An overview of raw materials and mineral policies from the European perspective

Mineral strategy for Finland

Espoo, Finland – March 17th, 2010

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Caveat

The views expressed in this presentation reflect the sole views of the author and do not explicitly of implicitly represent an official French point of view.

Minerals, essential minerals, but …

Isn't mineral resources supply an issue to be left to market forces?

Isn't the future of the EU to be: "*the most dynamic and competitive knowledge-based economy in the world capable of sustainable economic growth with more and better jobs and greater social cohesion, and respect for the environment by 2010"* (EU Lisbon Summit conclusions, 2000)?

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Minerals, essential minerals, but …

Reliance on « deregulate, liberalize, privatize » has been the political mantra in the Western world since the second oil shock (1979/1980), as market forces appeared to work well to supply the Western world, from there until 2002…

Minerals, essential minerals

But now there is the rapid development of the Chinese command economy, endowed with 2.4 trillions $ US of foreign exchange reserves (end 2009) and a population of 1.3 billion longing for development. At the same time, the EU public debt reached ~7.5 trillions

China, so far, plays along a different set of rules than Western countries.

This radically changes the context of mineral resources supply to the EU. And, in such a race, the EU appears poorly prepared.

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Is there a role for governments in the mineral resources industry?

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Yes, and it is a key role as can be seen in all countries that successfully developed their minerals potential

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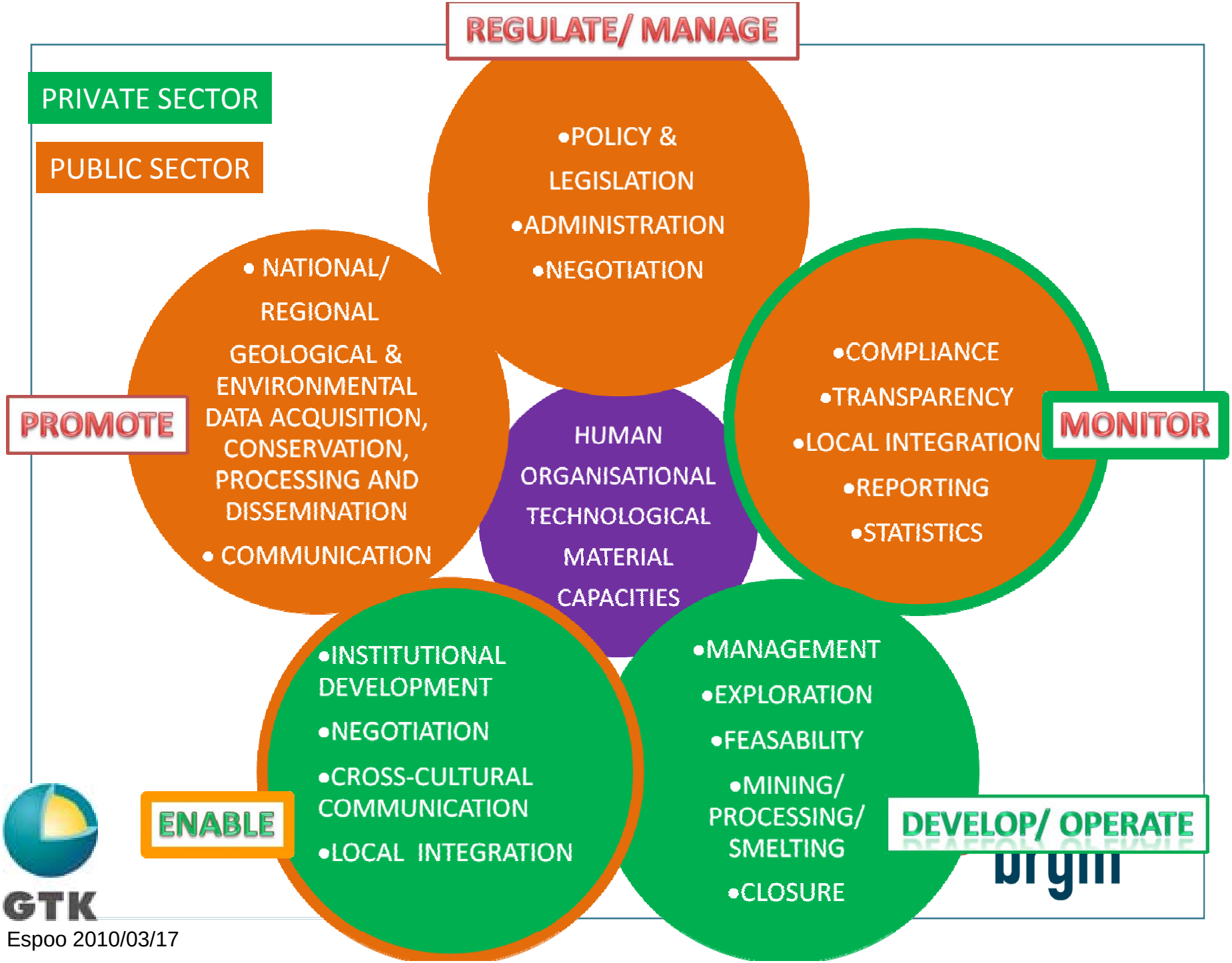
REGULATE/ MANAGE
PRIVATE SECTOR
PUBLIC SECTOR
•POLICY &
LEGISLATION
•ADMINISTRATION
•NEGOTIATION
PROMOTE
• NATIONAL/
REGIONAL
GEOLOGICAL &
ENVIRONMENTAL
DATA ACQUISITION,
CONSERVATION,
PROCESSING AND
DISSEMINATION
• COMMUNICATION
HUMAN
ORGANISATIONAL
TECHNOLOGICAL
MATERIAL
CAPACITIES
•COMPLIANCE
•TRANSPARENCY
•LOCAL INTEGRATION
•REPORTING
•STATISTICS
MONITOR
ENABLE
•INSTITUTIONAL
DEVELOPMENT
•NEGOTIATION
•CROSS-CULTURAL
COMMUNICATION
•LOCAL INTEGRATION
•MANAGEMENT
•EXPLORATION
•FEASABILITY
•MINING/
PROCESSING/
SMELTING
•CLOSURE
DEVELOP/ OPERATE
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The EU and its global context

