



International Raw Materials Observatory

Critical Raw Materials: the EU approach

Vítor Correia, MSc, MBA, EurGeol
European Federation of Geologists
International Raw Materials Observatory, Brussels

context

the EU response

Credits: U.S. National Archives and Records Administration

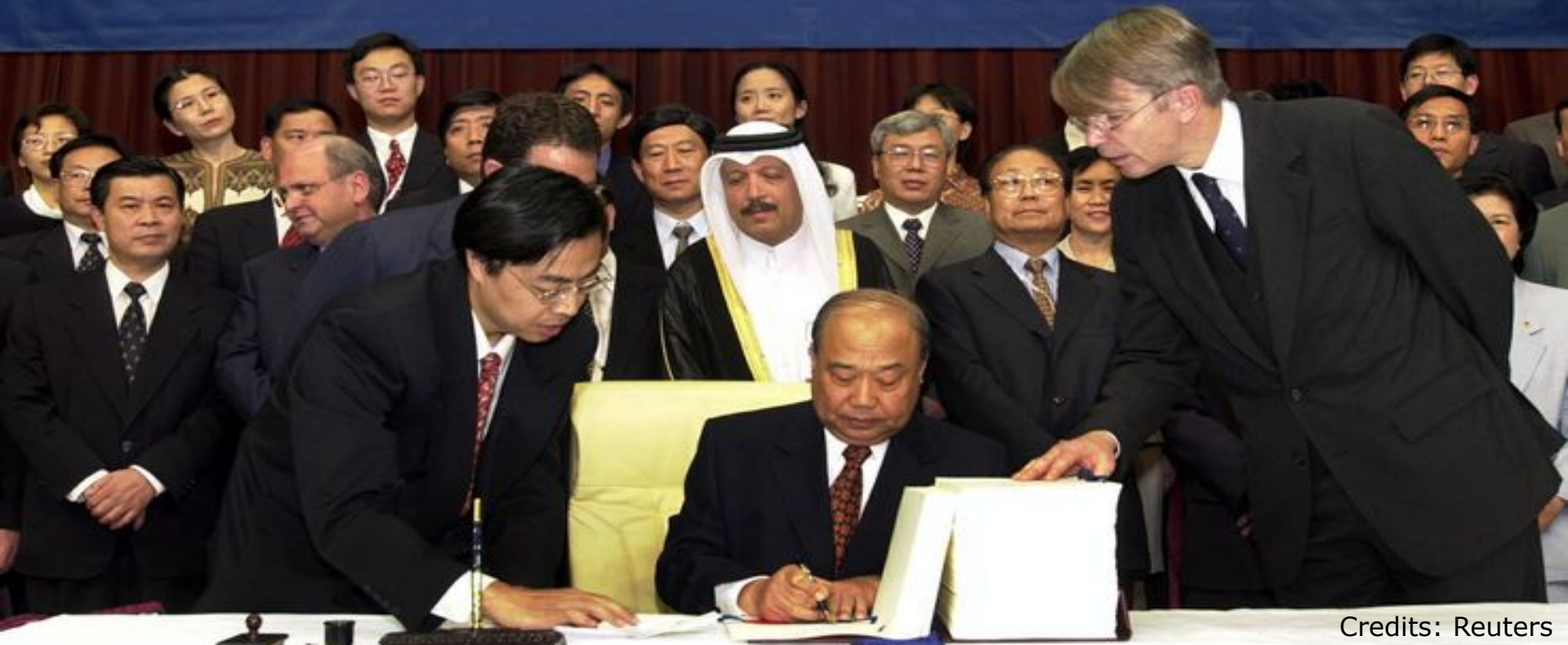
1983 G7 summit



中国加入世界贸易组织签字仪式

SIGNING CEREMONY ON CHINA'S ACCESSION TO THE WTO

11 November 2001, Doha



context

the EU response

Retrieved from http://www.economist.com/sites/default/files/cf_images/images-magazine/

