



Initiatives on critical raw materials

Renzo Tomellini

Head of Unit «Materials»

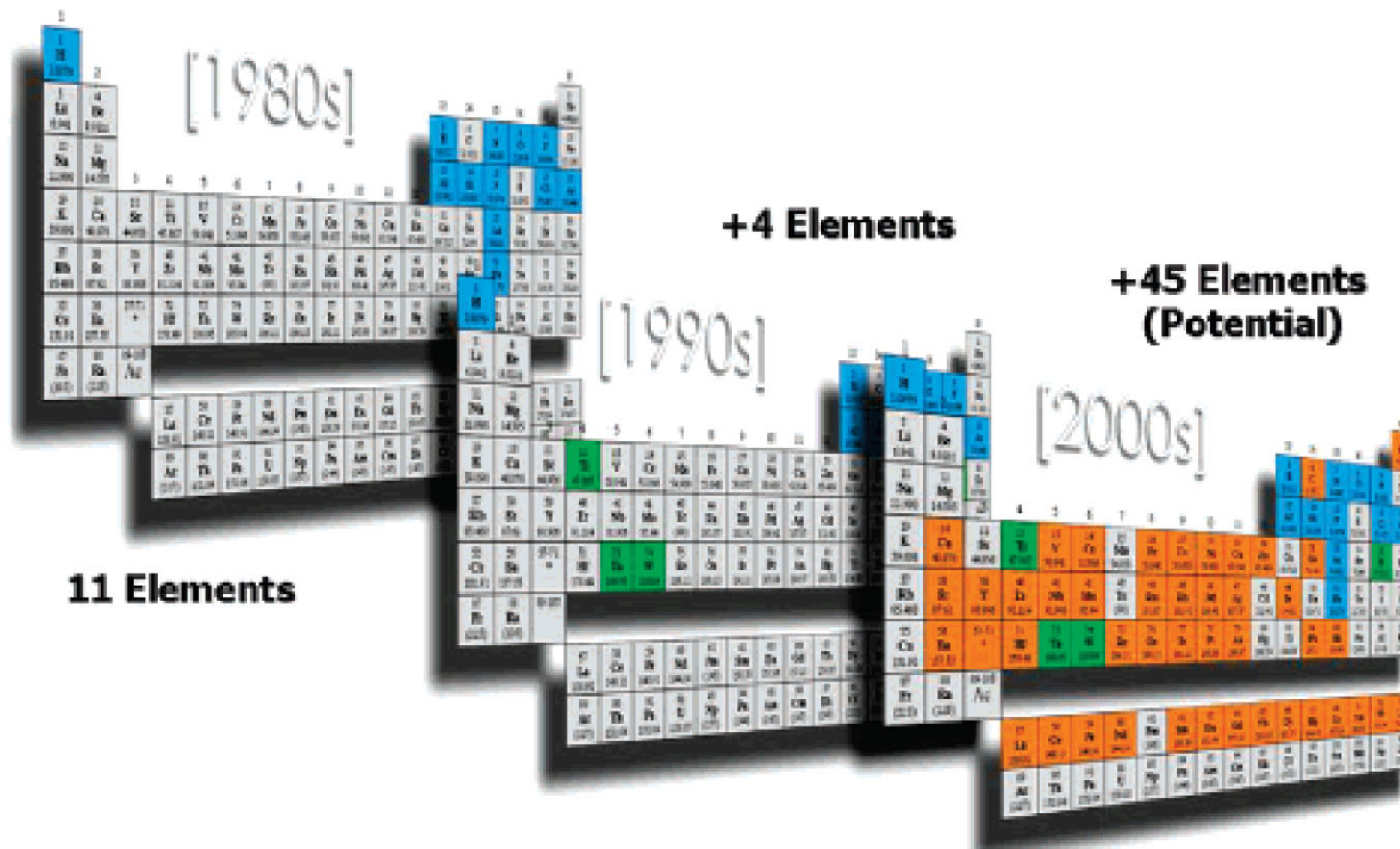
European Commission, DG Research and Innovation

CRM_Innonet

**1st Strategic Workshop and Network Launch Event,
Brussels, 15 April 2013**

Please note that this presentation is illustrative and it is not legally binding. It does not represent any commitment on behalf of the European Commission. It might have become obsolete. Please refer to official documents: http://ec.europa.eu/index_en.htm

Use of elements in a circuit board





Transition towards a new “socio-ecological” production and consumption model

Tension between rapidly growing demand and restricted supplies due to the resources available or their polluting nature should cause a constant rise in prices that could be contained by an increased use of renewable resources as well as progress in the reduction of the consumption of the resource.

