



Developing Radical Innovations through Knowledge Triangle Integration in Raw Materials

Dámaris Fernández, PhD | EIT RM Ambassador to Latin America | 26 April 2016 | Santiago de Chile



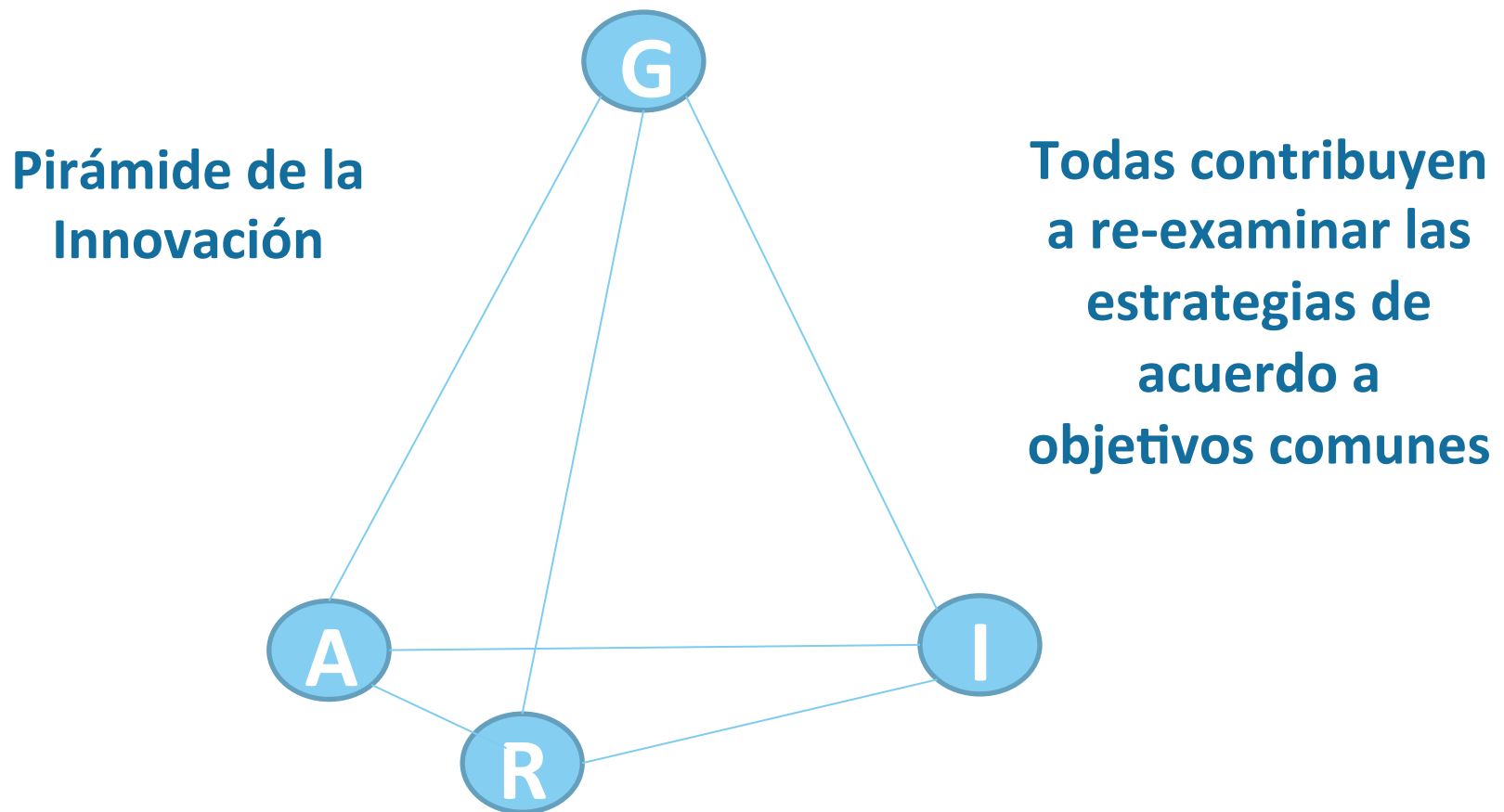
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European Institute of Innovation and Technology - EIT

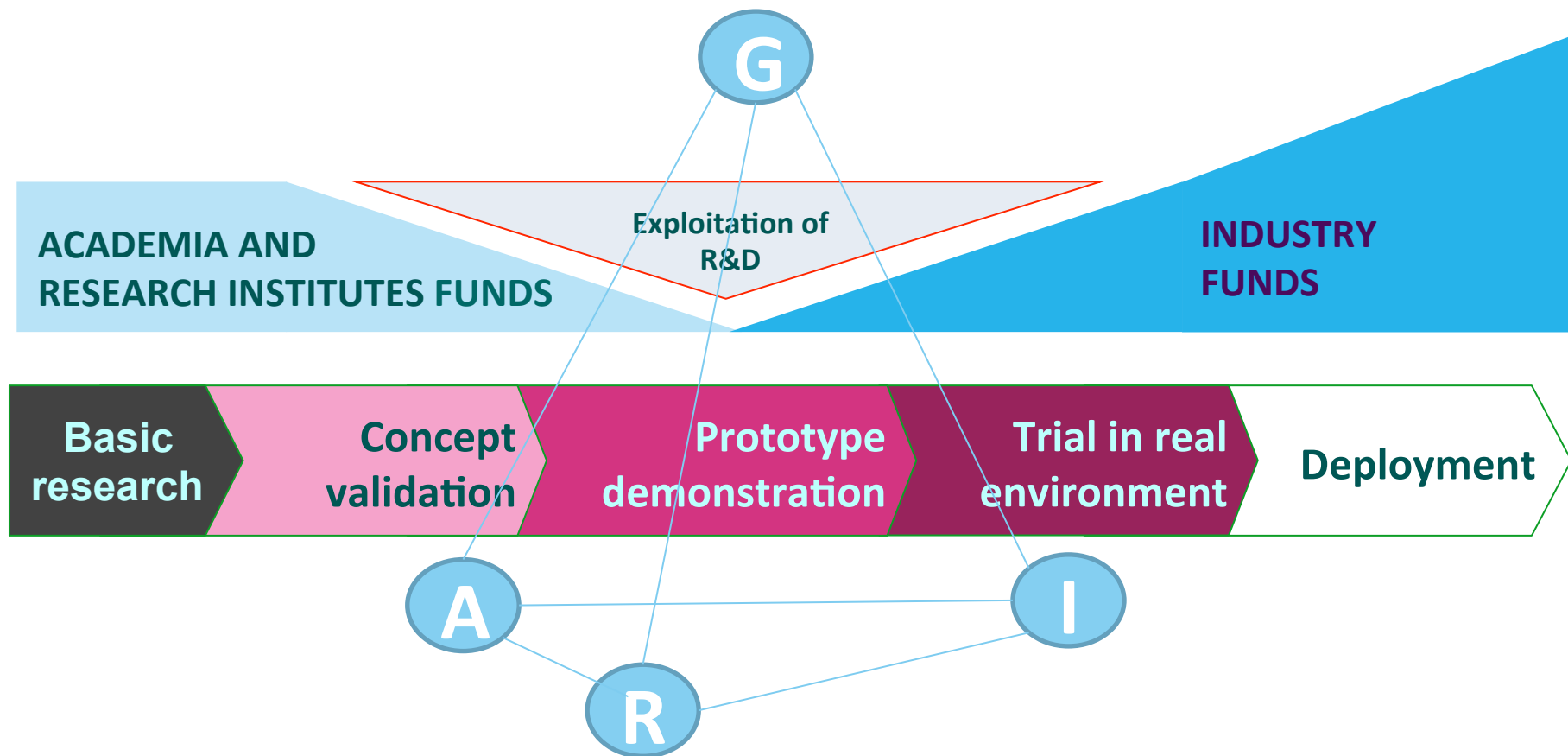
- EIT strengthens innovation in Europe by supporting new talent and new ideas through *Knowledge and Innovation Communities* (KICs).
- EIT brings together the three sides of the “knowledge triangle”: business, education and research.