Iron is gold

Prices, \$ terms

Vale's share price
\$



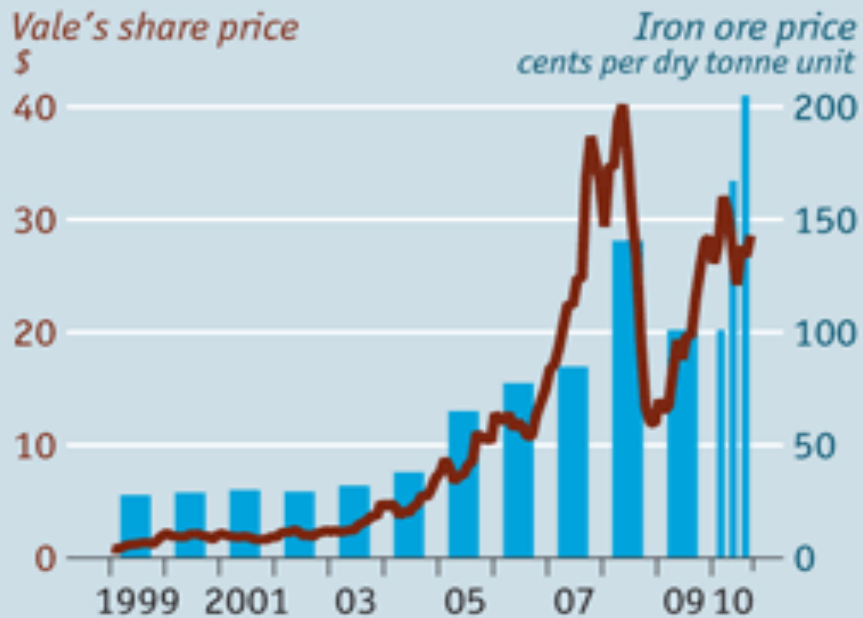
Sources: IMF; Thomson Reuters

Retrieved from http://www.economist.com/sites/default/files/cf_images/images-magazine/

Iron is gold

Prices, \$ terms

Vale's share price
\$



Sources: IMF; Thomson Reuters

Rarity value

Rare-earths price index*, January 2002=100



Source: Kaiser Bottom-Fish

*Composite of ten metals

FIFTH BRICS SUMMIT

26 - 27 MARCH 2013 DURBAN, SOUTH AFRICA



context

Understanding opportunities for Space and Environment in FP7 and H2020



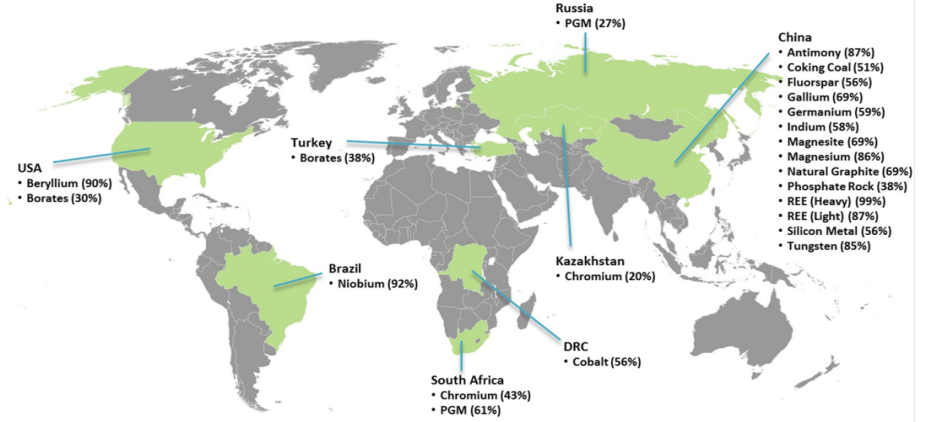
COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 4.11.2008
COM(2008) 699 final

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT AND THE COUNCIL

The raw materials initiative — meeting our critical needs for growth and jobs in Europe

the EU response



Understanding opportunities for Space and Environment in FP7 and H2020



COMMISSION OF THE EUROPEAN COMMUNITIES

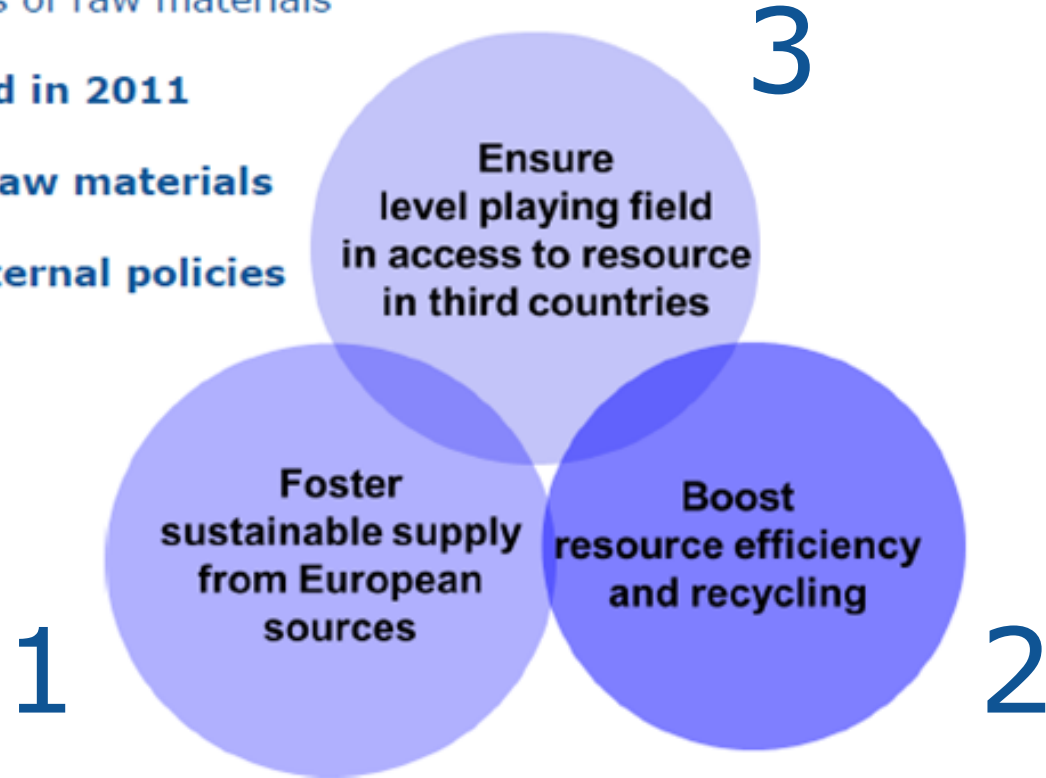
Brussels, 4.11.2008
COM(2008) 699 final

**COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN
PARLIAMENT AND THE COUNCIL**

The raw materials initiative — meeting our critical needs for growth and jobs in Europe