Europe's use of external resources



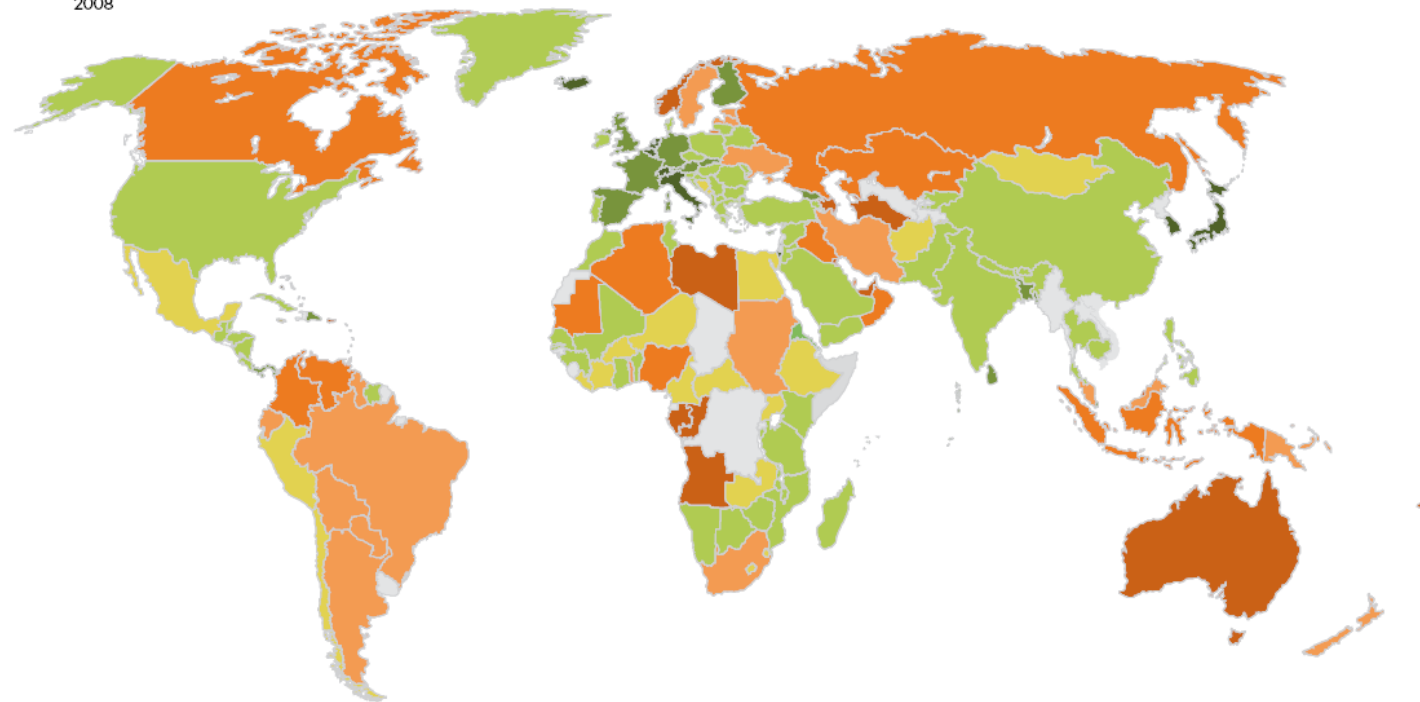
- **Europe's demand for resources reaching far beyond its borders**
- **Demand for materials is so intense that between 20 and 30 % of the resources we use in Europe are now imported.**
- **"With growing demands on the world's limited stock of resources, it is imperative that Europe makes more efficient use of both virgin materials and waste."**