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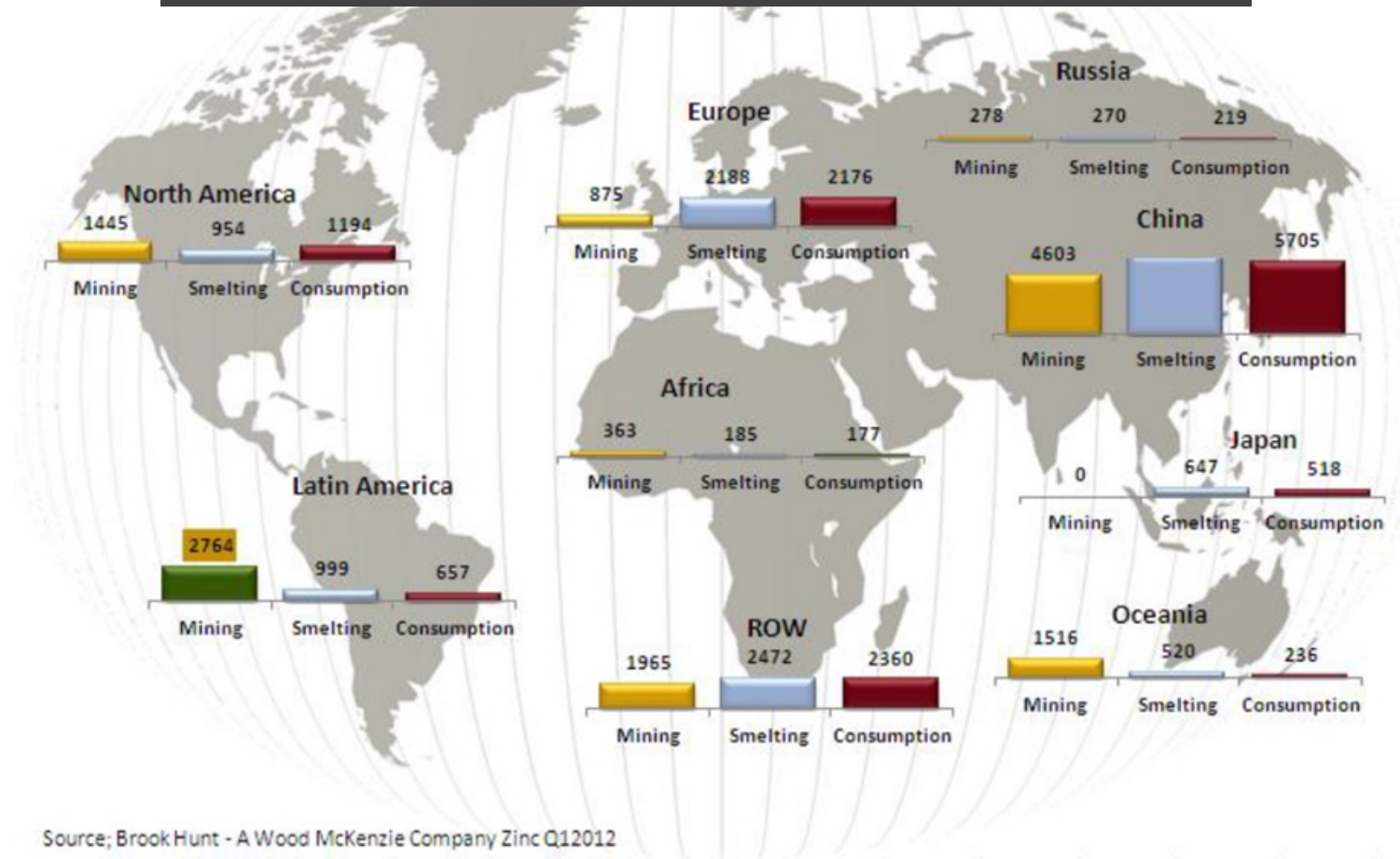


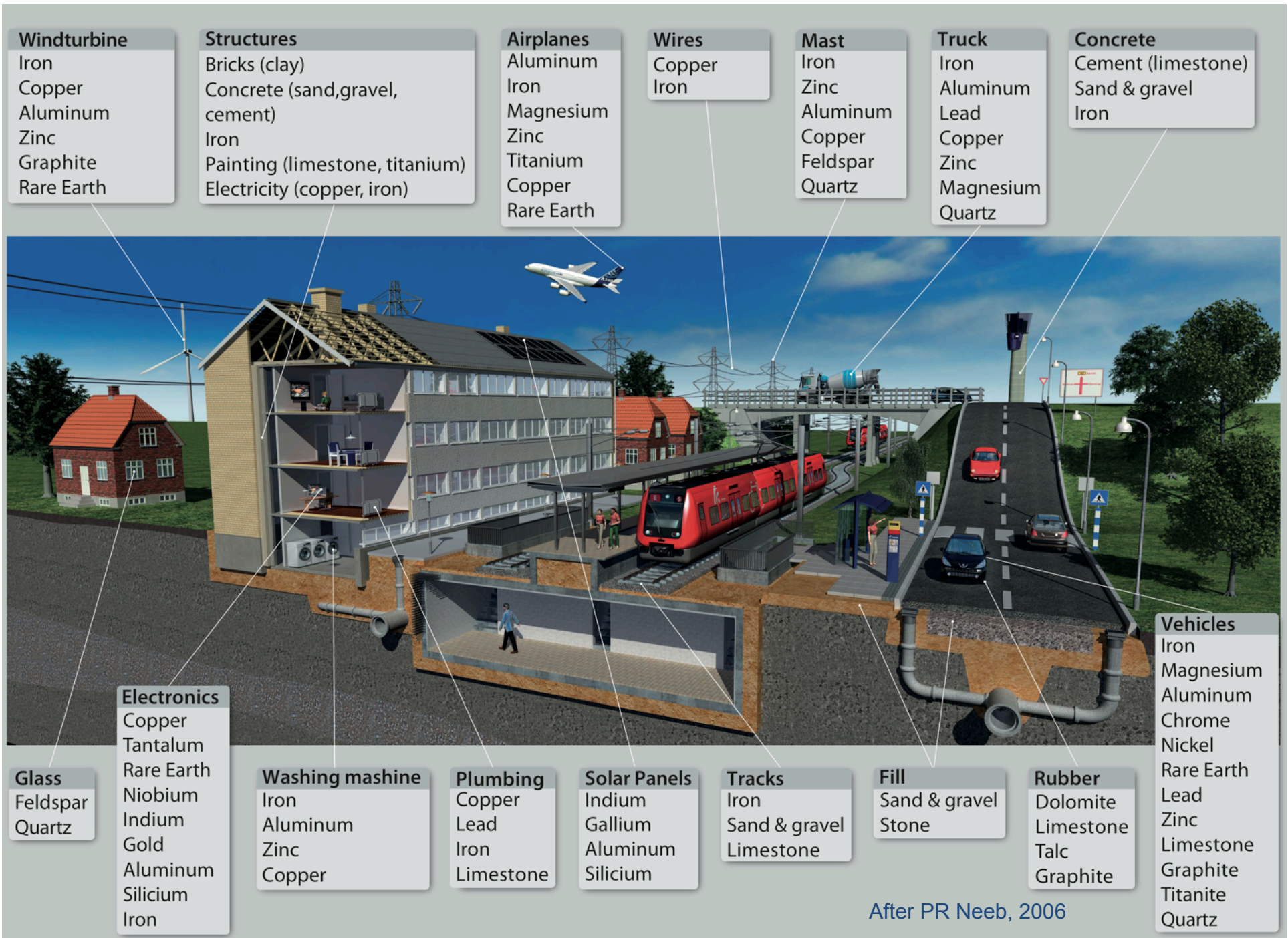
EIT Community



Differences as complementarities

Zinc market as anticipated in 2012 (kmT)