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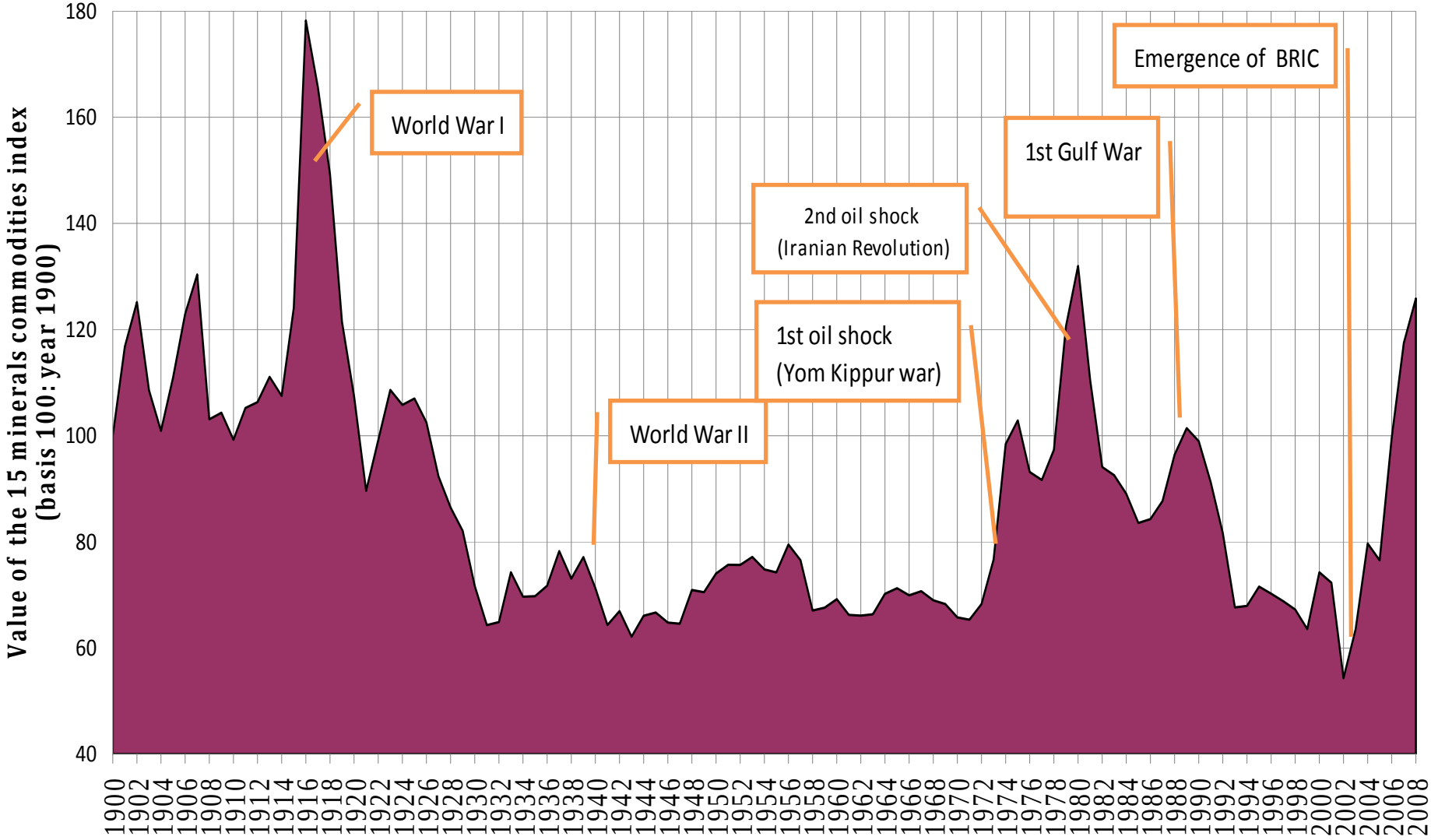
Price over the 1900-2008 period of a basket of non-energy 15 mineral substances in constant $ (1998 value) -Index basis 100 in 1900

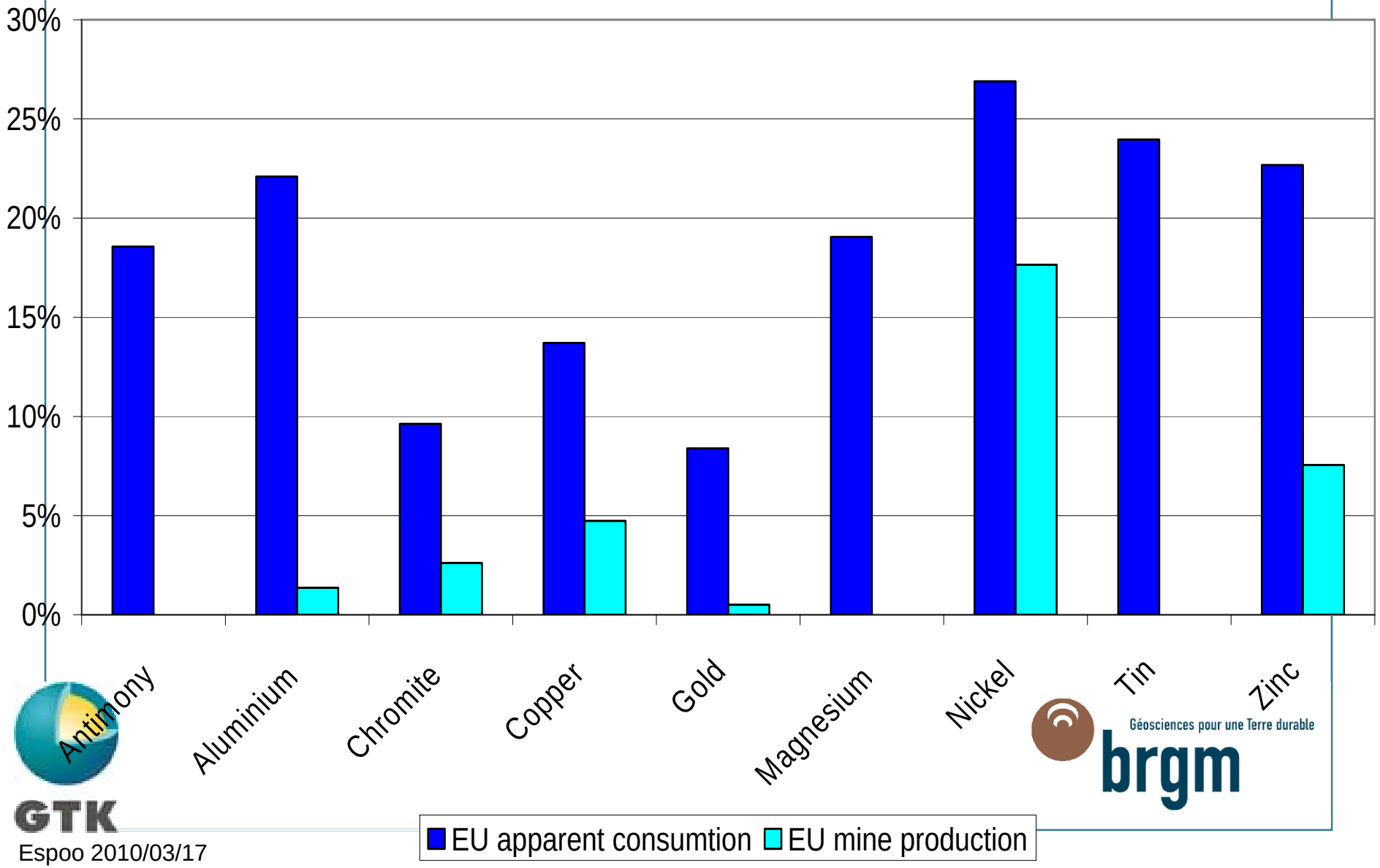
(Al, Au, Ba, B, Co, Cr, Cu, Fe ore, K, Mn, Ni, P, Pb, Pt, Zn)