EEA Executive Director Jacqueline McGlade

Import Export Balance



2008



Net-exporting countries

% of extraction which is net-exported

3-14%

15-29%

>30%

Net-importing countries

% of consumption which is net-imported

3-14%

15-29%

>30%

Balanced trade: +/- 2% of extraction/consumption is net-traded

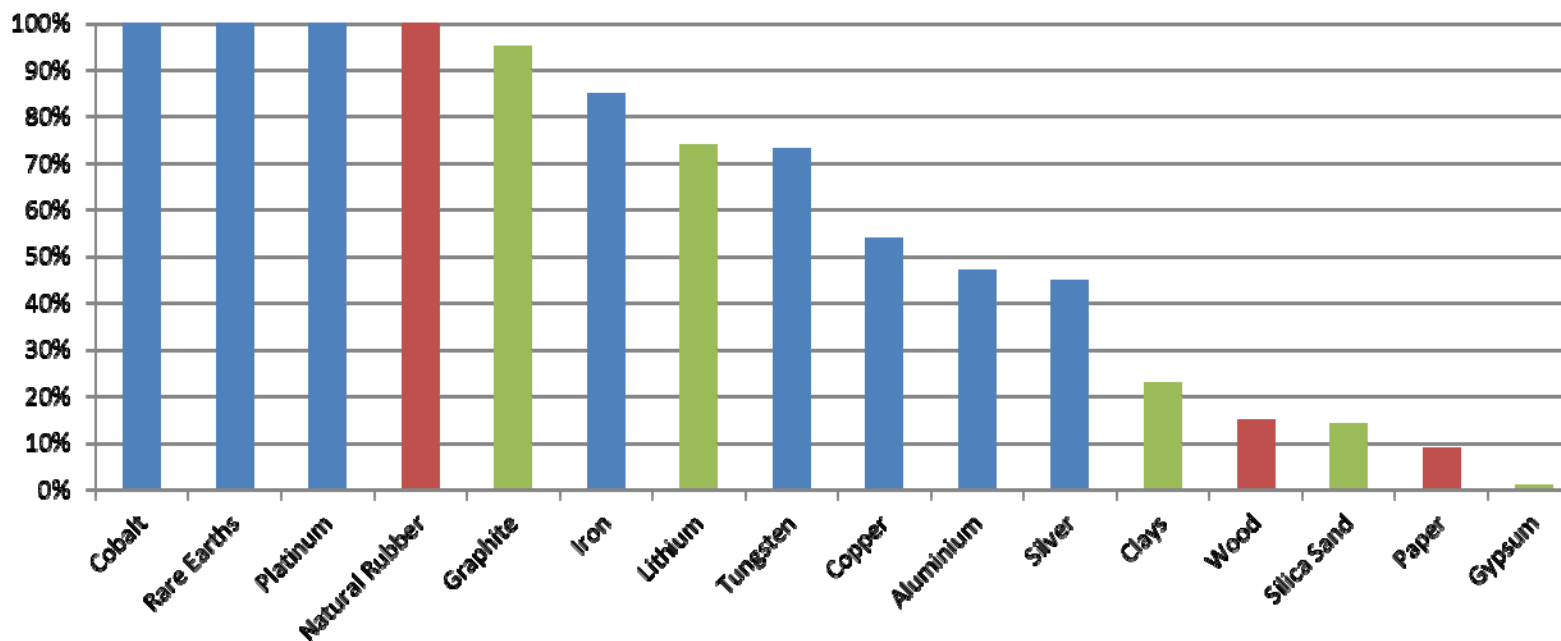


Data not available in acceptable quality



Monika Dittrich, Stefan Giljum, Stephan Lutter, Christine Polzin: Green economies around the world ? Implications of resource use for development and the environment. Vienna. 2012.