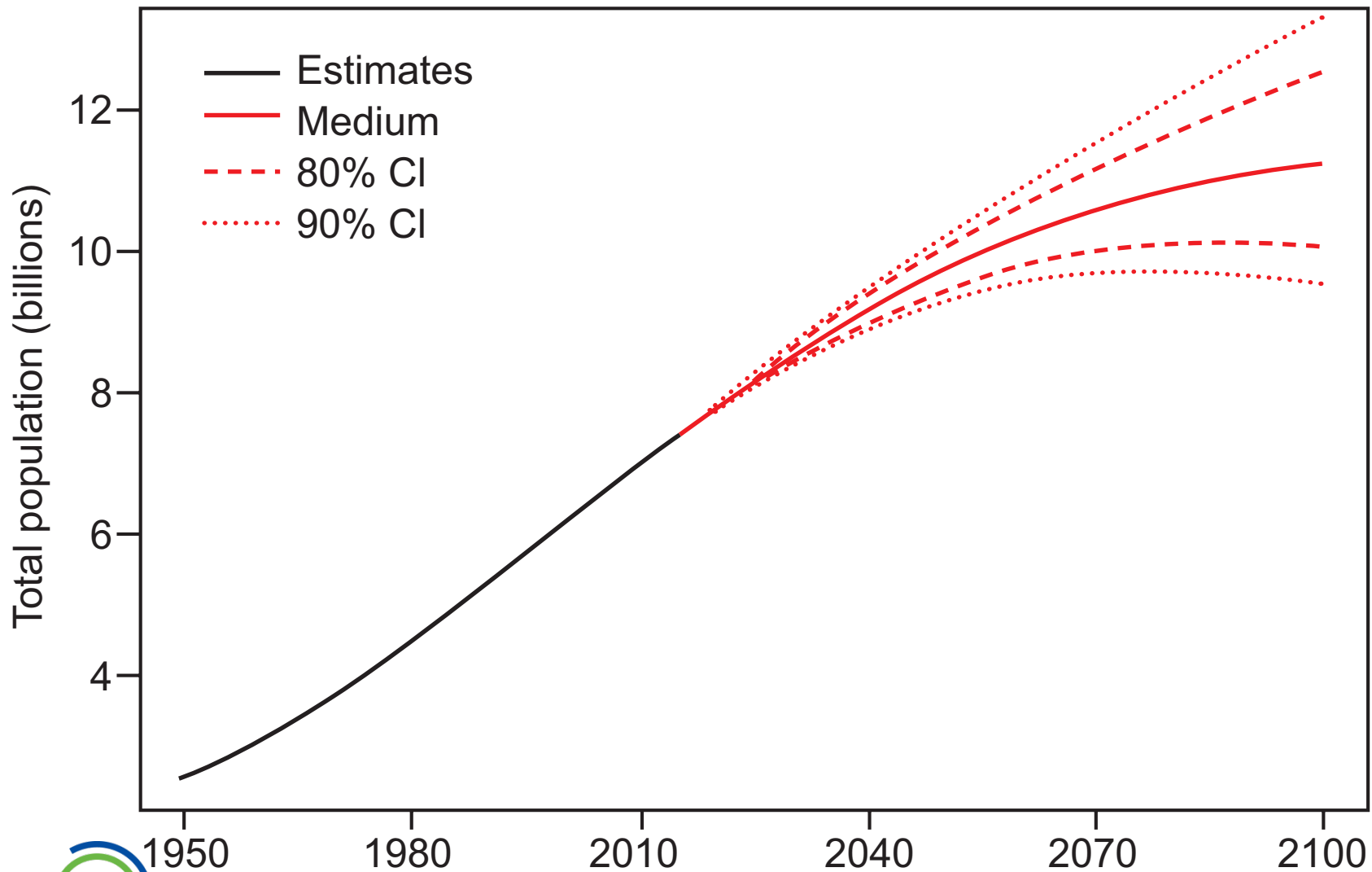




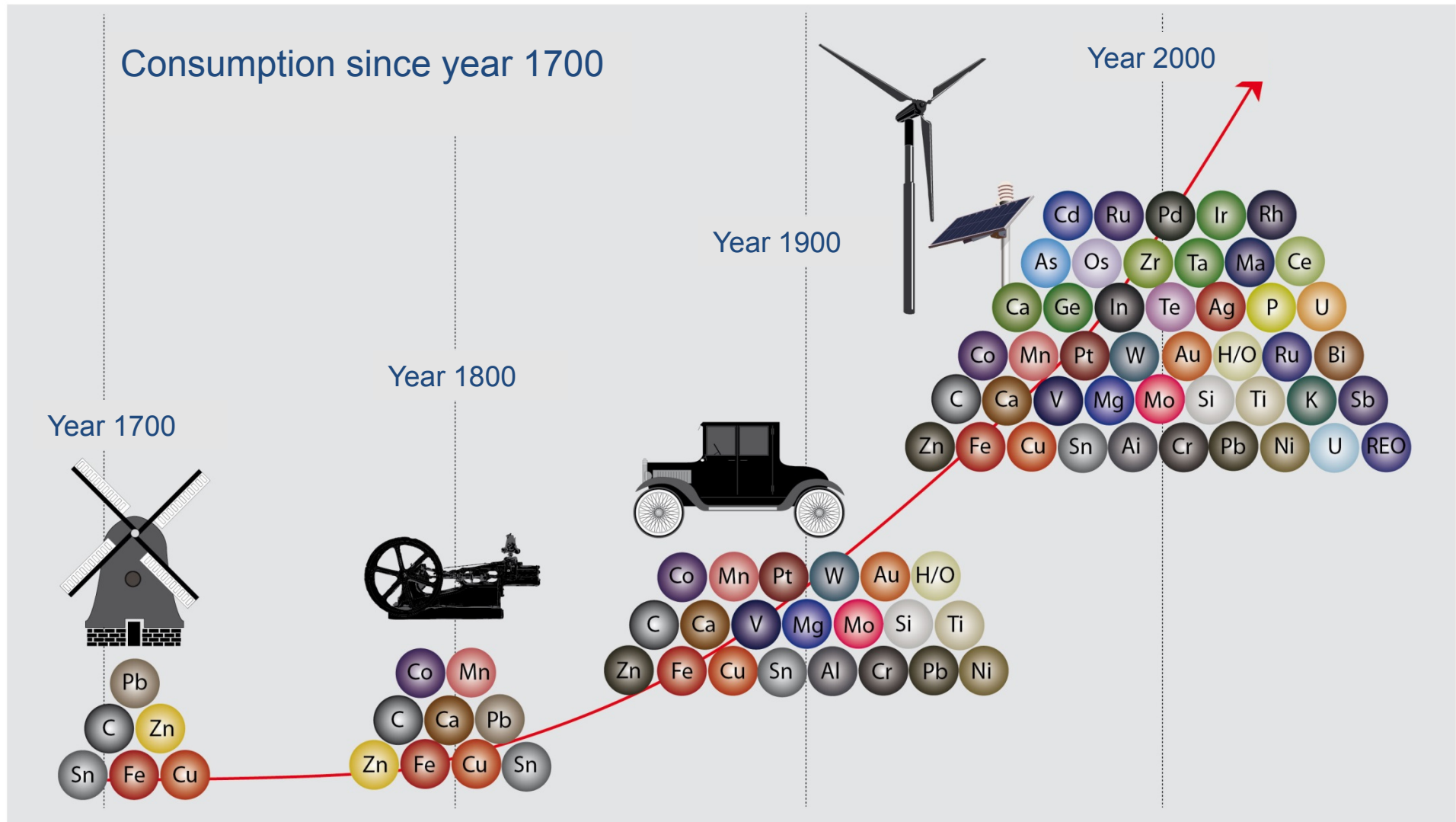
Challenges (Opportunities)

- Increasing population
- Increasing consumption per capita
- Production not paralleled with consumption
- We use more complex technologies, thus consume more different raw materials