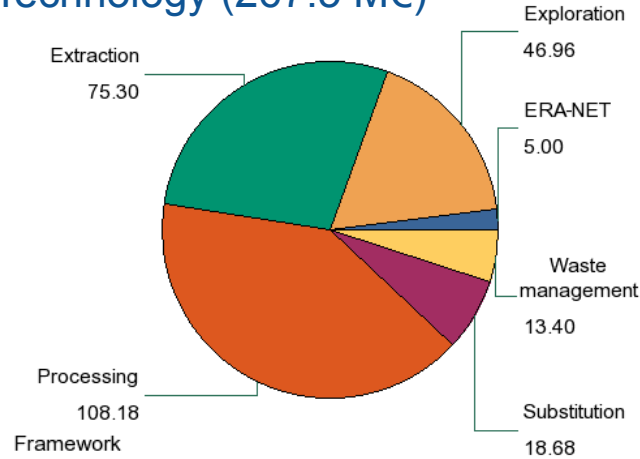
EU “Raw Materials Initiative”

- **Aim:** securing sustainable supplies 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)**

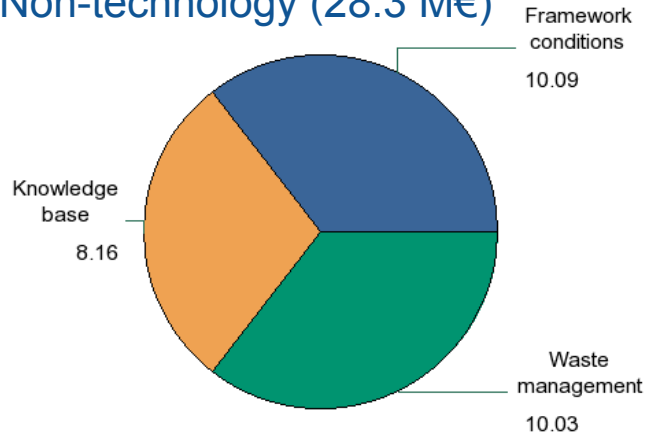


Addressing the targets (56 projects)

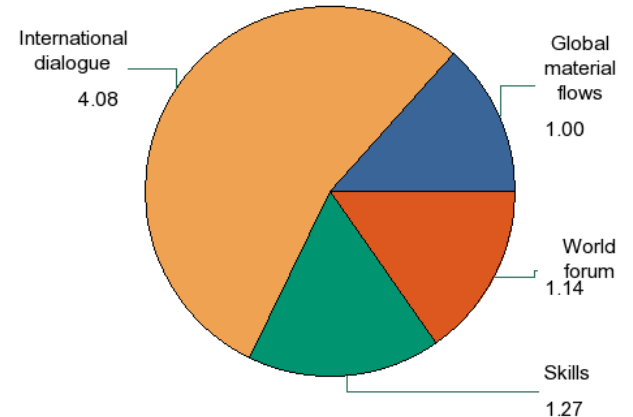
Technology (267.5 M€)



Non-technology (28.3 M€)