EU Import Dependency of Raw Materials

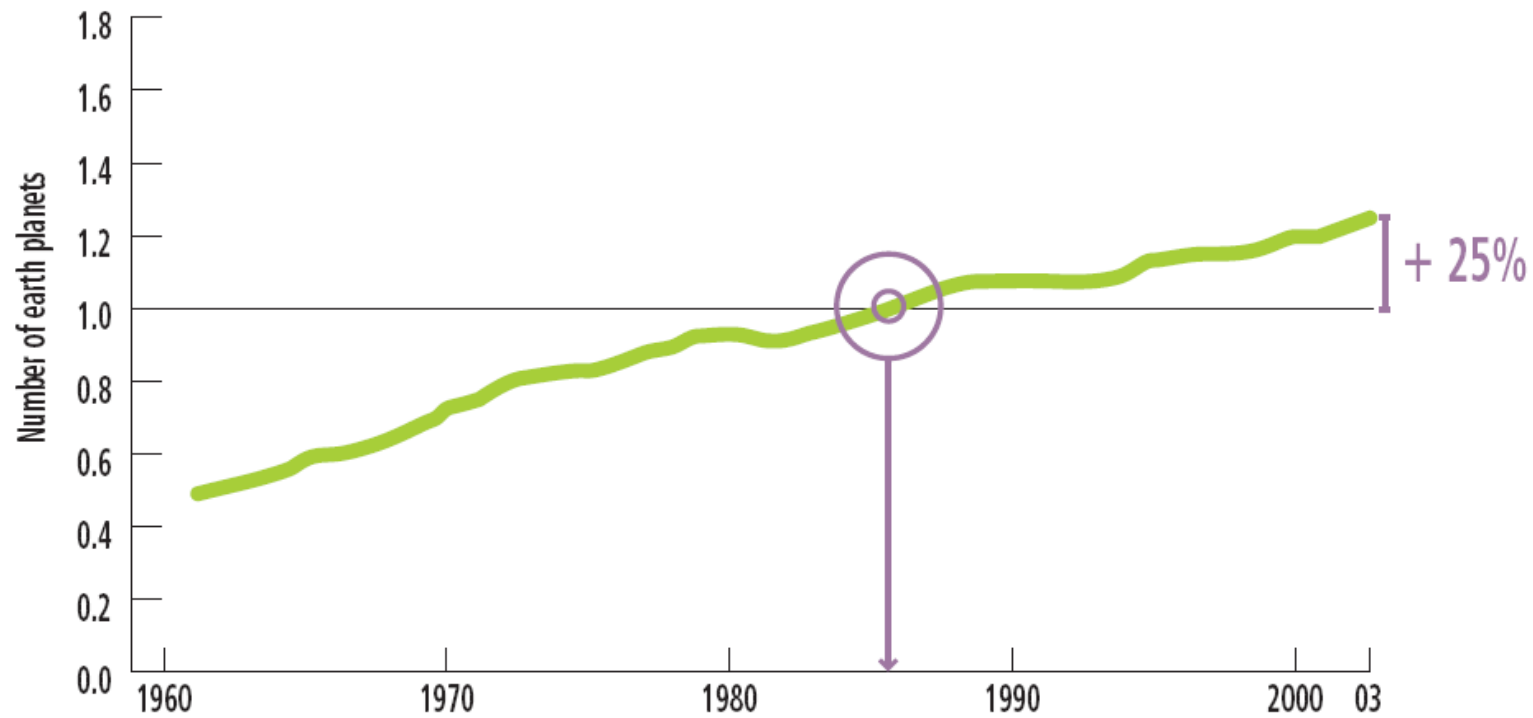


Raw Material	Import Dependency	Raw Material	Import Dependency
Natural Rubber	100%	Bulk Metals	57%
High-Tech Metals	96%	Industrial Minerals	46%
Iron Ore	85%	Wood	15%
Critical Raw Materials	77%	Paper	9%