World Population

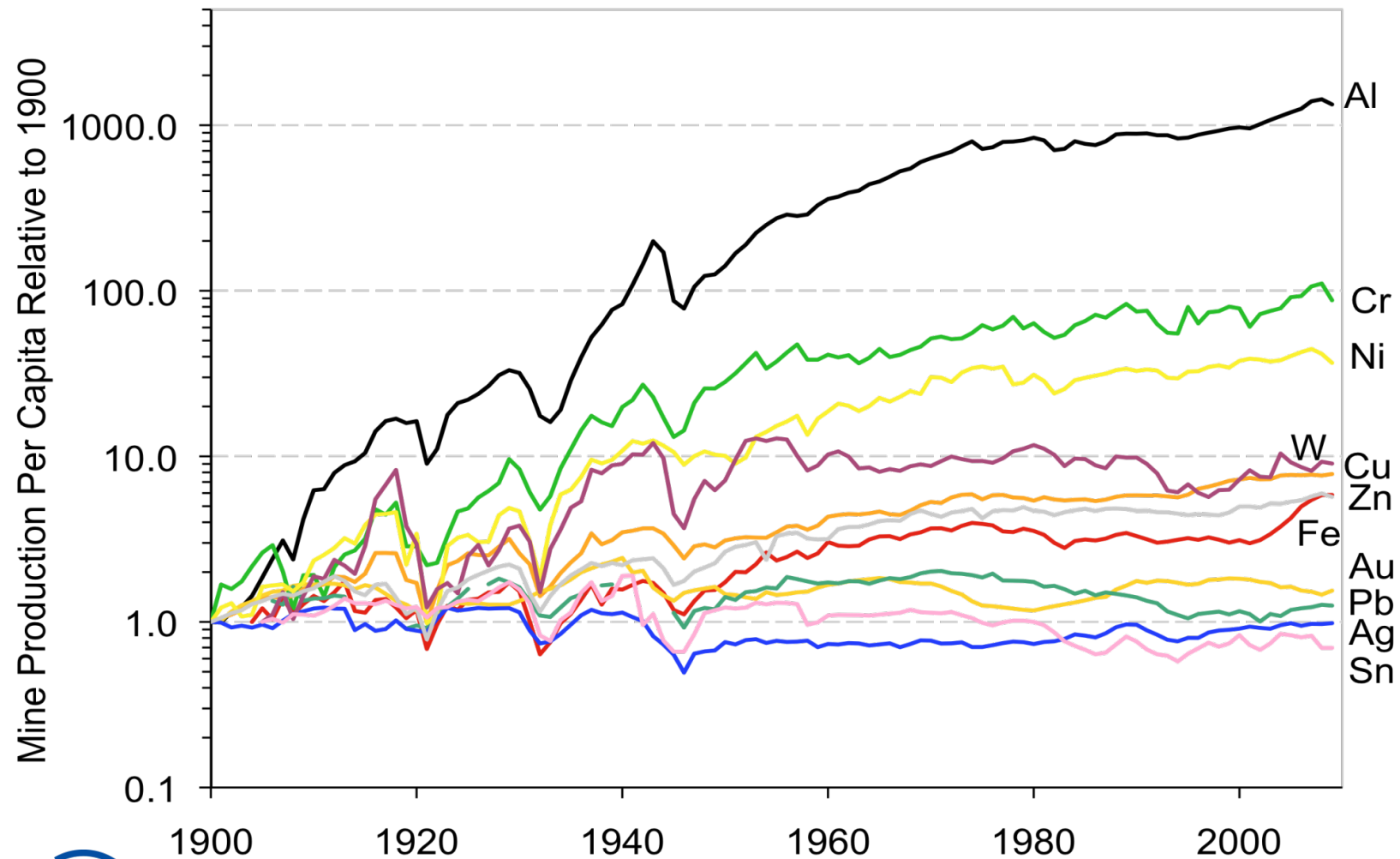


Consumption of mineral raw materials



After Van Schalk and Reuter, 2012.

Global per Capita metals use 1900-2008



EIT RawMaterials

Vision:

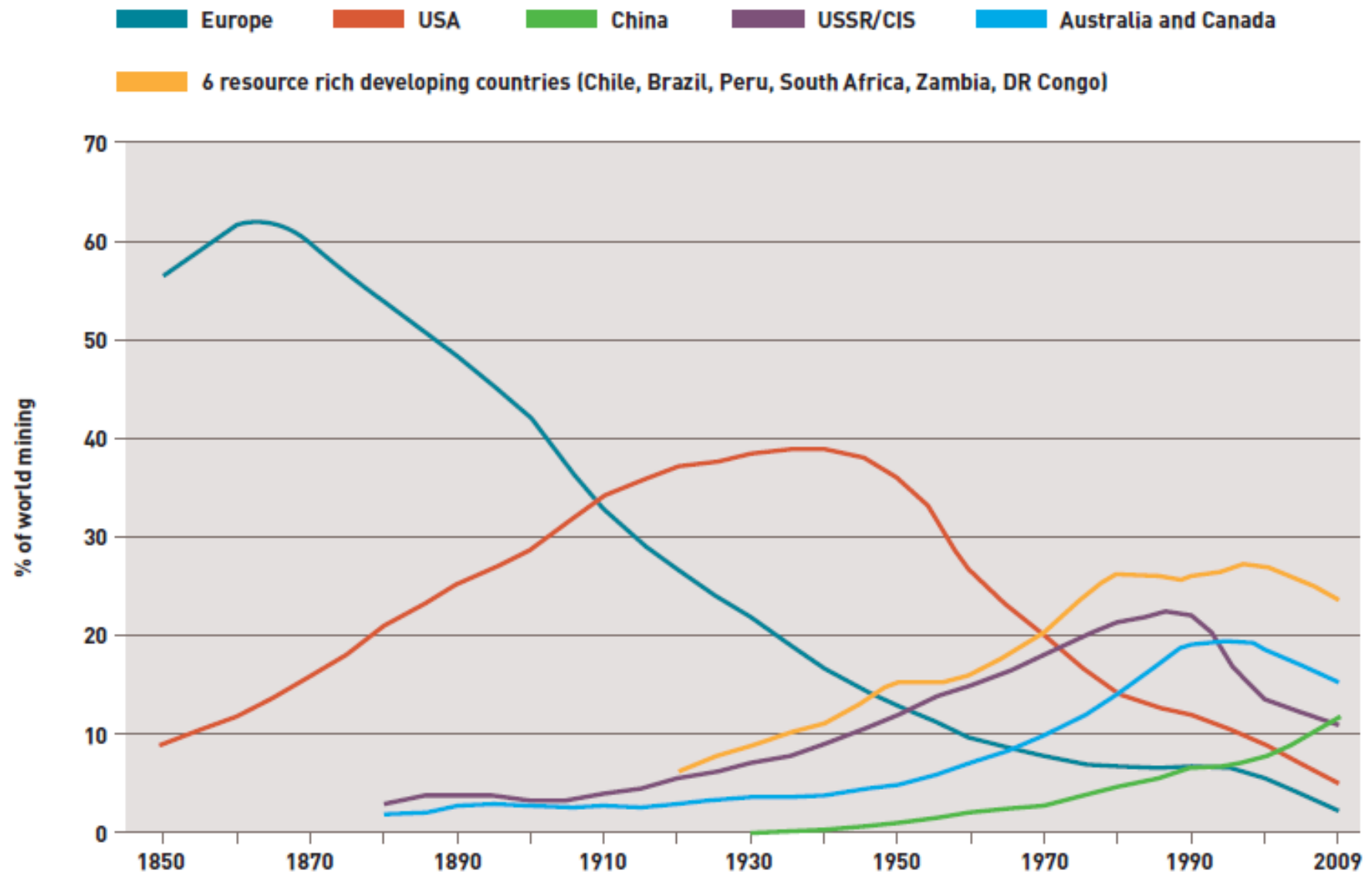
To develop raw materials into a major strength for Europe

Mission:

To boost competitiveness, growth and attractiveness of the European raw materials sector via radical innovation and entrepreneurship.



Mining Regions 1850 - now



Source: Raw Materials Group, Stockholm, Sweden.