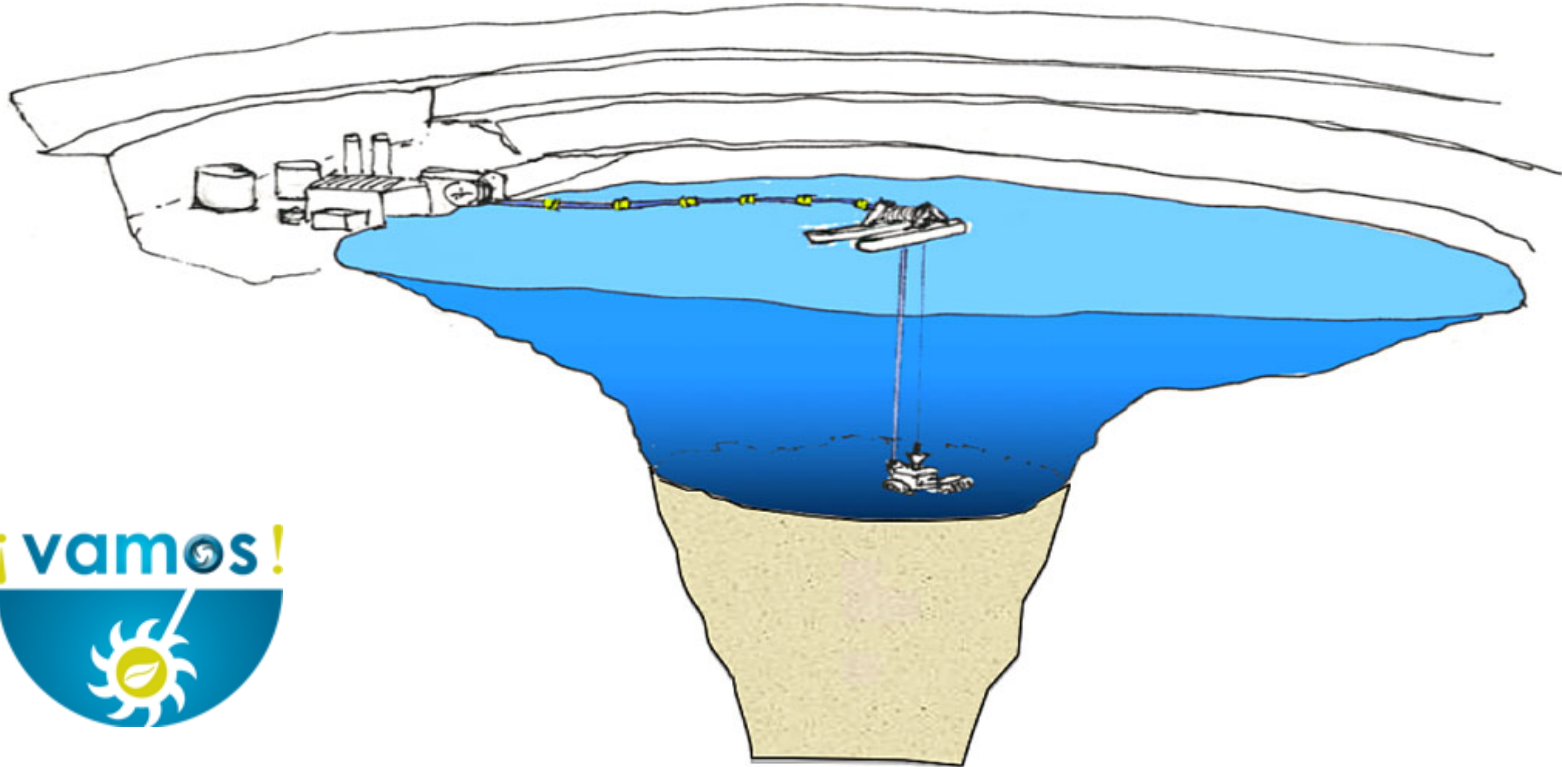


International cooperation (7.5 M€)