We only have one planet

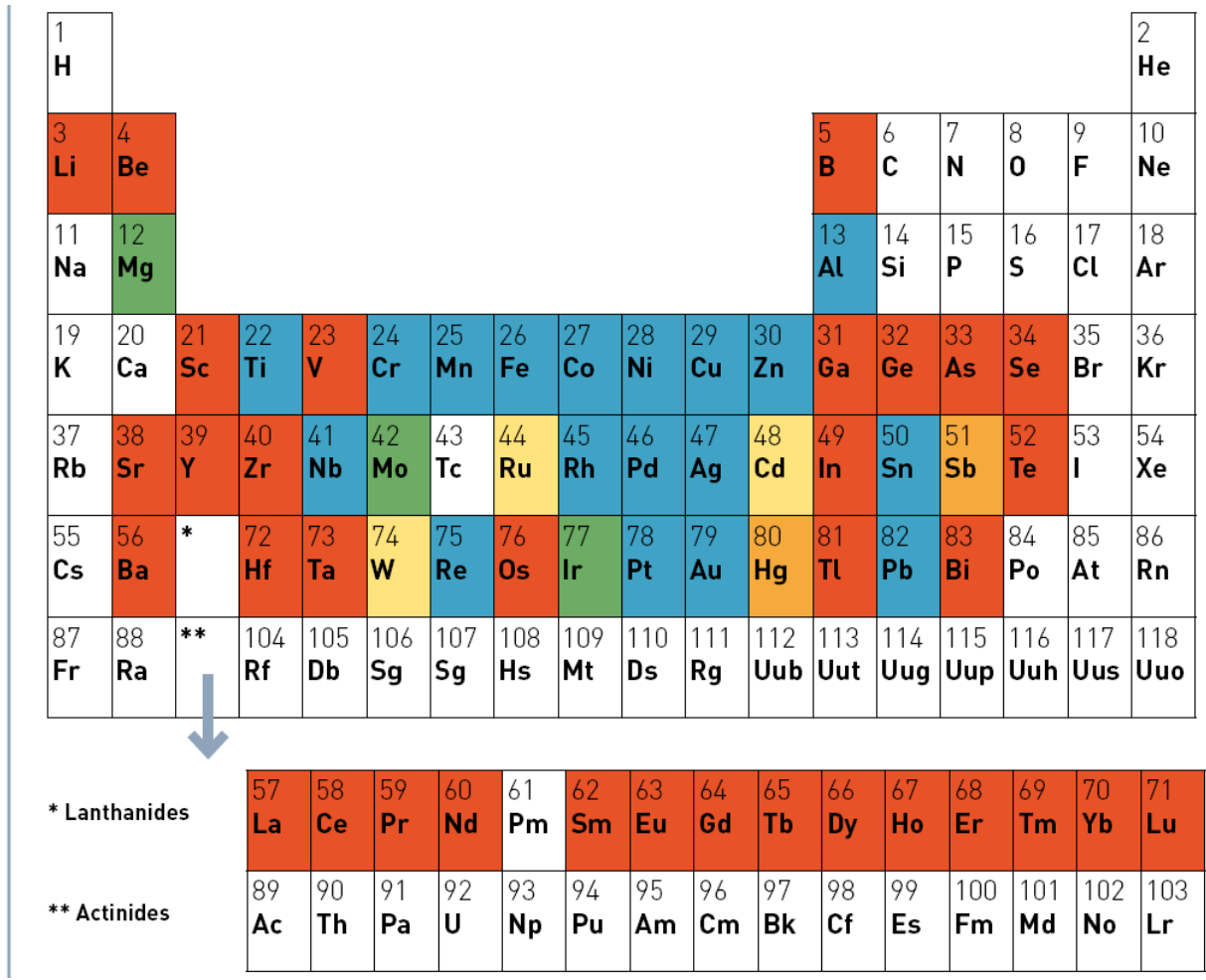


Ecological footprint of the humanity



Geoffroy De Schutter, WWF, 2009

End of life recycling rates



The policy context

A matter of survival in a globalised world



- **Innovation Union**
- **European Raw Materials Initiative**
- **European Innovation Partnership on Raw Materials**
- **Transition from FP7 to Horizon 2020**











Innovation Union

Innovation Union






European Commission

2012 Progress on commitments

 Put in place national strategies to train enough researchers 	 Put in place EU-level financial instruments to attract private finance 
 Test feasibility of independent university ranking Create business-academia «Knowledge Alliances» 	 Ensure cross border operation of venture capital funds 
 Propose an integrated framework for e-skills 	 Strengthen cross border matching of innovative firms with investors 
 Propose an ERA framework and supporting measures 	 Review State Aid Framework for R&D&I 
 Construct the priority European Research Infrastructures 	 Deliver the EU Patent 
 Simplify and focus future EU research and innovation programmes on Innovation Union 	 Screen the regulatory framework in key areas 
 Ensure stronger involvement of SME in future EU R&I programmes 	 Speed-up and modernise standard-setting 
 Strengthen the science base for policy making through JRC; Set up a Forum on Forward Looking Activities 	 Set aside dedicated national procurement budgets for innovation 
 Set out EIT strategic agenda 	 Set up an EU level support mechanism and facilitate joint procurement 

 Present an eco-innovation action plan 	 Support a research programme on public sector and social innovation Pilot a European Public Sector Innovation Scoreboard 
 Set up a European Design Leadership Board 	 Consult social partners on interaction between the knowledge economy and the labour market 
 Establish a European Creative Industries Alliance 	 Pilot and present proposals for European Innovation Partnerships 
 Promote open access; support smart research information services 	 Put in place integrated policies to attract global talent 
 Facilitate collaborative research and knowledge transfer 	 Propose common EU / MS priorities and approaches for scientific cooperation with third countries 
 Develop a European knowledge market for patents and licensing 	 Roll-out global research infrastructures 
 Safeguard against the use of IPRs for anti-competitive purposes 	 Self-assess national research and innovation systems and identify challenges and reforms; 
 Improve the use of Structural Funds for research and innovation 	 Develop an innovation headline indicator 
 Launch a Social Innovation pilot; promote social innovation in European Social Fund 	 Monitor progress using Innovation Union Scoreboard 