Main Mineral Deposits of Europe

ProMine

Scientific coordination

Daniel CASSARD¹ & Guillaume BERTRAND²

<http://www.bram.fr/>



Polynomic Projection, Central Meridian: 10°E, PE = 6, PR = 3, Latitude of origin: 0, DATUM WGS84

Databases, applications and interfaces development

Jean-Michel ANGEL¹, Sébastien AATOS¹, Daniel CASSARD¹,
Paul ELIUP, Ewen PELLETERE¹ & Fernando TORRES¹

Mineral Deposit (MD) database feeding

Nikolaos ARVANITIDIS³, Christophe BAILLY⁴, Guillaume BERTRAND², Marie HELLA⁵,
Christophe CHRISTIDIS⁶, Dimitris DIMITROV⁷, Paul ELIUP, Auguste FILIPE⁸,
Erik GILGARD⁹, Armin GÜNTHER¹⁰, Ewen GILBERT¹¹, Dimitris KIOPOULOS¹²,
Carla INVERNIZZI¹³, Sanna KARINEN¹⁴, Pami LINTINEN¹⁵, Tero MÄKÄ¹⁶,
Sanna MANNISTO¹⁷, Jukka MÄNTY¹⁸, Christophe MICHEL¹⁹,
Venketa MIJENOVIC²⁰, Jevon NUNAN²¹, Hans-Joachim NIEDELMANN²², Ewen PELLETERE²³,
George PERANTONIS²⁴, Jean-Claude PICOT²⁵, Jukka PIRILÄ²⁶, Helena SANTAMÄKI²⁷,
Todor SERAFIMOVSKI²⁸, Maria STROJEVIC²⁹, George TADEU³⁰,
Fernando TORRES³¹ & George TUDOR³²

Antipogonite Concentration (AC) database feeding

Sébastien AATOS¹, Venketa MIJENOVIC²⁰, Nikolaos ARVANITIDIS³,
Armin GÜNTHER¹⁰, Marie HELLA⁵, Guillaume BERTRAND²,
Christophe CHRISTIDIS⁶, Alexander DEMETRIADIS³³, Dimitris DIMITROV⁷,
Auguste FILIPE⁸, Philippe GENTILE³⁴, Christophe JOANNES³⁵,
Todor KALINOVSKI³⁶, Christophe MICHEL¹⁹, Venketa MIJENOVIC²⁰,
Jevon NUNAN²¹, Francis RALAY³⁷, Ignace SAUTERLUS³⁸, Helena SANTAMÄKI²⁷,
Todor SERAFIMOVSKI²⁸, George TADEU³⁰ & George TUDOR³²

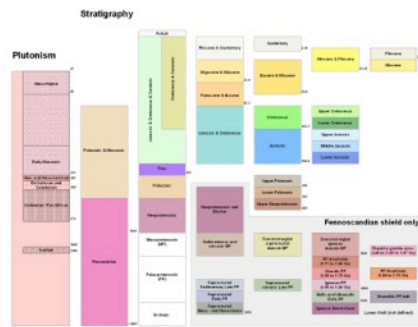
ProMine portal development

Ewa KALINOVSKAYA³⁹, Hans MELANI⁴⁰,
Jean-Jacques SERFANTY⁴¹ & Anne STENGEL⁴²

GIS management

Fabrice MALDAN⁴³

1. Bureau de Recherches Géologiques et Minières (BRGM), France
2. Geological Survey of Finland (GTK), Finland
3. Institute of Geology and Mining, University of Athens (IGMA), Greece
4. Institute of Geology and Mining, University of Athens (IGMA), Greece
5. Hellenic Gold S.A., Greece
6. Bulgarian Academy of Sciences, Bulgaria
7. Laboratoire National de Recherche en Géologie (LNRG), Portugal
8. Portuguese Mineral Resources Agency (AGN), Portugal
9. Institute of Geology, Bulgaria
10. Institute of Geology, Bulgaria
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Specific lithologies

Structural features

Main commodity

- Aluminum
- Antimony
- Barium
- Bismuth
- Chromium
- Cobalt
- Copper
- Diamond
- Fluorite
- Germanium
- Gold
- Iron
- Lithium
- Lead
- Nickel
- Mercury
- Molybdenum
- Phosphate
- PGS Platinum Group Elements
- Potash
- Silver
- Tantalum
- Tin
- Titanium
- Vanadium
- Zinc
- Zirconium