context

the EU response



Source: <http://vamos-project.eu/>

context

the EU response



Source: <http://vamos-project.eu/>

context



the EU response



Source: <http://www.unexmin.eu/>

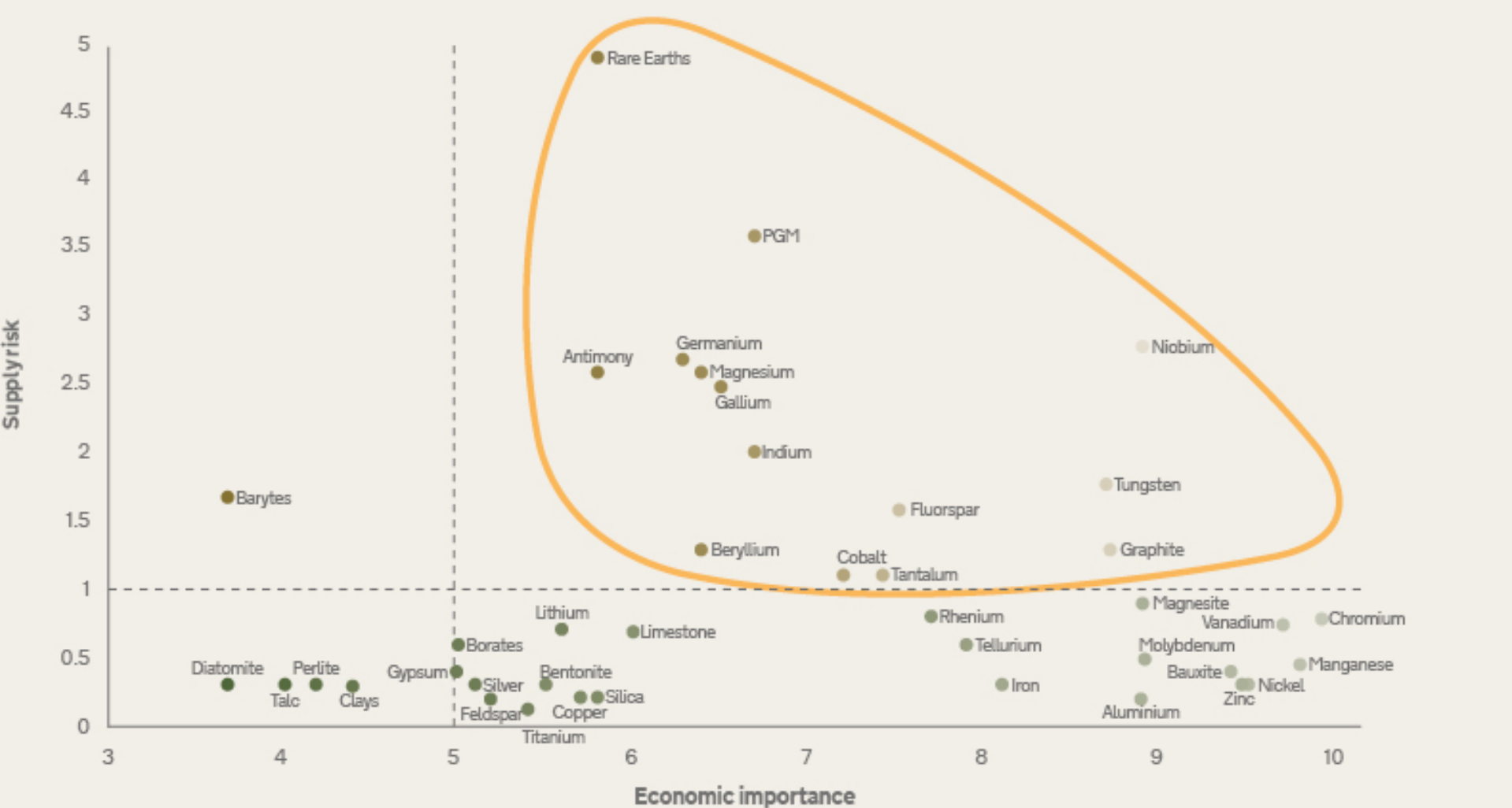


International Raw Materials Observatory

International
Organisation AISBL
Based in Brussels
Incorporated on 14
SET 2017

MEMBERSHIP
open to all
stakeholders
fees depend on the
size of

honest broker acting as an **impartial** international **mediator**
specialised in the **minerals** value chain to **support**
international cooperation



Source: Critical raw material for the EU: report of the Ad-hoc Working Group on defining critical raw materials. European Commission, June 2010

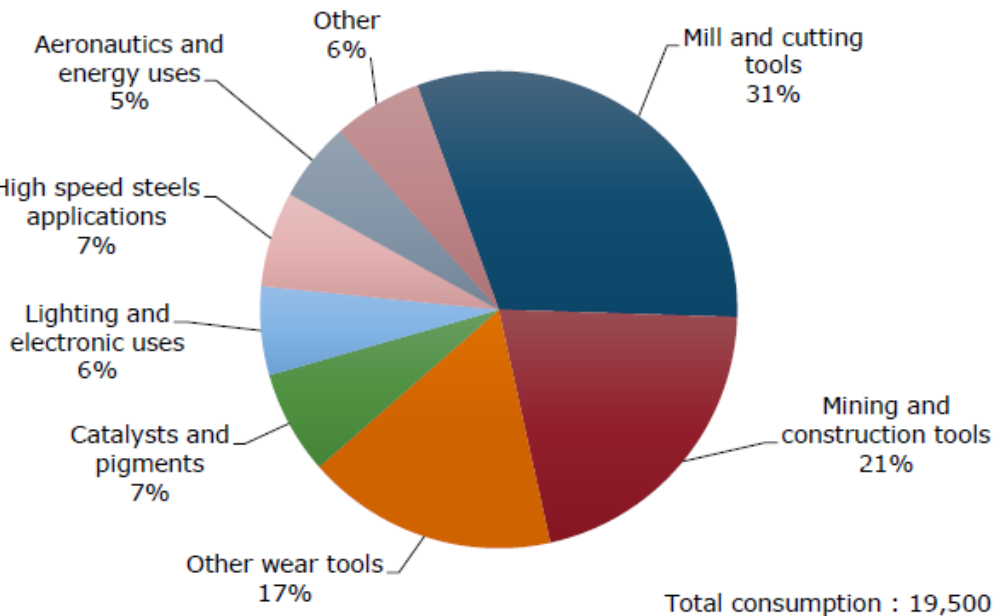
Economic Importance

$$(EI) = \sum(A_{ss} * Q_s) * SIEI$$

where:

- *EI* = economic importance;
- *As* = the share of end use of a raw material in a NACE Rev. 2 (2-digit level) sector;
- *Qs* = the sector's VA at the NACE Rev. 2 (2-digit level);
- *SIEI* = the substitution index of a raw material related to economic importance;
- *s* denotes sector.

End uses of tungsten applications



Tungsten applications, 2-digit NACE sectors, and value added per sector

Applications	2-digit NACE sector	Value added of NACE 2 sector (millions €)
Mill and cutting tools	C28 - Manufacture of machinery and equipment n.e.c.	191,000
Mining and construction tools	C28 - Manufacture of machinery and equipment n.e.c.	191,000
Other wear tools	C28 - Manufacture of machinery and equipment n.e.c.	191,000
Catalysts and pigments	C20 - Manufacture of chemicals and chemical products	110,000
Lighting and electronic uses	C26 - Manufacture of computer, electronic and optical products	75,260
High speed steels applications	C25 - Manufacture of fabricated metal products, except machinery and equipment	159,513
Aeronautics and energy uses	C28 - Manufacture of machinery and equipment n.e.c.	191,000