Data source: USGS - http://minerals.usgs.gov/ds/2005/140



EU 27 APPARENT consumption and mine production in % of World totals -

2007 data from the World Mining and Metals Yearbook (BRGM)



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Espoo 2010/03/17

EU dependence on metal and metallic ores imports (2009)

Data sources: USGS, BGS, BRGM, PGI

Antimony ore	100%	Vanadium ore	100%
Beryllium ore	100%	Phosphate rock	92%
Boron	100%	Rhenium ore	90%
Cobalt	100%	Nickel	86%
Molybdenum	100%	Iron ore	83%
Niobium ore	100%	Bauxite	80%
PGM ores	100%	Zinc ore	80%
Rare Earth ores	100%	Tungsten ore	76%
Tantalum ore	100%	Lead Ore	76%
Ilmenite	100%	Copper Ore	74%
Rutile	100%	Chromium ore	53%

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The EU Raw Materials Initiative

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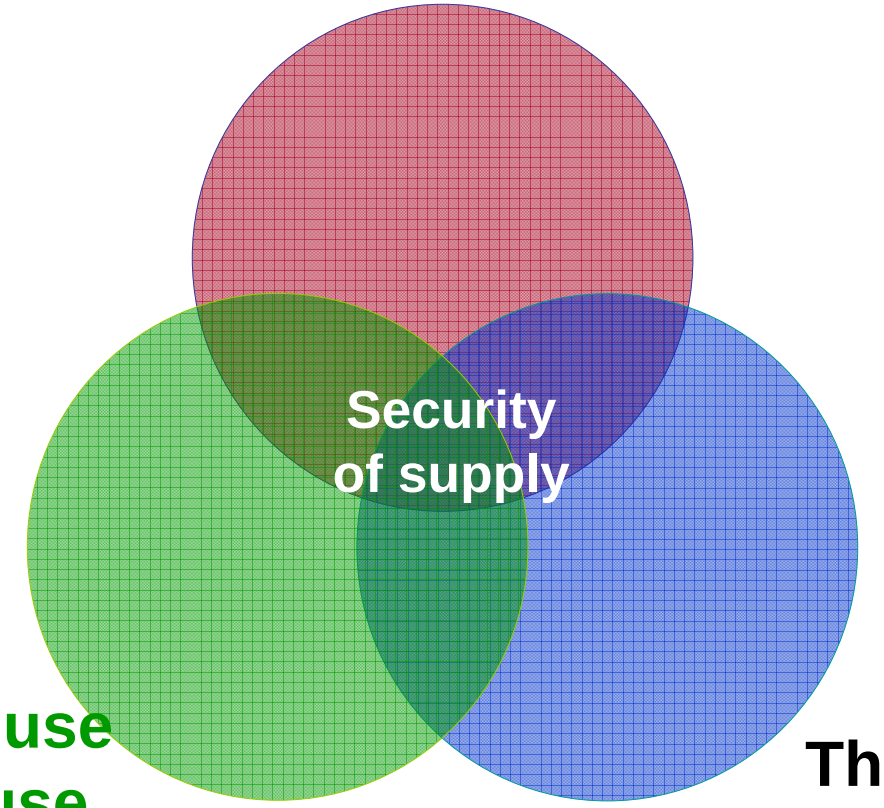
The EU Raw Materials Initiative
COM(2008)699

The External Pillar



Better resource use
Recycling/ Re-use

The Internal Pillar

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What global scenario will prevail in the coming decades?

A Green Trade Alliance?

Rebased globalism?

Resources nationalism?

After: « Mining & Metals – Scenarios to 2030 » – World Economic Forum (http://www.weforum.org/en/initiatives/Scenarios/MiningandMetalsScenarios/index.htm)

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What matters is not how much mineral resources humanity uses, but how sustainable such use is, and how fair the distribution of access to these resources is.

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The external pillar

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Mineral resources and development: an inconvenient truth?

- **Mineral resources industry development plays a critical role in support of the development of low-income countries, as much as it plays a critical, albeit most frequently ignored, role in the development of the EU, of Canada, of the US, Japan and other high-income corners of this world**
- **Well thought partnerships between the EU and developing countries could lead to win-win scenarios…**