 On track  Delayed  Not taken up



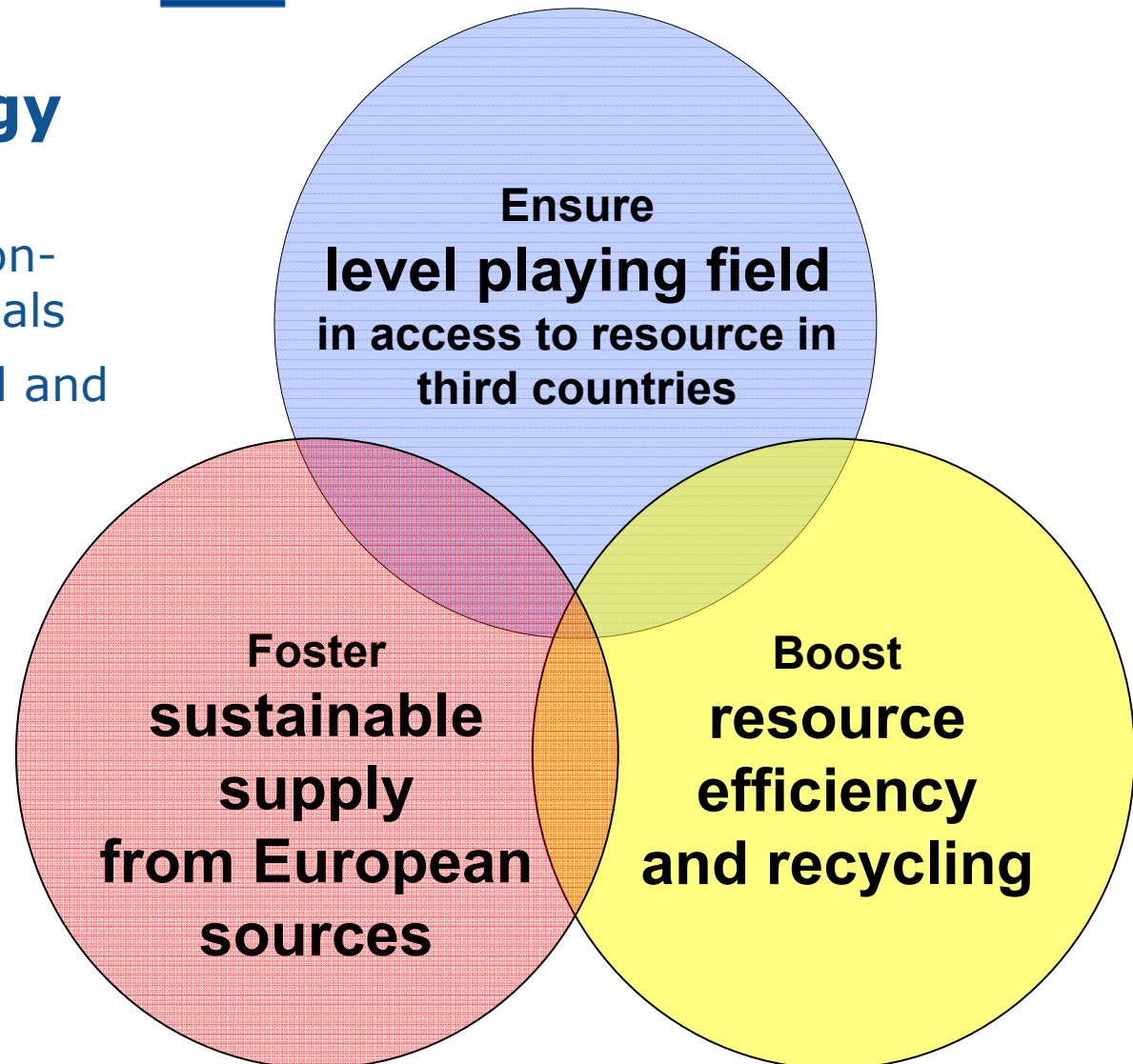
The Raw Materials Initiative

EU Raw Materials Initiative



Integrated strategy

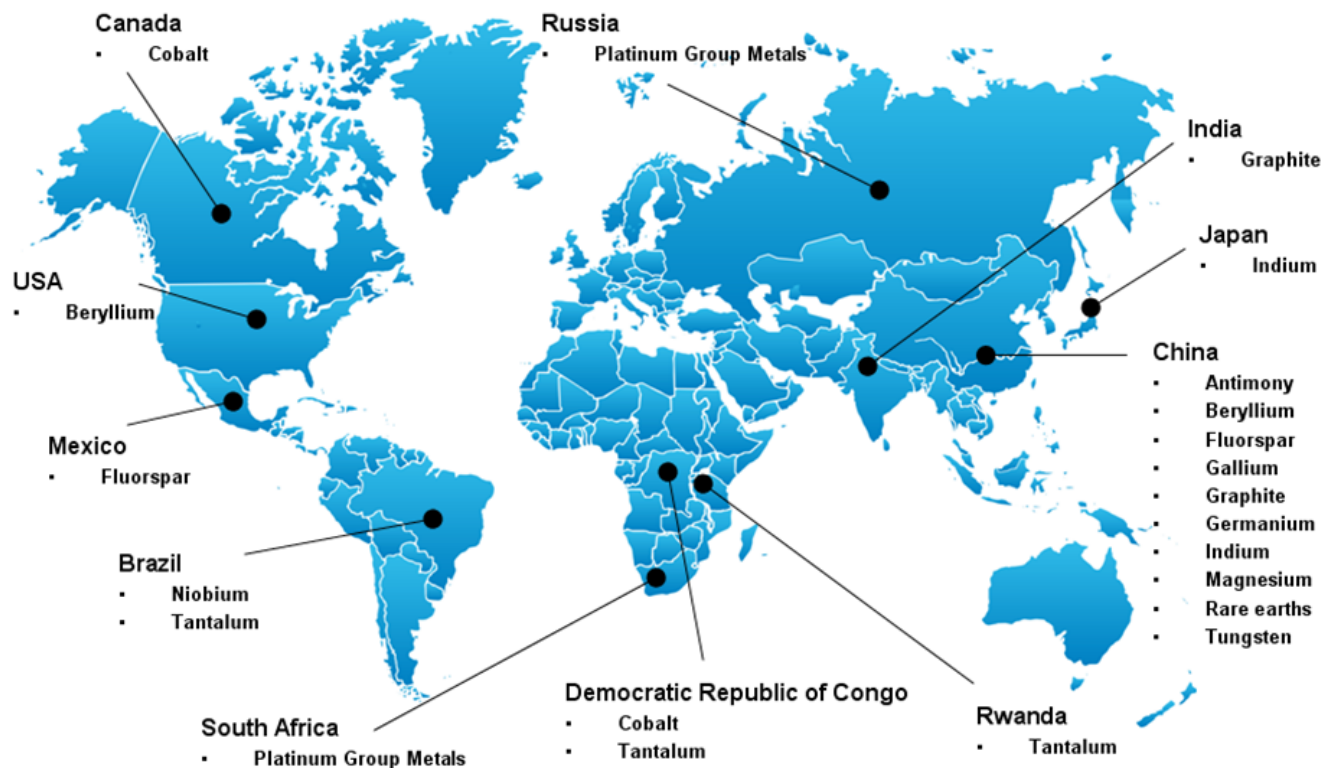
- based on three pillars
- area of non-energy, non-agricultural raw materials
- connecting EU external and internal policies
- launched Nov. 2008
- reinforced Feb. 2011