Deposit size

- Class A
- Class B
- Class C

0 500 1000
© ProMine, 2012 v2.0

The Supply Chain for Mineral Raw Materials



EXPLORATION AND
RESOURCES



MINING



TRANSPORT



SMELTING



PRODUCTION



URBAN MINING

The Supply Chain for Mineral Raw Materials



EXPLORATION AND
RESOURCES



MINING



TRANSPORT



SMELTNING



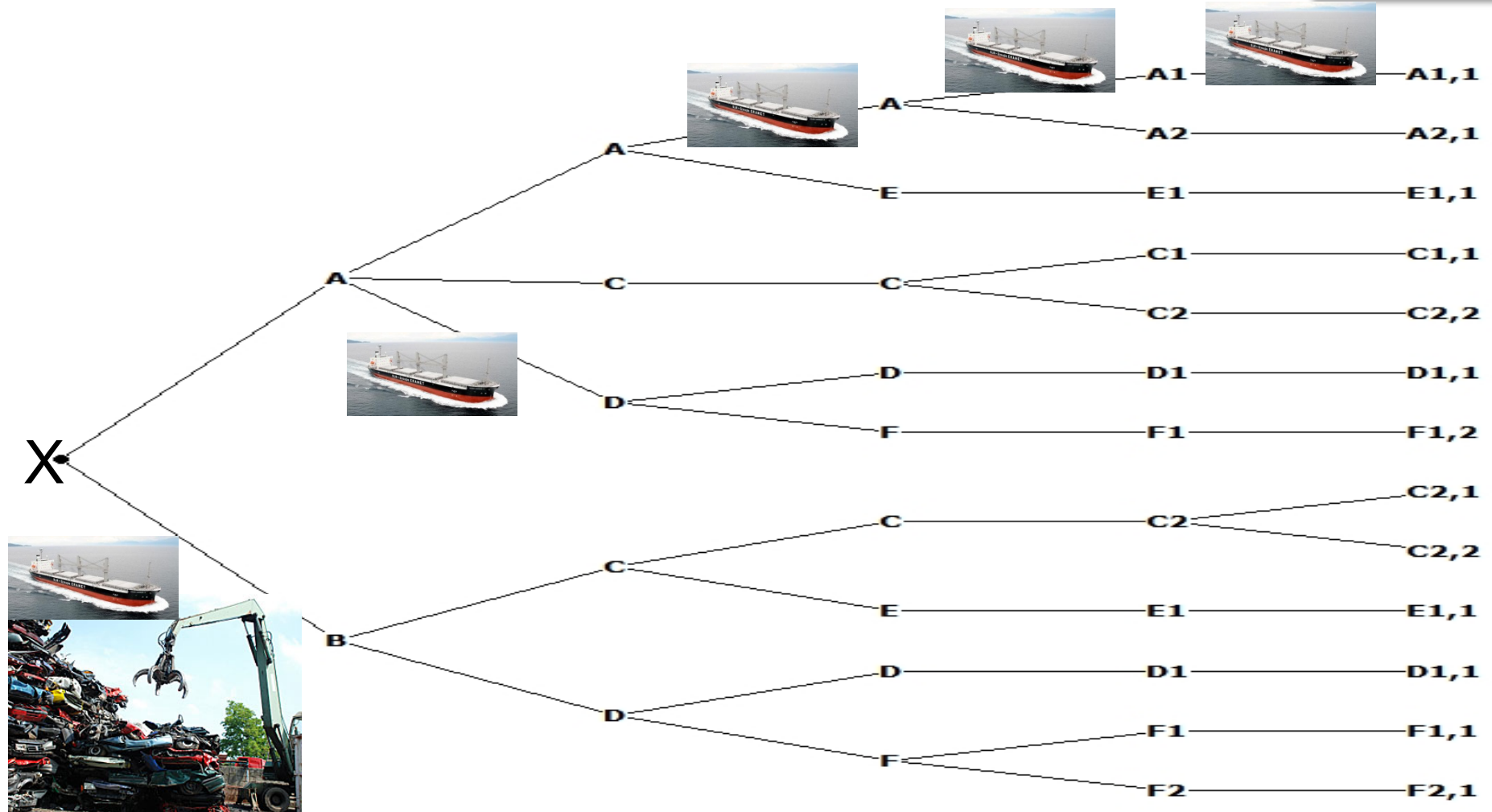
End-use
markets

PRO

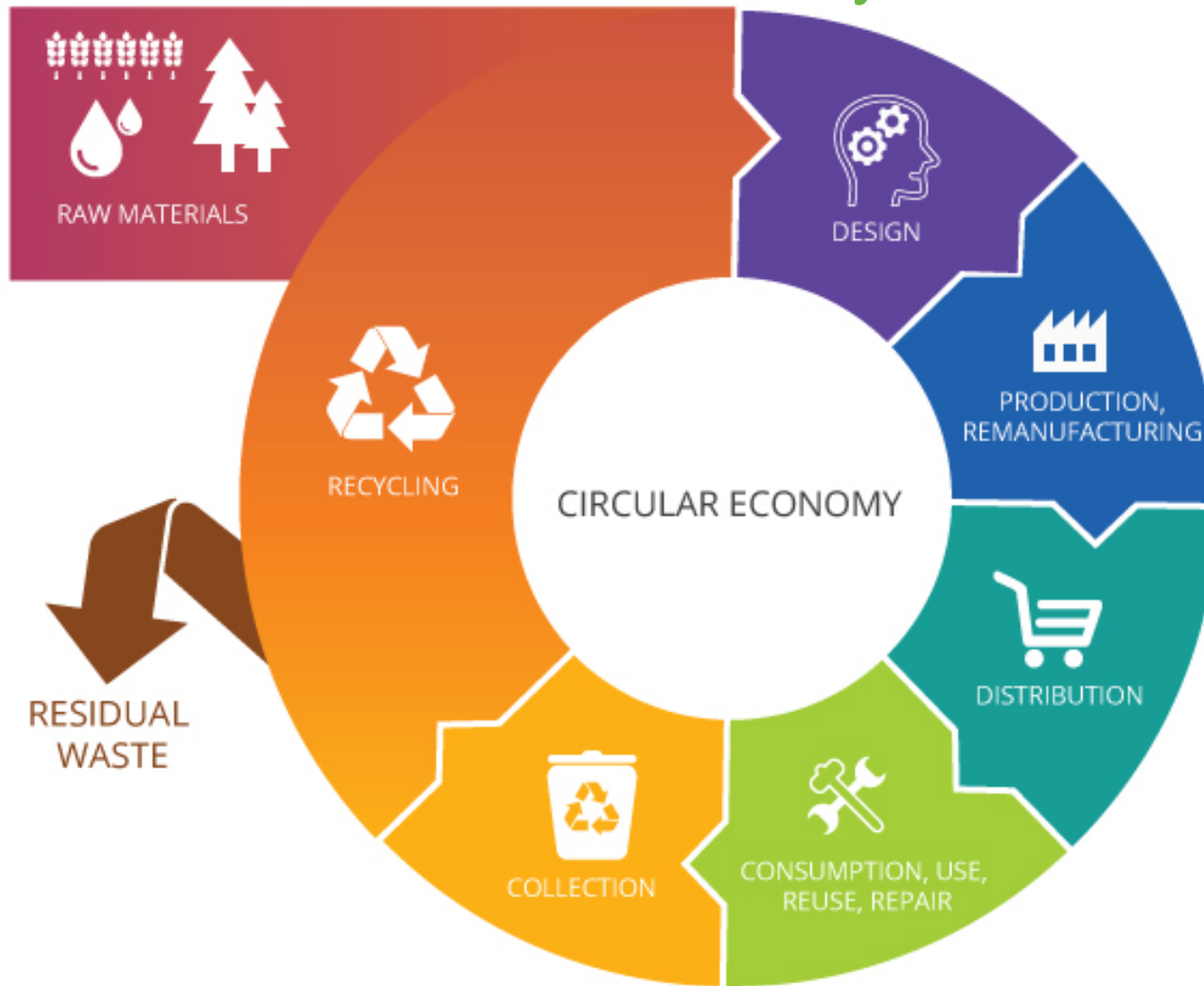


MINING

Supply Chain



Circular economy



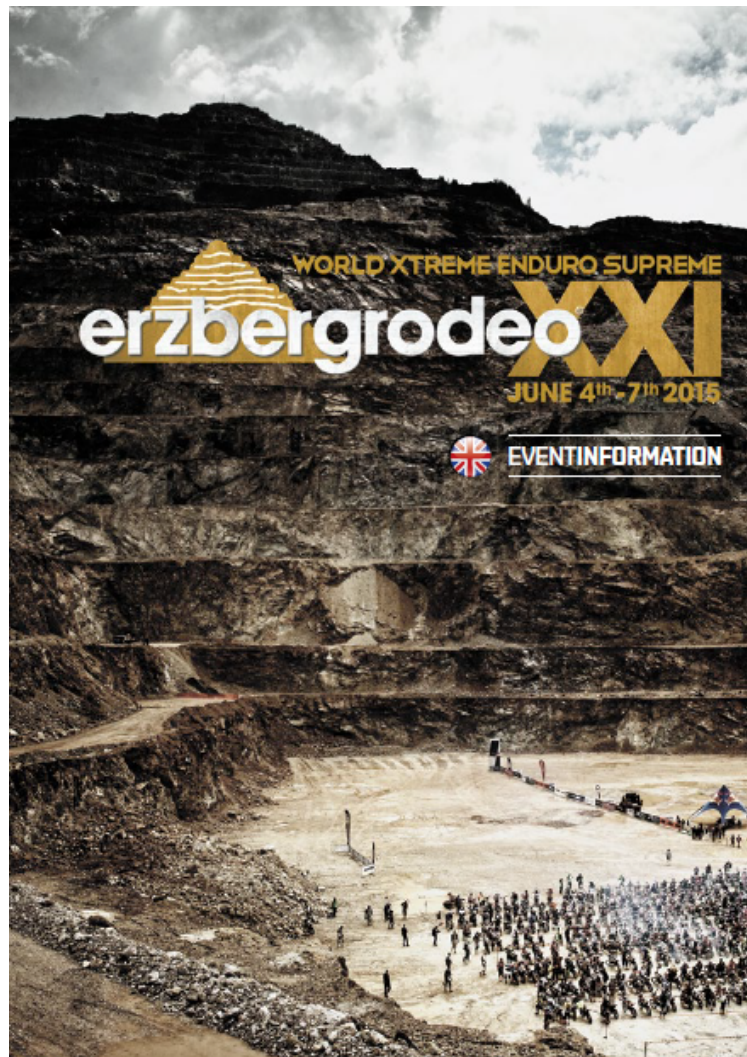
Caso de buenas prácticas en recursos primarios



Caso de buenas prácticas en recursos secundarios



Caso de Europa: Economía circular implica apoyar un amplio rango de actividades.