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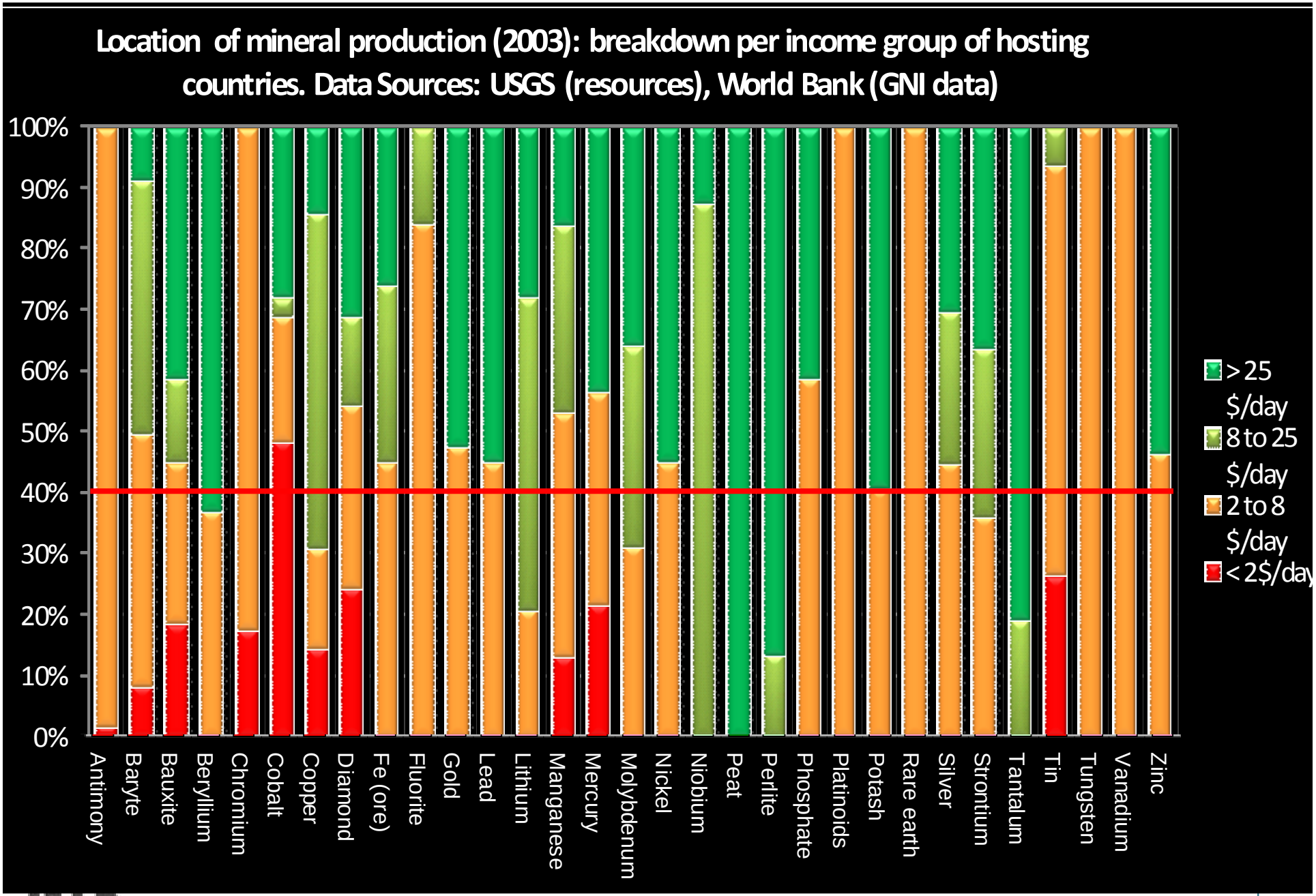
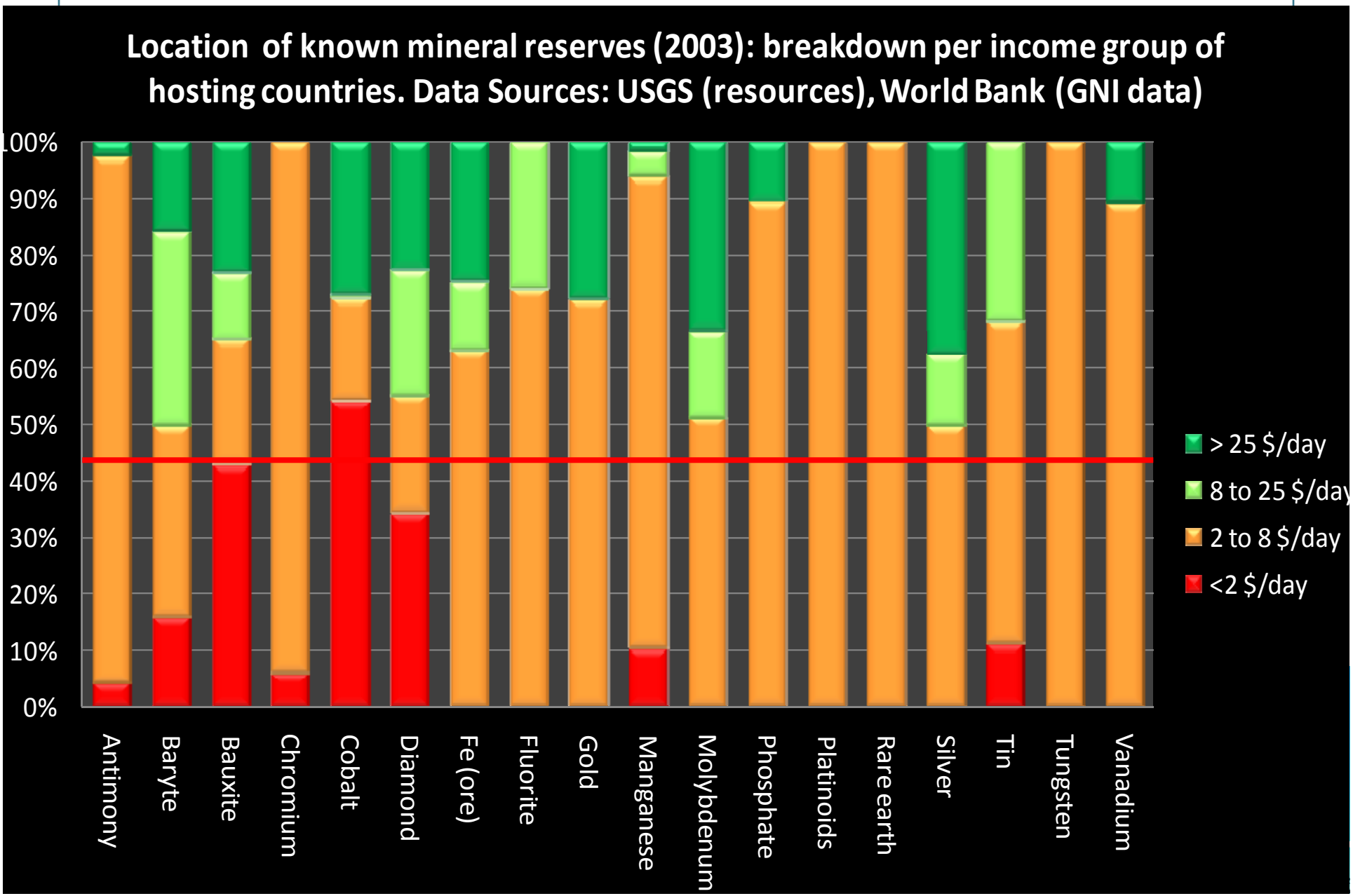
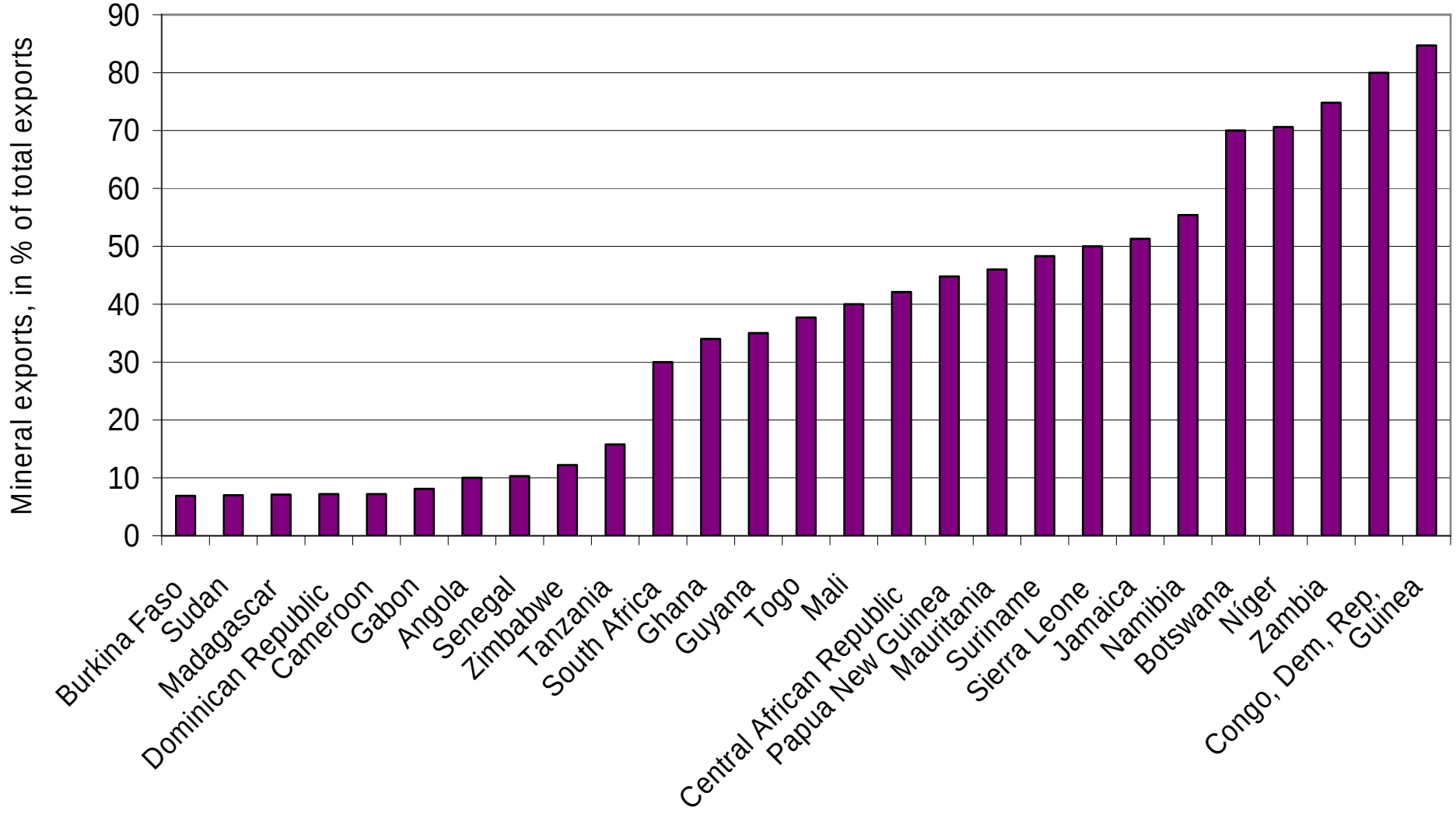