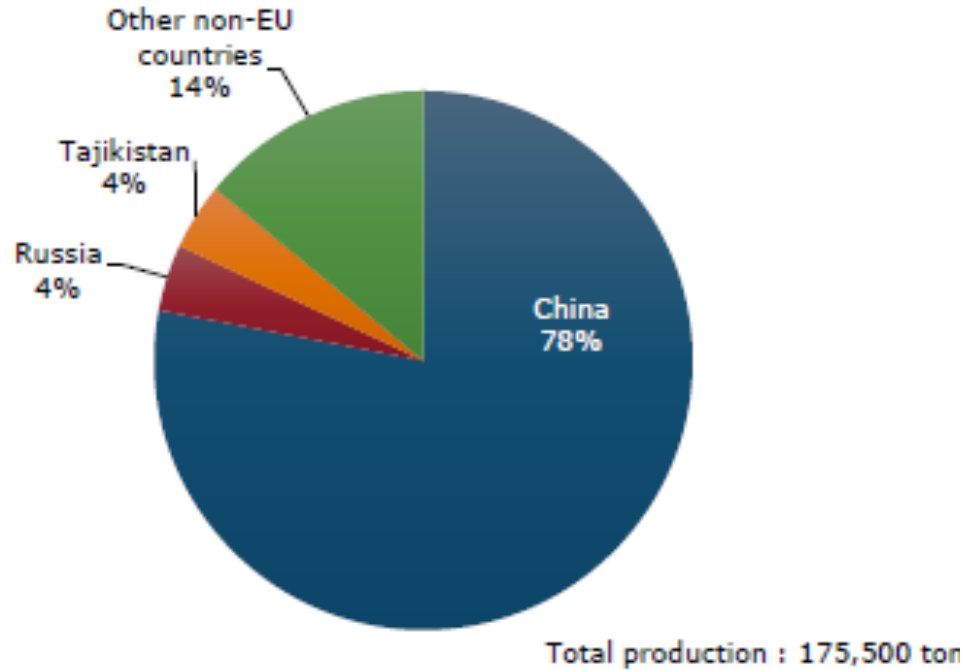
Supply Risk

$$SR = [(HHIWGI, t)GS \cdot IR2 + (HHIWGI, t)EU\text{sourcing}(1 - IR2)] \cdot (1 - EoLRIR) \cdot SISR$$

where:

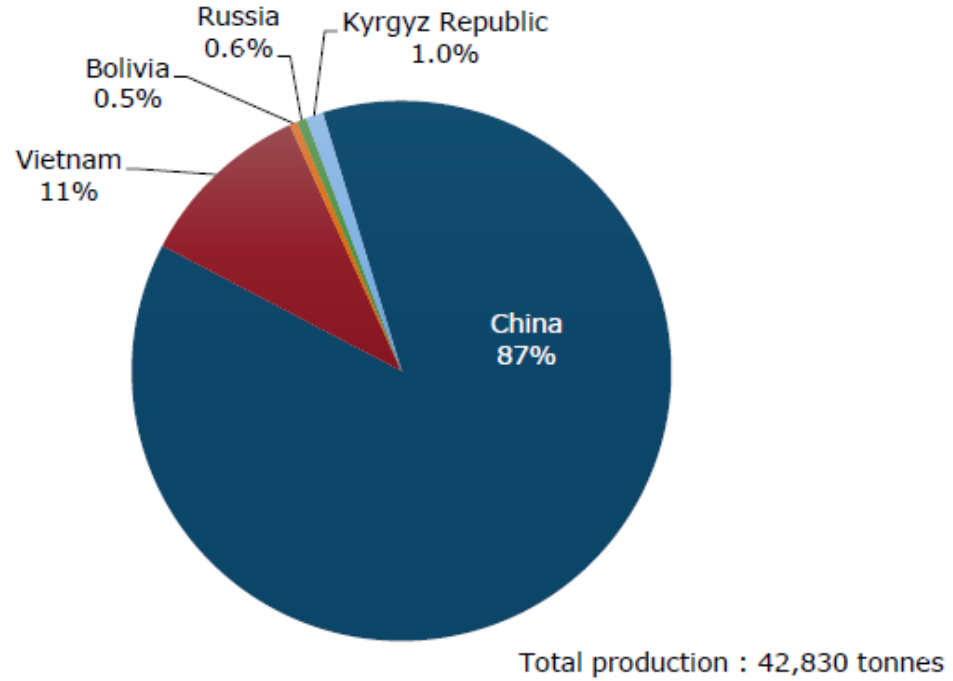
- *SR* = supply risk;
- *GS* = global supply, i.e. global suppliers countries mix;
- *EU sourcing* = actual sourcing of the supply to the EU, i.e. EU domestic production plus other countries importing to the EU;
- *HHI* = Herfindahl-Hirschman Index (used as a proxy for country concentration);
- *WGI* = scaled World Governance Index (used as a proxy for country governance);
- *t* = trade parameter adjusting WGI;
- *IR* = import reliance;
- *EOLRIR* = end-of-life recycling input rate;
- *SISR* = substitution index related to supply risk.