Critical raw materials



Production concentration of critical raw mineral materials



EC will update the list of critical raw materials at least every 3 years after 2010, review in **2013**.

Pillar 3 : Resource efficiency

- **Give impetus to resource efficiency and eco-innovative production processes:**
 - EU Action Plan on Sustainable Consumption and production and Sustainable Industrial Policy
 - EU Thematic Strategy Sustainable use of natural resource
- **Promote and fund research on**
 - **resource-efficient** products and production
 - development of **substitutes**.





European Innovation Partnership on Raw Materials

Objectives



- Reduce **import dependency**
- Push Europe **to the forefront** in raw materials sectors
- Provide **alternatives in supply**
- Mitigate negative **environmental impacts**

Key components



- **Technology-focused policy areas**
 - WP1 - Exploration, extraction, processing, recycling ...
 - WP2 - Substitution, alternative functionalities and materials
- **Non Technology policy areas**
 - WP3 - Improving Europe's **raw materials** regulatory framework conditions, knowledge base and infrastructure
e.g. data interoperability and availability
 - WP4 - Improving Europe's **recycling** regulatory framework conditions and excellence
e.g. public procurement, private initiatives
- **International cooperation** - WP5

Overarching partnership

Link with KIC and other initiatives



European Innovation Partnership on Raw Materials

- Up to 10 innovative pilot actions
- **Substitutes for at least 3 applications of critical raw materials**
- Network of Research, Education and Training Centres on sustainable raw materials management
- EU standardised instruments for the survey of resources/reserves and 3-D geological map
- Dynamic modelling of trends: link demand and supply with reserves and complete LCA
- Pro-active strategy of EU at bilateral and multilateral level

ERAMIN

ETP-SMR

ETP
Suschem
EUMAT
FBI...

CRM_
Innonet

KIC/
SPIRE



Workpackage 2:

Achieving solutions to reduce the use including finding substitutes of critical, scarce or hazardous materials

Overarching objective:

Expected outcome (medium to long term – 2014-2020):

Industrially viable alternatives for at least 3 applications containing (critical) raw materials

Priorities WP2



- a) First set of priority actions may be derived from **identified critical raw materials** for our economy and from the most economically vital and ecological sensitive applications where critical raw materials are used in large proportions or are the crucial components
- b) **Finding sustainable alternatives**, for example, for rare earths in permanent or heat resistant magnets, LEDs and displays, or electrical drives and regenerative braking
- c) **Addressing technical solutions to increase resource efficient production technology** (production processes and manufacturing equipments) in order to be competitive on the global market
- d) Building upon the work of relevant European Technology Platforms, **identify opportunities and develop new ideas for innovative materials and products** with potential to be put in the market.

The way forward



- **On the basis of Council conclusions, political mandate to proceed**
- **Members' appointment Oct. 2012**
- **High Level Conference on the EIP on 13 Nov. 2012**
- **First meetings of Sherpa group, HLSG and operational groups February 2013**
- **HLSG to prepare Strategic Implementation Plan (SIP), for adoption ~ July 2013**
- **Communication on SIP, December 2013**
 - ⇒ SIP implementation to start
- **Monitoring and evaluation, late 2014**



From FP7 to Horizon 2020



The European Union's 7th Framework Programme for Research and Technological development

- **Mapping**
 - **Mining, both technologies and machines, in particular for extreme environments**
 - **Manufacturing, incl. improvements to reduce waste or breakages**
 - **Recycling, ranging from eco-design to re-entering into the manufacturing cycle**
 - **Substitution**
-