Location of mineral production (2003): breakdown per income group of hosting countries. Data Sources: USGS (resources), World Bank (GNI data)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Antimony
Baryte
Bauxite
Beryllium
Chromium
Cobalt
Copper
Diamond
Fe (ore)
Fluorite
Gold
Lead
Lithium
Manganese
Mercury
Molybdenum
Nickel
Niobium
Peat
Perlite
Phosphate
Platinoids
Potash
Rare earth
Silver
Strontium
Tantalum
Tin
Tungsten
Vanadium
Zinc
> 25 $/day
8 to 25 $/day
2 to 8 $/day
< 2$/day


Location of known mineral reserves (2003): breakdown per income group of hosting countries. Data Sources: USGS (resources), World Bank (GNI data)
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Antimony
Baryte
Bauxite
Chromium
Cobalt
Diamond
Fe (ore)
Fluorite
Gold
Manganese
Molybdenum
Phosphate
Platinoids
Rare earth
Silver
Tin
Tungsten
Vanadium
> 25 $/day
8 to 25 $/day
2 to 8 $/day
<2 $/day

ACP countries: mineral exports (1990-1999) in % of total exports
Data source: Weber-Fahr, 2002 (World Bank)



Mineral resources and development: an inconvenient truth?

How can mineral-rich countries with a GNI of less than 2€/ per capita and day manage to develop and maintain the core institutions necessary to promote and regulate the development of their mineral resources sector?

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Mineral resources and development: towards a win-win mineral resources diplomacy

Provide sustained **grant** financing for:

- institutional development/ strengthening,
- capacity building (training, including of local entrepreneurs !!!!),
- mineral resources and environment related data acquisition and processing,
- results dissemination and promotion
- technical assistance to SMEs and small-scale mining

Mineral resources and development: towards a win-win mineral resources diplomacy

As mineral resources development requires long-term visions and policies in countries plagued by a wide range of short-term issues it is necessary to set-up a specific, ring-fenced, mineral resources development instrument within the European Development Fund (22.7bn € for the 2008-2013 period).

100 M€/ year over 10 years would be required to have a significative

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Mineral resources and development: towards a win-win mineral resources diplomacy

- **100 M€/ year over 10 years would be required as a minimum to have a significative impact. This is well in line with the past Sysmin facility, which was endowed with 575 M€ for its last 5-years tranche (1995-2000).**
- **Eligibility should be made conditional with commitment to transparency (Extractive Industries Transparency Initiative), good governance and environmental management.**

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What does the EU prefer?

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Sustainable Development

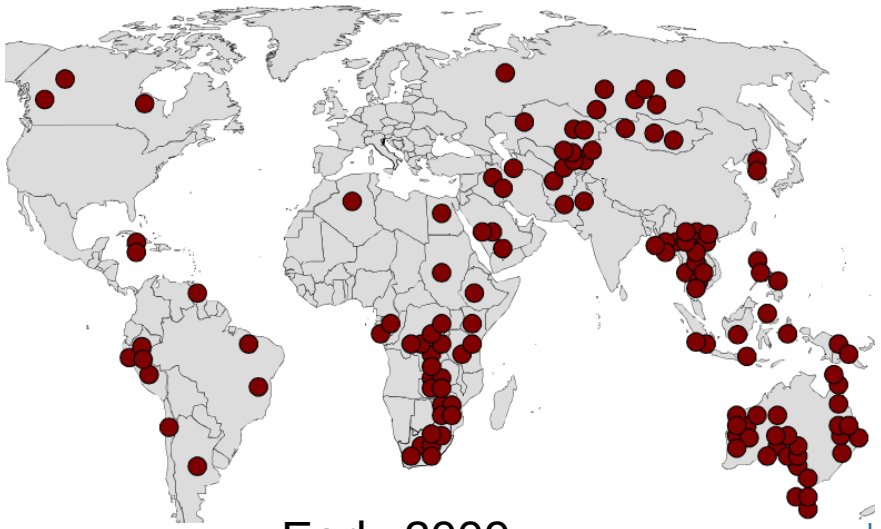
	ECONOMY	ENVIRONMENT	SOCIAL
GOVERNANCE	- Budget income - Added value generation, including in other sectors of the economy - Development of various Forms of capital, for the benefit of several generations	- Low environmental footprint -Creation of new habitats (old quarries)	Human capital development via access to education, health, water, Infrastructure Skills development
	- Economic destabilisation - Inflation - - Corruption - -- Minerals rent squandering	 – Risks of air, soils and/or water pollution - Risk of subsidence - Possibly lasting impacts, even after mine closure	- Weakening of social Linkages - Development of conflicts (access to land, to water, Property rights, sharing of wealth)