context



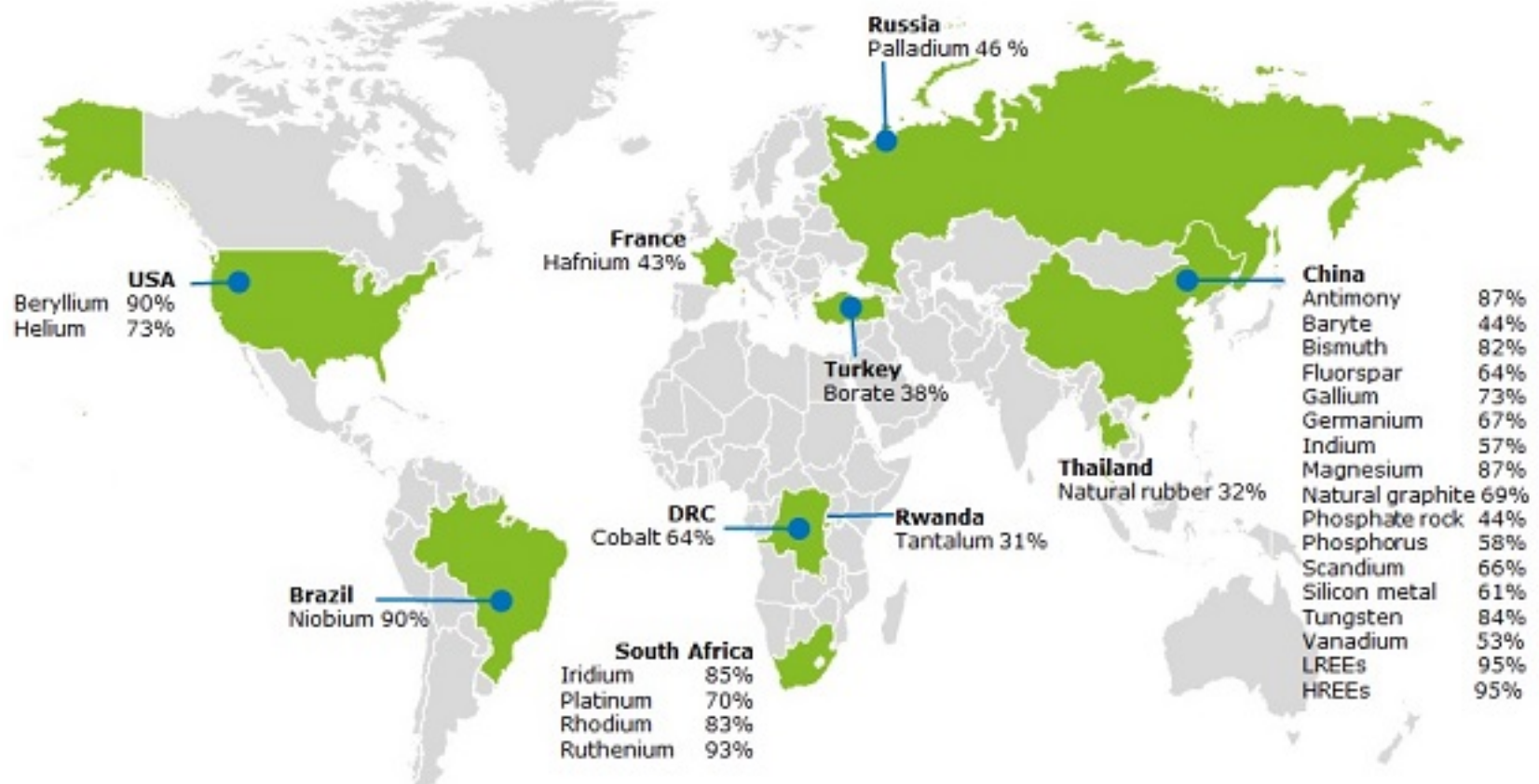
Global mine production of Antimony ores, average 2010–2014 (Data from BGS, 2015)

