increase **coherence of EU policy** with respect to raw materials supply, for example in the assessment of injurious dumping and subsidies.

The Group recommends that policy actions are undertaken to make **recycling of raw materials or raw material-containing products more efficient**, in particular by:

- mobilising **End of Life products** with critical raw materials for proper collection instead of stockpiling them in households (hibernating) or discarding them into landfill or incineration;
- improving overall organisation, logistics and efficiency of **recycling chains** focus on interfaces and system approach;
- preventing **illegal exports of EoL** products containing critical raw materials and increasing transparency in flow;
- promoting **research on system optimisation** and recycling of technically-challenging products and substances.

The Group recommends the encouragement of **substitutability of certain raw materials**, notably by promoting research on substitutes for critical raw materials in different applications and to increase opportunities under EU RTD Framework Programmes.

The Group recommends the **improvement of the overall material efficiency of critical raw materials** by the combination of two fundamental measures:

- by **minimising the raw material** used to obtain a specific product function;
- This covers every step from **smart production with metals and minerals savings** to substitution of potentially critical raw materials by less critical ones;
- by minimising **raw material losses** into residues from where they cannot be economically-recovered.

The measures should be evaluated with regard to impacts on environmental and economic performance over the entire value chain.

### **More information**

[http://ec.europa.eu/enterprise/policies/raw-materials/critical/index\\_en.htm](http://ec.europa.eu/enterprise/policies/raw-materials/critical/index_en.htm)