FP7 funded research



- **Substitution of materials or components utilising "green nanotechnology" NMP.2010.1.2-2**
- **Novel materials for replacement of strategic or scarce raw materials (platinum group metals and rare earths) NMP-2011-2.2-4**
- **Innovative recycling technologies of key metals in high-tech Applications NMP.2012.4.1-2**
- **Development of new materials for the substitution of critical metals NMP.2013.4.1-1 Coordinated call with Japan**
- **Substitution of critical raw materials: networking, specifying R&D needs and priorities NMP.2012.4.1-4:**
- **European Intelligence Network on the Supply of Raw Materials NMP.2013.4.1-3**

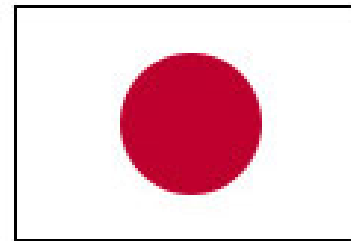
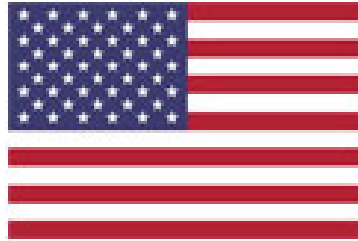


FP7 funded research



- **CRM_Innonet: "Critical Raw Materials Innovation Network – Towards an integrated community driving innovation in the field of critical raw material substitution for the benefit of EU industry"**
- **Several EU funded research projects (from 2 dedicated topics)**
 - **Reduction** of the use of rare earth elements: DRREAM
 - **Substitution** of rare earth elements : ROMEO, NANOPYME, REFREEMAG
 - **Substitution** of platinum group metals: FREECATS, NEXT-GEN-CAT

FP7 funded research



Third EU-US-Japan Trilateral Conference on Critical Materials

Towards New Models in Efficient Management of Critical Materials

29-30 May 2013 - Brussel, Belgium
Royal Academy of Belgium for Sciences and Arts

[Additional information and registration](#)

http://ec.europa.eu/research/industrial_technologies/event-13_en.html

[For further inquiries](#)

RTD-Trilateral-Conference-2013@ec.europa.eu

CRM_Innonet Expected Impact



- CRM_Innonet should network interested stakeholders, in order to
- Contribute to the successful implementation of the Raw Materials Initiative and related activities
 - Collect and elaborate of data and formulation of ideas for possible novel actions with high European common interest
 - Identify and prioritise of R&D needs in order to support the EU strategic approach regarding the substitution of critical raw materials
 - Improve coordination in research and innovation actions in the field of raw materials substitution
 - Increase efficiency and effectiveness of the EU research activities in this field
 - Create of one (or more) leading pole(s) of excellence that will be able to support and enhance the competitiveness of the EU industry and economy.



proposal!

What is Horizon 2020

- Commission proposal for a 80 billion euro research and innovation funding programme (2014-2020)
- A core part of Europe 2020, Innovation Union & European Research Area:
 - - **Responding to the economic crisis** to invest in future jobs and growth
 - - **Addressing people's concerns** about their livelihoods, safety and environment
 - - **Strengthening the EU's global position** in research, innovation and technology



New advanced materials are needed in developing better performing and sustainable products and processes. Such materials are a part of the solution to our industrial and societal challenges, offering better performance in their use, lower resource and energy requirements, and sustainability during the entire life-cycle of the products.

Materials shall be conceived according to a full life-cycle approach, from the supply of available materials to end of life (cradle to cradle), with innovative approaches to minimise the resources required for their transformation or to minimise negative impacts for humans and the environment.

Continuous use, recycling or secondary end-of-life utilisation of the materials shall also be covered as well as related societal innovation, such as changes in consumer behaviour and new business models.



Novel green innovation alliances and industrial symbiosis shall be fostered allowing industries to diversify, expand their business models, re-using their waste as a basis for new productions, e.g. CO₂ as carbon base for fine chemicals and alternative fuels.



proposal!

As a result it is expected that at least 60% of the overall Horizon 2020 budget should be related to sustainable development.

It is also expected that climate-related expenditure should exceed 35% of the budget, including mutually compatible measures improving resource efficiency.

COM(2011) 810 final
Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL
laying down the rules for the participation and dissemination in 'Horizon 2020 – the
Framework Programme for Research and Innovation (2014-2020)

Conclusion



- **Critical raw materials initiative**
 - Important and visible integrated strategy
 - Focus on resource efficiency, with an important role for substitution
- **EIP on Raw Materials**
 - Creating critical mass to ensure sustainable access to raw materials
 - Creating synergies between different policy instruments (technological, regulatory and standardisation)
 - Reinforcing coordination with the MS
 - Strong focus on substitution (WP2)
- **CRM_Innonet**
 - Brings together recognised and experienced key actors across the value chain of substitution of critical raw materials
 - Networking initiative to facilitate knowledge exchange and promote synergies

CRM_Innonet has the potential to acquire a unique position at the heart of EU policies to tackle an important socio-economic and industrial challenge

We look forward to what CRM_Innonet will deliver !