Short-term vision

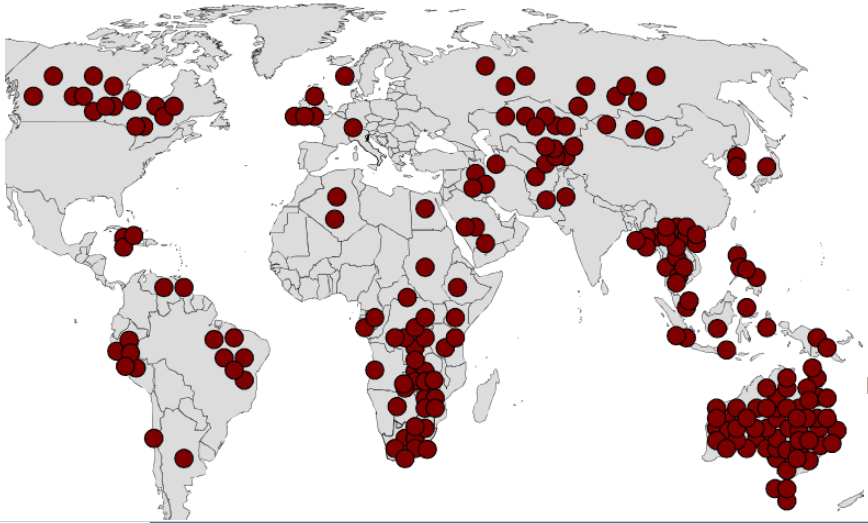
Chinese investments in the global mineral resources industry

(After Van der Wath, Bateman Beijing Axis, « China and Africa: A Global Natural Resources Alliance?, presentation given at Indaba Mining 2010, Cape Town)

2004



Early 2009



Early 2010

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The internal pillar

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Key issues

- Proper integration of subsurface knowledge, including mineral resources, in land-use planning, to avoid resources sterilisation

- Development of a pan-European 3D knowledge base on EU's mineral potential between 0 and 3 km depth

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Key issues

- Proper integration of subsurface knowledge, including mineral resources, in land-use planning, to avoid resources sterilisation
- Development of a pan-European 3D knowledge base on EU's mineral potential between 0 and 3 km depth
- Creating conditions attractive to socially and environmentally responsible

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Europe’s geological potential

- General belief 1: Europe’s mineral’s industry belongs to the past, there is no more potential
- General belief 2: production costs in the EU would be too high to make mining profitable

Europe’s geological potential

- Except in very few countries, such as Finland, the public effort to develop the knowledge base on EU’s subsurface has been very limited over the last 20-30 years, with an important risk of loss of expertise

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Do we know the geological potential of Europe?

- The location of deposits of economic interest (a very dynamic concept) is determined by the geological history of Europe,
- For the time being, except for some areas with oil and gas, we only well know the near-surface geology of Europe and the related mineral deposits
- There so far not even is a 2D public pan-EU Mineral Resources GIS, only heterogeneous information at national/ regional levels, some very difficult to identify and to access

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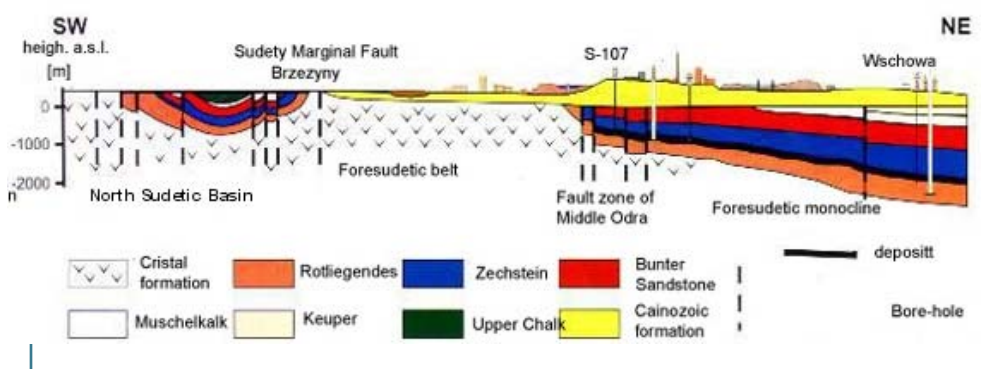
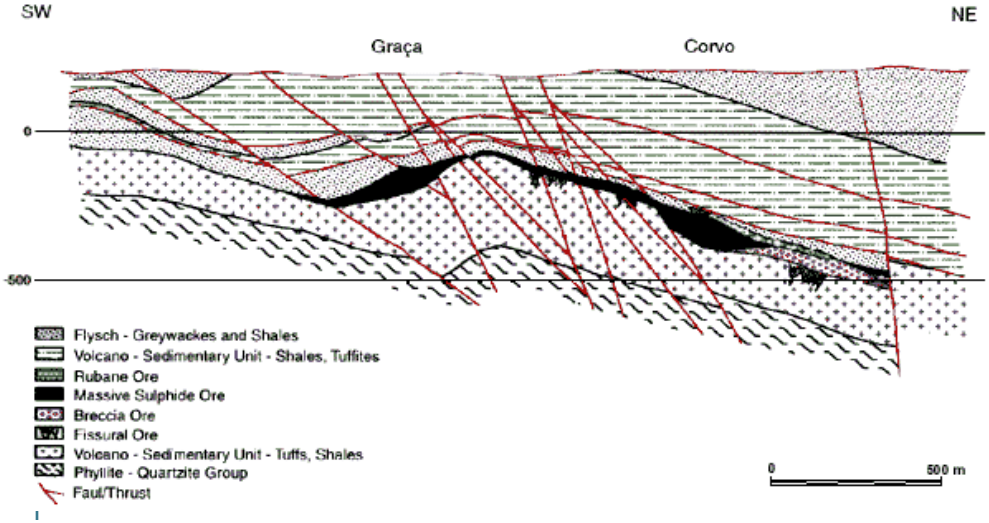
… WHILE EUROPE's POTENTIAL FOR DEEP-SEATED, HIDDEN, LARGE-SCALE MINERAL DEPOSITS IS ALREADY PROVEN



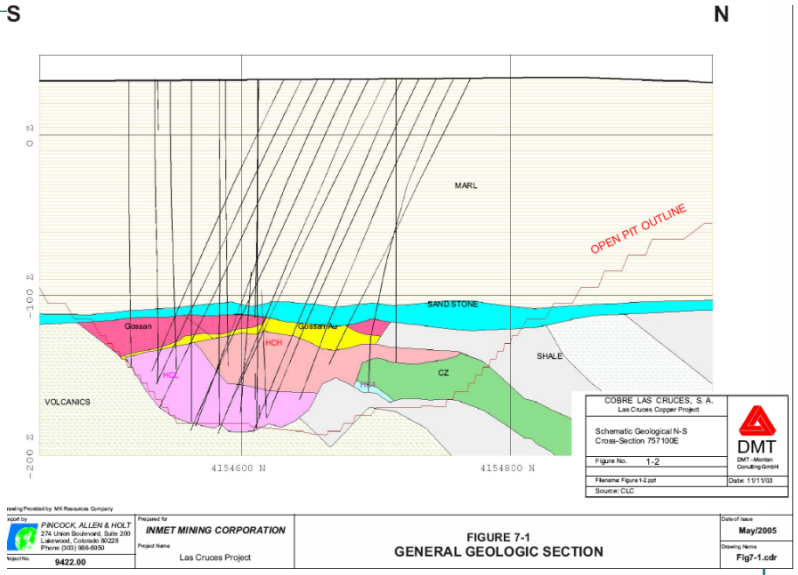
The foresudetic basin, Poland – 30.8 Mt resource (31/12/07 data)