EIT RawMaterials



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EIT Raw Materials Themes

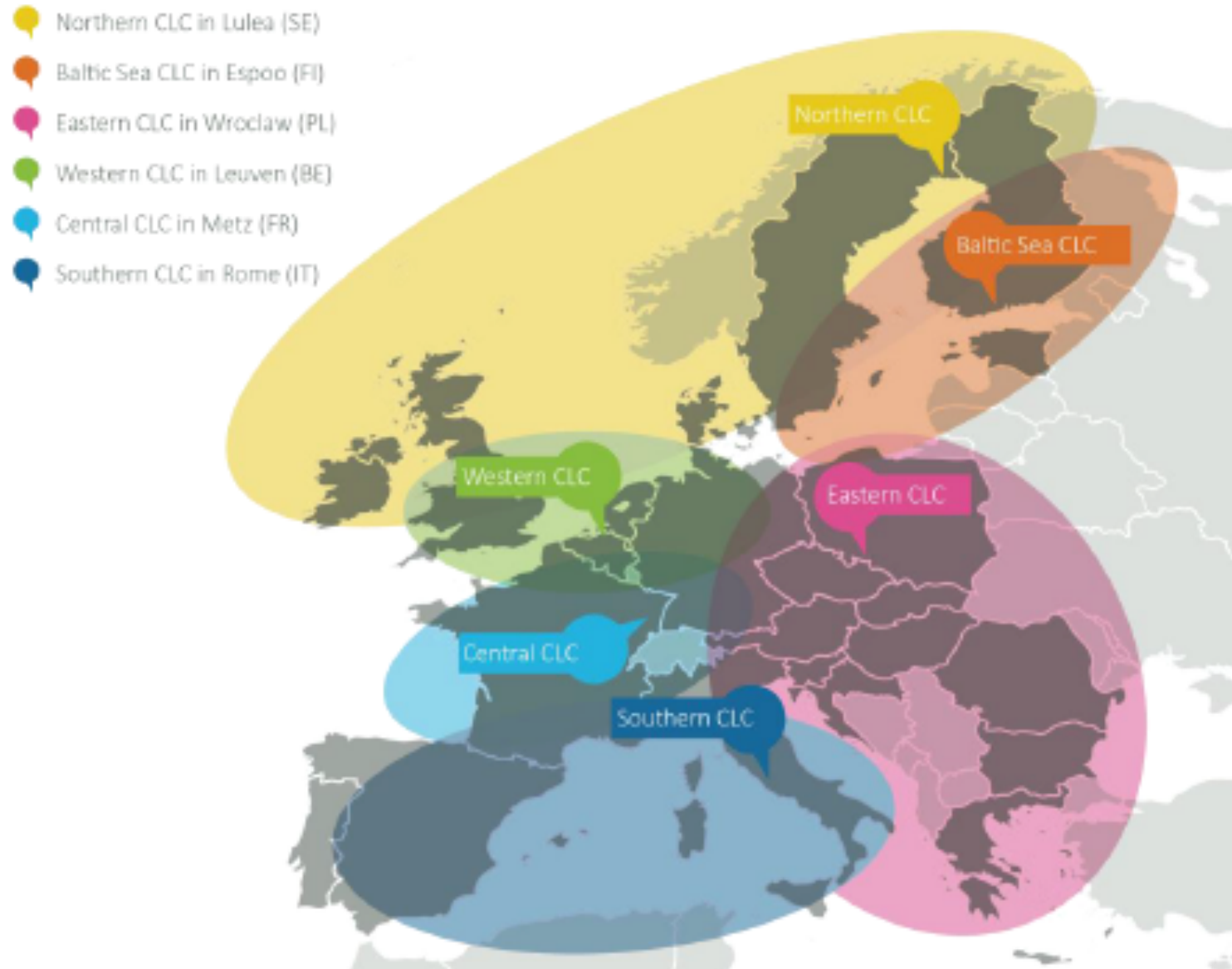
- Exploration and raw materials resource assessment
- Mining in challenging environments
- Increased resource efficiency in mineral and metallurgical processes
- Recycling and materials chain optimisation for End-of-Life products
- Substitution of critical and toxic materials in products and substitutions for optimised performance
- Design of products and services for the circular economy

EIT RawMaterials Activities

- Matchmaking & Networking
- Validation & Acceleration
- Learning & Education
- Business Creation & Support

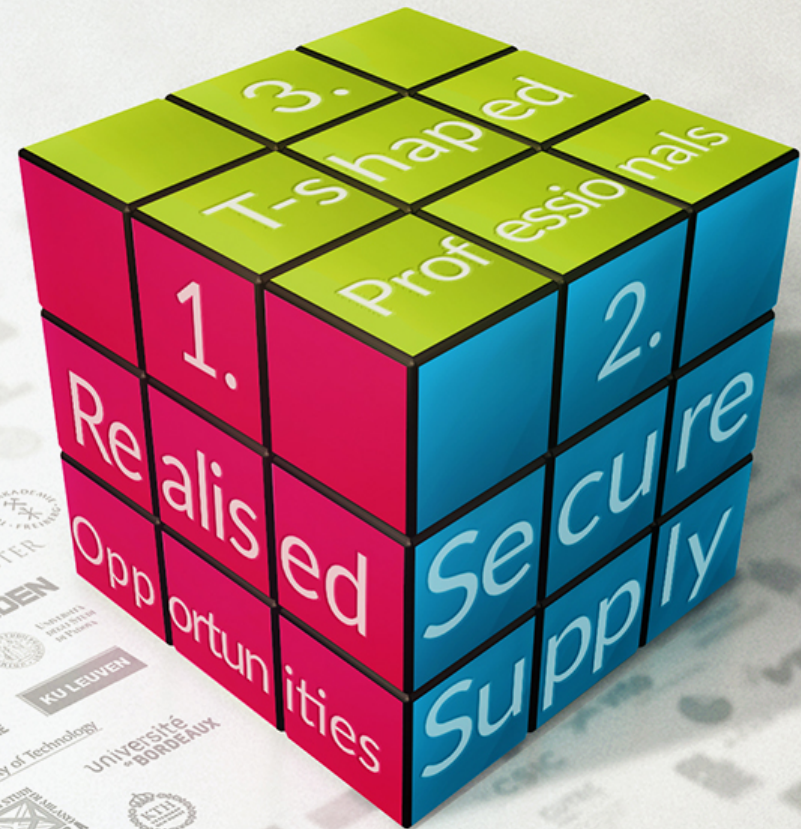


EIT Raw Materials Co-Location Centers



International Collaboration Activities

- MSc and PhD Programmes
- Seminars/Conferences/Brokerage events
- Knowledge databases
- Innovation projects
- Wide society outreach & learning

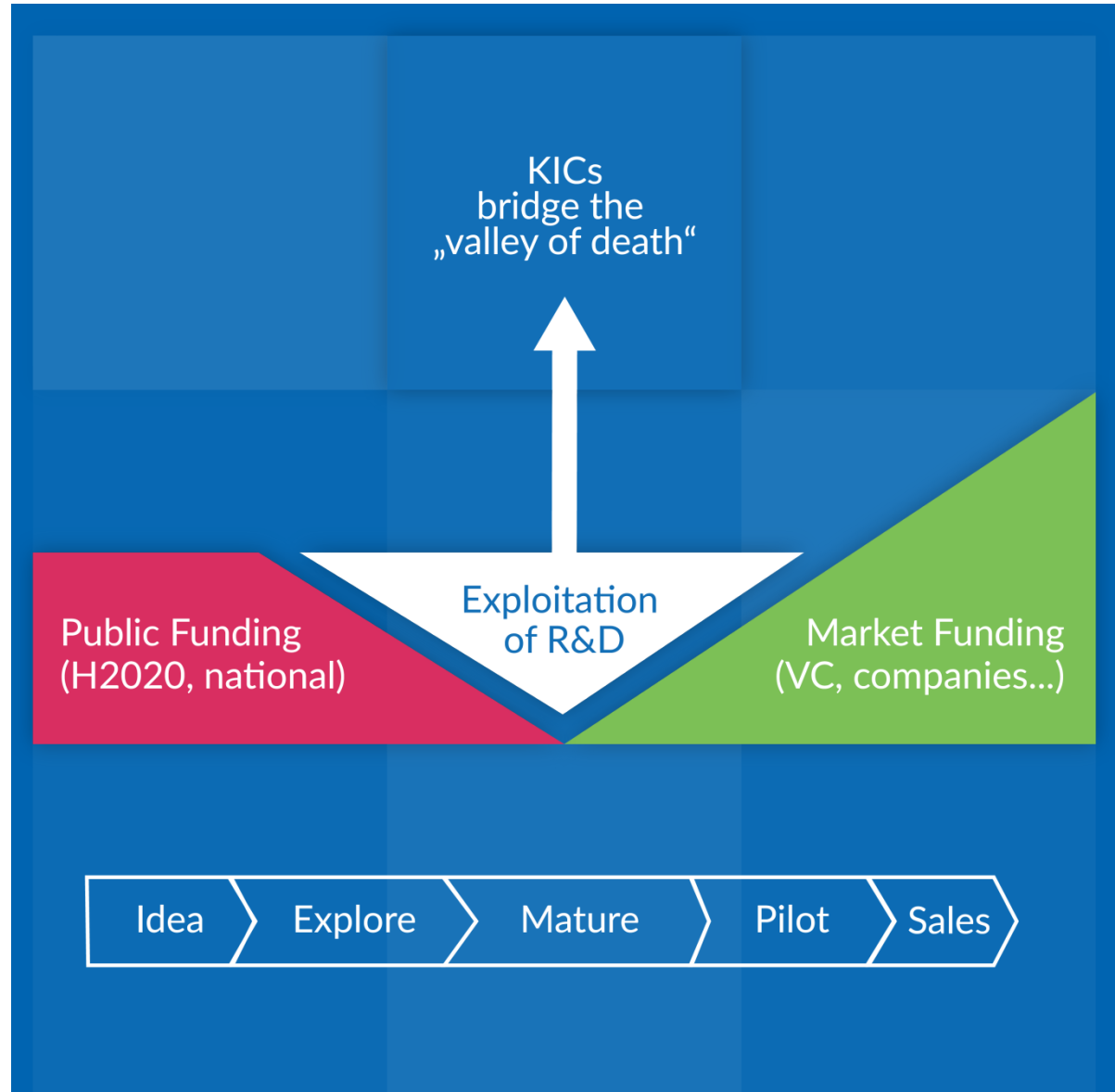


Predictions

- A strong move towards recycling and circularity
- Mining will not disappear
- The need for raw materials will not disappear
- Technology will matter more than ever
- Understanding value chains is important

What is the purpose?