the EU response

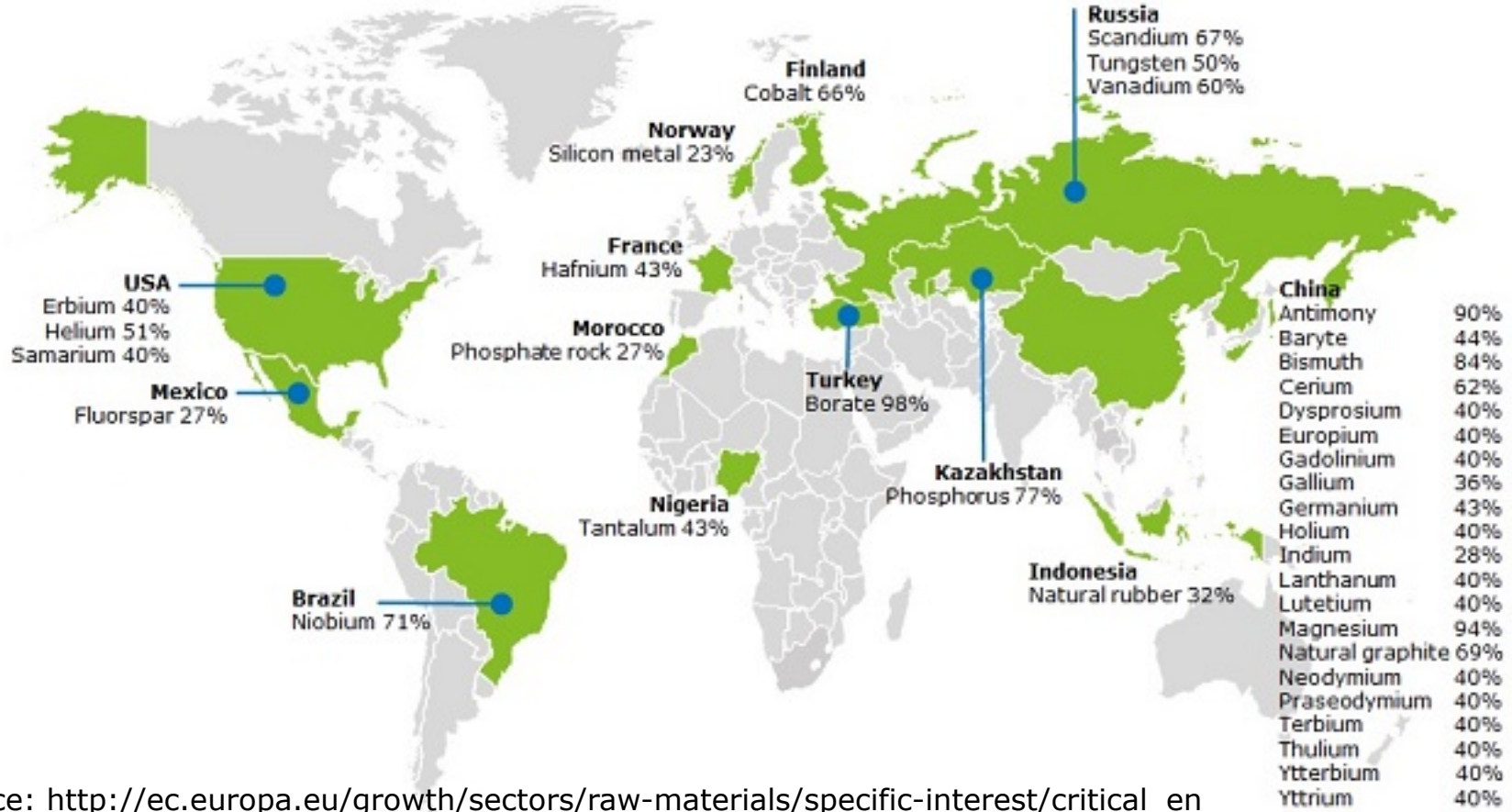


Global production of unwrought antimony metal, average 2010–2014 based on reconstructed trade data (Data from UN Comtrade database)

Countries accounting for largest share of global supply of CRMs



Countries accounting for largest share of EU supply of CRMs



40. TUNGSTEN

Key facts and figures

Material name and Element symbol	Tungsten, W	World/EU production (tonnes) ¹	82,000 / 2,175
Parent group	N/A	EU import reliance ¹	44%
Life cycle stage/ material assessed	Mine production/ Ore	Substitution index for supply risk [SI(SR)] ¹	0.97
Economic importance (EI) (2017)	7.3	Substitution Index for economic importance [SI(EI)] ¹	0.94
Supply risk (SR) (2017)	1.8	End of life recycling input rate (EOL-RIR)	42%
Abiotic or biotic	Abiotic	Major end uses in EU ¹	Mill and cutting tools (31%), Mining and construction tools (21%), Other wear tools (17%),
Main product, co-product or by-product	Main product	Major world producers ¹	China (84%), Russia (4%),
Criticality results	2011	2014	2017
	Critical	Critical	Critical

¹ average for 2010-2014, unless otherwise stated;

2017 CRMs (27)			
Antimony	Fluorspar	LREEs	Phosphorus
Baryte	Gallium	Magnesium	Scandium
Beryllium	Germanium	Natural graphite	Silicon metal
Bismuth	Hafnium	Natural rubber	Tantalum
Borate	Helium	Niobium	Tungsten
Cobalt	HREEs	PGMs	Vanadium
Coking coal	Indium	Phosphate rock	

*HREEs=heavy rare earth elements, LREEs=light rare earth elements, PGMs=platinum group metals

Supporting information

[Study on the review of the list of Critical Raw Materials 2017](#)

[Critical raw materials factsheets 2017](#)

[Non-critical raw materials factsheets 2017](#)

[Executive summaries: list of critical raw materials 2017](#)

[Report on Critical Raw Materials for the EU 2014](#)

[Annex to the Report on Critical Raw Materials for the EU 2014](#)

[Critical Materials Profiles 2014](#)

[Non-Critical Materials Profiles 2014](#)

[Study on Critical Raw Materials at EU Level 2014](#)

[Report on Critical Raw Materials 2010](#)

Contact INTRAW

www.intraw.eu

@vitor_eurgeol