http://www.kghm.pl/index.dhtml?category_id=260&lang=en



Neves Corvo, Portugal – 1.7 Mt Cu, 3 Mt Zn, 50 kt Sn in resources + ~ 1Mt Cu produced (12/1997 data)

http://e-geo.ineti.pt/edicoes_online/diversos/mining_develop/capitulo4.htm



Las Cruces, Spain – ~1.1 Mt Cu In reserves (31/12/07 data)

http://www.inmetmining.com/ouroperations/mineralreservesresources/default.aspx

ON THE WAY TO THE FUTURE:
THREE WORLD-CLASS EU CONCEALED DEPOSITS


… Sweden's Aitik open-pit copper pit mine, one of the world's lowest grade copper operations (0.27% Cu in the reserves), demonstrates that mining is possible and profitable with EU cost factors and regulations. Aitik has a recent cash cost of 1,24 $/ lb Cu (current market price: over 3 $/lb) … thanks to technology and engineering


MAIN MINERAL DEPOSITS OF EUROPE
Main commodity
Aluminium
Antimony
Arsenic
Barite
Bismuth
Chromium
Cobalt
Copper
Diamond
Fluorite
Germanium, Gallium
Gold
Iron
Lithium
Lead
Manganese
Mercury
Molybdenum
Nickel
Phosphate
PGE Platinum Gr. Elements
Pyrite
Silver
Tantalum
Tin
Titanium
Uranium
Vanadium
Tungsten
Zinc
Zirconium
Deposit size
Class A
Class B
Class C
Total deposits : 943
© BRGM, 2008
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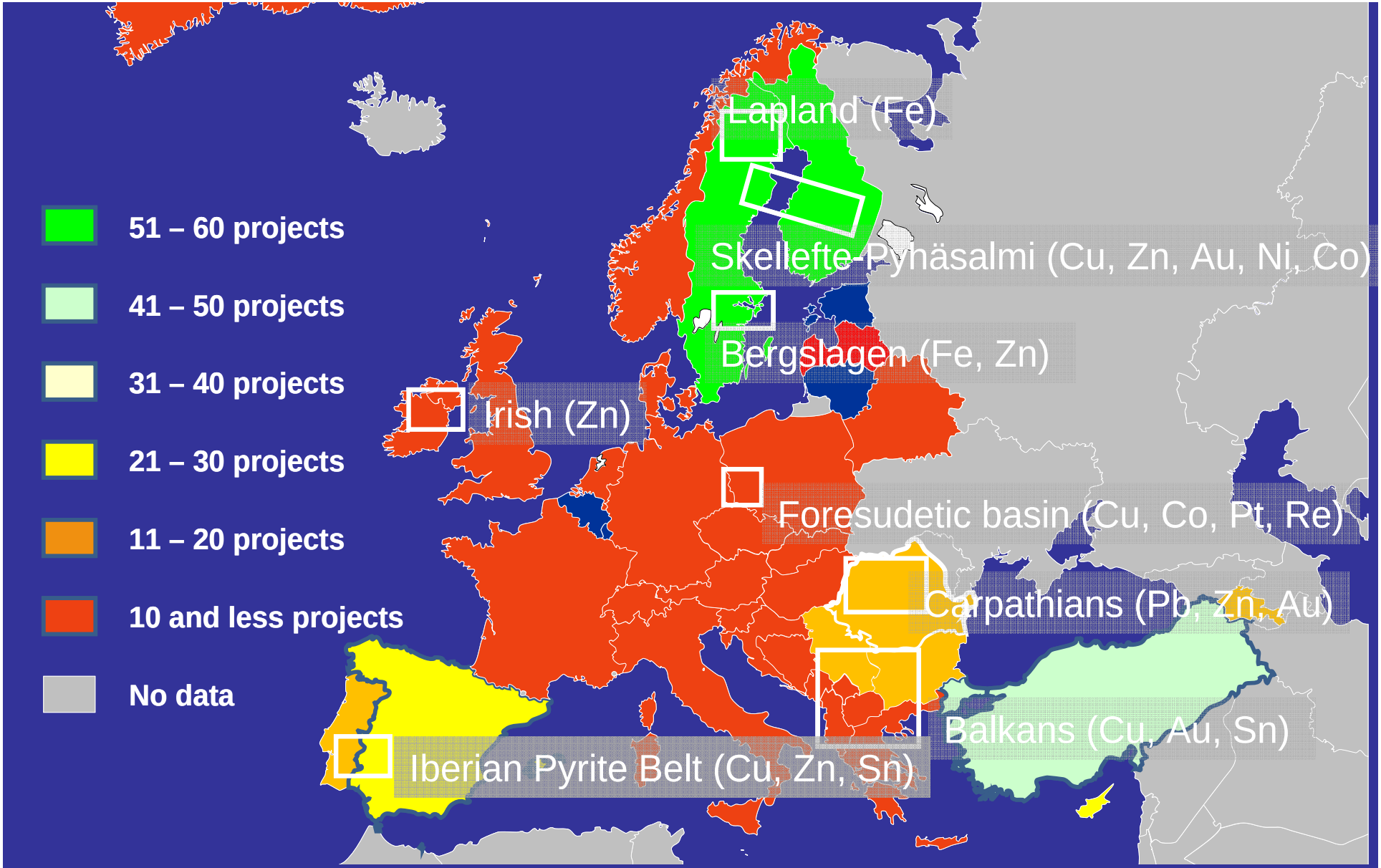
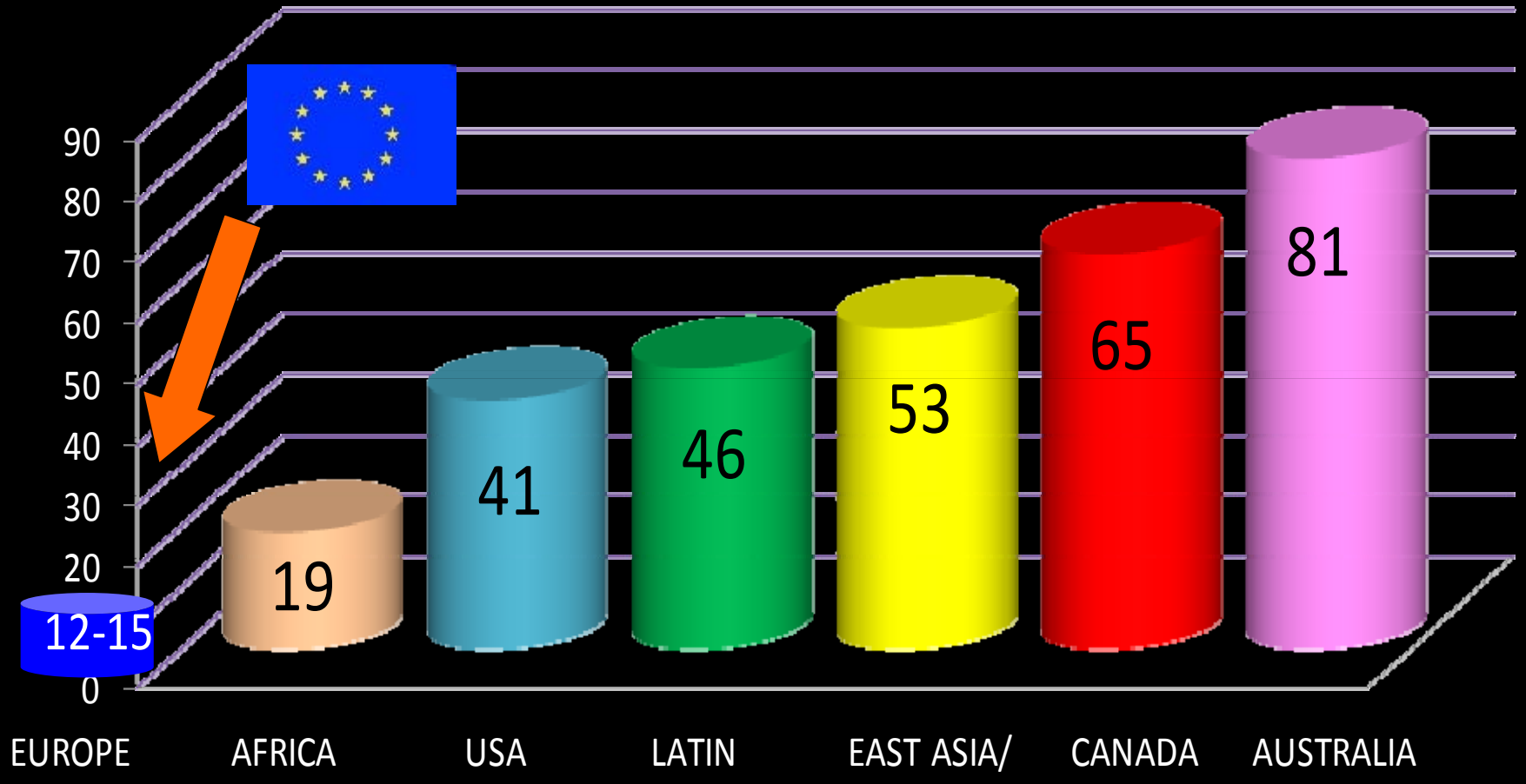
Geoscience for a sustainable Earth
KEY EU METALLOGENIC PROVINCES
Lapland (Fe)
Skellefte-Pyhäsalmi (C
Bergslagen (Fe, Zn)
Irish (Zn)
Foresudetic basin (Cu, C
Carpathians (Pb
Balkans (Cu, Au,
Iberian Pyrite Belt (Cu, Zn, Sn)
ATLANTIC OCEAN
NORTH SEA
BALTIC SEA
BARENT SEA
BLACK SEA
MEDITERRANEAN SEA
ADRIATIC SEA
Torshavn
Oslo
Helsinki
Tallinn
Stockholm
Moscow
Copenhagen
Vilnius
Minsk
London
Amsterdam
Berlin
Warsaw
Brussels
Essen
Luxembourg
Paris
Kiev (Kyyiv)
Vienna
Bratislava
Budapest
Chisinau
Bern
Ljubljana
Zagreb
Belgrade
Bucharest
Sarajevo
Sofia
Skopje
Andorra la Vella
Serravalle
Madrid
Lisbon
Rome
Athens
Gibraltar
Algiers
Tunis
Valletta
Nicosia
0 km 500