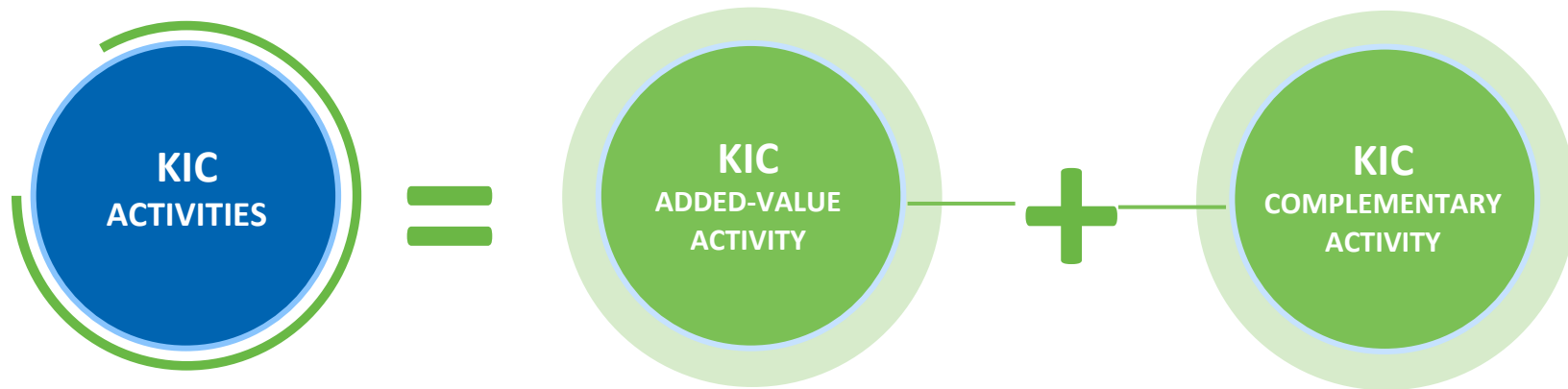
- Bridging the valley of death
- Market introduction of products and processes
- Educate entrepreneurs



Partnerships

	Core Partner	Associate Partner	Task Partner	Support Partner
Governance & Operations	In GA, elects the Board	One common representative in GA	No	No
• KIC Level decisions				
• CLC Level decisions	In CLC steering Group	In CLC steering Group	No	No
Number of annual activities/ Leading a KAVA	Unlimited / Yes	Unlimited / Yes	Dedicated events and activities/ No	Dedicated events and activities/ No
Annual KIC funding ceiling	None	EUR 300.000	EUR 100.000	No funding
Annual Cash contribution	EUR 100.000	EUR 30.000	None	None
Annual KCA contribution	EUR 900.000	EUR 300.000		

KIC Activities



KIC

KAVA

KCA

EIT RawMaterials Focus Markets

... Solutions for
Raw Materials



Mobility

Machinery & Equipment

Energy Supply

ICT

Designing
Solutions

Closing
Material
Loops

Securing
Raw Materials
Supply

Mobility

Machinery & Equipment

Energy Supply

ICT

Raw Materials
Solutions for...



Mineral Raw Material Exploration Globally

Map 1: Top Destinations for Nonferrous Exploration, 2014

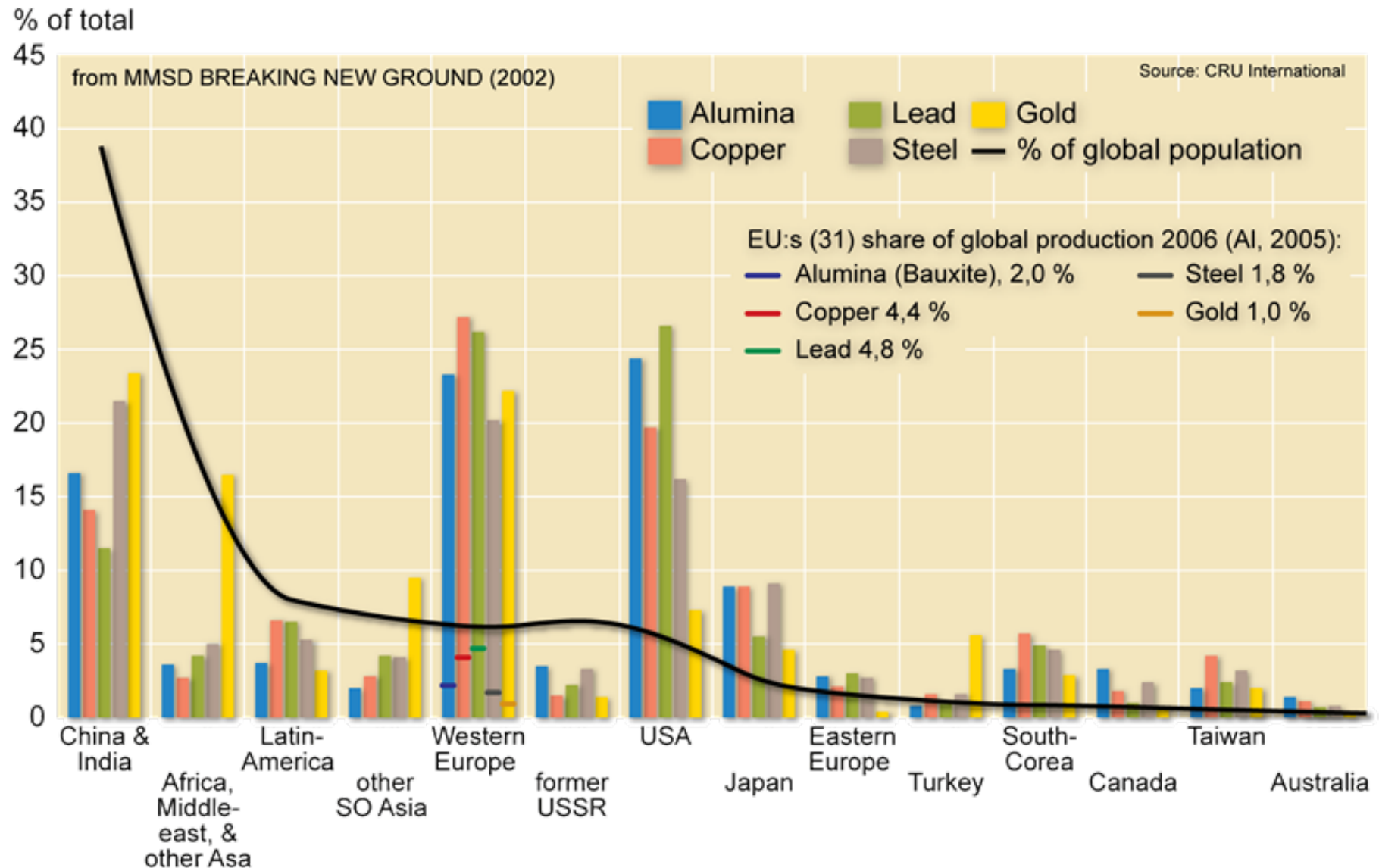


2013: 14.43 billion USD, Europe : 452 M USD, Nordic 180 M USD

2014: 10.74 billion USD, Europe : 386 M USD, Nordic 154 M USD

Mineral Raw Material Consumption Globally

Consumption of metals compared to population for regions and selected countries 2000



Mineral Raw Materials Globally

Mineral production value and mineral contribution to exports for important extraction countries in the developing world