Number of mineral resources projects, at all stages of development, listed in the MineSearch database developed by the Metals Economics Group (period: 2005 -2009. Note: projects can be shelved or dormant

Average yearly investments forecasts in non-ferrous mineral exploration by regions -constant US$/km² ($ value on 31/12/07, corrected by the change in the CPI index)

Data sources: Metals Economic Group, Wikipedia, US Department of Labor Statistics



To turn potential into the material flows required by the EU economy (beyond recycling/ re-use) requires:

- Well supported, publicly-funded, Geological Surveys to safekeep existing data and expertise and make it publicly accessible;
- Data acquisition on the deep geology and mineral potential of selected areas
- EU Data interoperability specifications (INSPIRE) , to easily integrate geological, mineral resources and other environmental data into land-use planning and decision-aiding information systems
- Enabling business framework conditions, to attract the needed private-sector investment.

Europe's geological potential

- While as a whole Europe's mineral potential remains MUCH underexplored, there are sharp contrasts about mineral resources development activities across Europe …
- In 2007 and 2008 an average of 149 €/ km2 were spent in mineral exploration in Sweden, much more than in Canada or Australia!

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It is time that after critical investments into Space, EU invests in the knowledge of our planet, the EU beneath our feet, possibly as an extension of the Global Monitoring for Environment and Security (GMES) programme

The « recycle, re-use and use less pillar »

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Towards a resources lean society?

- **R & D is required to further develop better use of resources, use of non-conventional resources, reduction of of the minerals industry environmental footprint**
- **R & D is also needed to further develop efficient recycling technologies of complex materials**

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Towards a resources lean society?

- **Access to specific minerals is highly critical to green technologies (e.g. neodymium to windmills and green cars, neodymium, niobium and lithium to green cars; gallium, indium, selenium, tellurium to photovoltaics; rhenium to fuel-efficient planes)**
- **However recycling and re-use have limits: not all materials are recyclable, long transit times of certain materials (e.g. copper) through the economy are limiting the potential stocks**

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Conclusions: towards a national (and/or EU) mineral resources strategy

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Strategy vs. policy

A mineral resources stategy document should precede policy design and implementation to:

- Bring all stakeholders together, from government, industry and civil society
- Analyse opportunities and threats related to the current and foreseen circumstances
- Review current strengths and weaknesses
- Set objectives
- Identify the way forward (define actors; actions; human resources, technological, financial requirements)
- Set indicators to monitor progress

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Examples of EU Member States mineral resources strategies

Very few EU Member States so far have specific mineral resources sector strategy papers.

One example is Germany.

Die
Bundesregierung

Elemente einer Rohstoffstrategie der Bundesregierung

Stand: März 2007

… a strategy addressing 15 key issues

- **Address raw materials supply issues**
- **Intermininsterial coordination**
- **Remove obstacles to free trade**
- **Reinforce "raw materials policy" aspects in the development policy**
- **Enhance extractive industries transparency**
- **Enhance vertical integration of the mineral resources dependent industries**
- **Enhance international statistics and their usability**
- **Enhance efficient resources use and develop substitutions**
- **Develop recycling**
- **Foster the use of national resources**
- **Stimulate and enhance the resources research network**
- **Foster EU and foreign resources policy**
- **Develop human resources and skills**
- **Simplify the regulatory framework**
- **Enhance resources related infrastructure**

Thank you for the invitation addressed to the French Geological Survey and for your attention

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