



Addressing raw material exploration and extraction challenges: policy responses in Europe

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Opening 1

- **Raw Materials** build a basis for Europe's re-industrialization and provide an important opportunity for **Innovation** and **Industrial Development**
- To be successful, re-industrialization has to work on the principles of a circular economy, along the **Value Chain** from raw materials to products back to raw materials

Opening 2

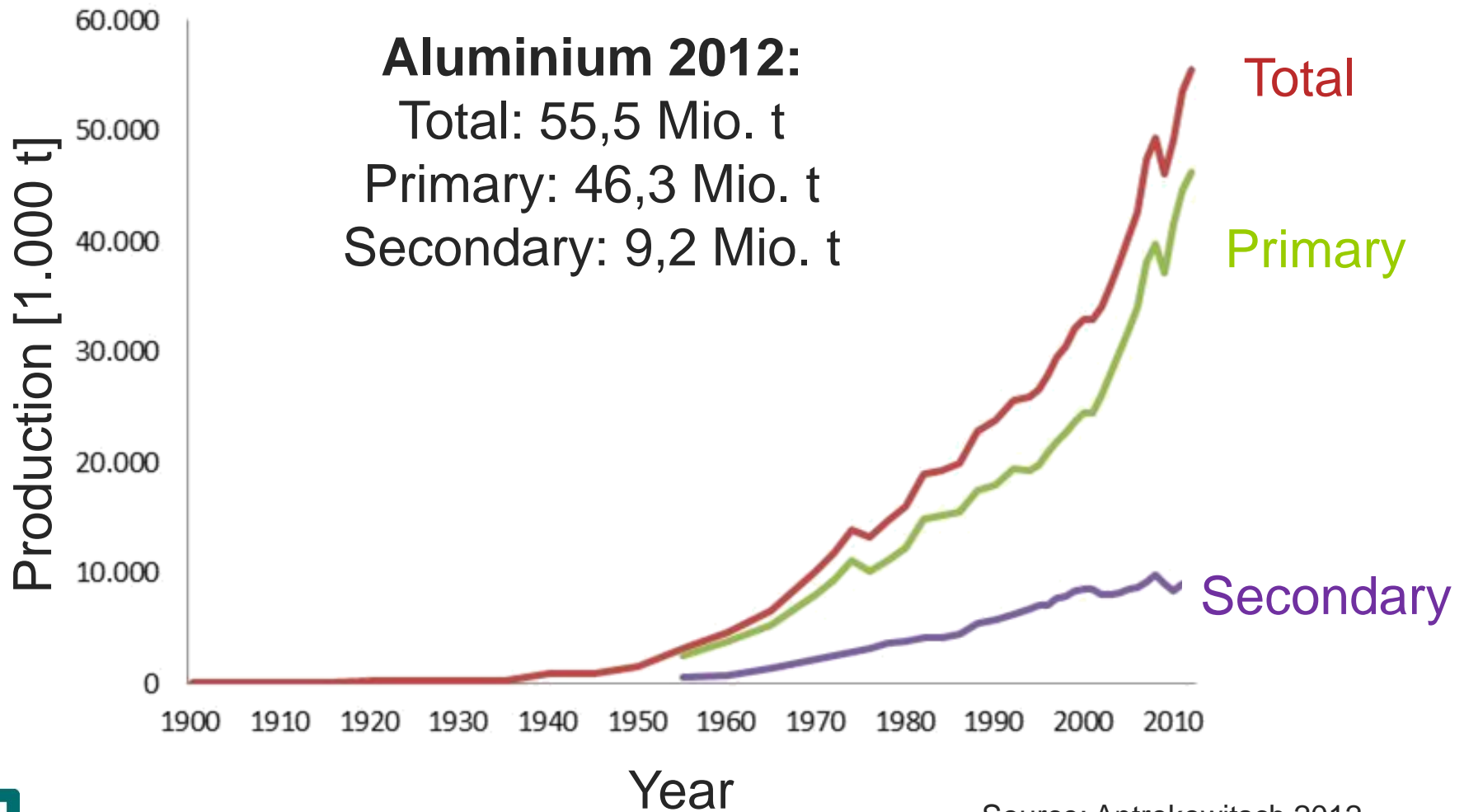
➤ Strong hypothesis

- There is a direct link between innovative products on the one side and the raw materials needed for the products on the other side
- Because of ever increasing quality requirements we cannot separate raw materials production from manufacturing anymore
- Innovation in Raw Materials must be regionally based and needs a suitable biotope
- Cutting off the Raw Materials part triggers supply risks

Opening 3

- Supply from **Primary Resources** is necessary to meet the gap between the consumption and the production from **Recycling** and **Urban Mining**
- Today's **increase** in raw materials consumption is too high for a total supply from secondary resources only

Supply from primary & secondary resources - example



Source: Antrekowitsch 2012

Raw Material Supply risks 1

- Despite a growing demand, no physical shortage for practical all raw materials is visible today
- But the sustainable supply with raw materials is influenced by a number of important parameters
 - Concentration of production in single countries and in a few companies
 - Political instabilities in supply countries outside Europe

Raw Material Supply risks 2

➤ Critical issues

- Lacking focus on primary raw material resources in Europe
- Lacking solutions for sustainable raw materials production under increased technical and societal restrictions
- Absence of a positive investment climate
- Shortage of skilled engineers and disappearance of know how

Basic strategy

- **Contribution to global sustainable development** through making **use of Europe's own resources** and **re-taking responsibility** for the sustainable re-localised raw materials production from
 - Primary Resources
 - Secondary Resources
- **Re-connecting society** with its need for sustainable resources supply
- **Regionalisation of the production of primary and secondary resources**
 - Resources occur locally
 - Society has to be integrated into raw materials production on a local level to let them participate in the benefits and challenges

Challenges 1

- Development of new primary and secondary raw materials sites in the frame of a **NIMBY** society
- Creation of an **innovation biotope** consisting of
 - Education to provide **human resources**
 - **Raw materials, energy and land** availability on an **affordable level**
 - **Capital for investment** into production plant
 - Short time frame for **permitting processes**
 - **Research and Development** activities

Challenges 2

- **Decreasing the raw materials production impact** on water, air, land and other environmental issues
- **Mine waste use**
- **Increasing the quality of raw materials from recycled products** comparable to primary origin
- **Simultaneous recovery of a variety of different elements** from one piece of waste

Challenges 3

- **Exploration technologies** for deep deposits
- **Innovative solutions for the extraction** of primary resources
- Extraction of raw materials from **unconventional deposits**
- Advanced Raw Materials **Education** programs

Policy responses

- Minerals Policy Framework
- Exploration and Extraction relevant framework: EIP SIP
- EIT Raw Materials - KIC
- Horizon 2020

European Innovation Partnership

- **Exploration relevant framework:**
 - new **cost-effective exploration concepts** and technologies providing high quality data and information including high resolution 3D geo-data down to 150-4000 meters depth,
 - interpretation through **geo-models** in order to facilitate both finding new mineral deposits on the continent and in the sea-bed, as well as fostering industry investment to mining

European Innovation Partnership

- Extraction relevant framework:
 - Enable continental and deep-sea extraction of minerals in a socially acceptable, environmentally responsible and economically viable way by developing new technological concepts and solutions leading to social acceptance of extraction
 - Automated mining
 - Mining of small deposits:
 - Alternative mining
 - Deep-sea mining

KIC – Knowledge and Innovation Community Raw Materials

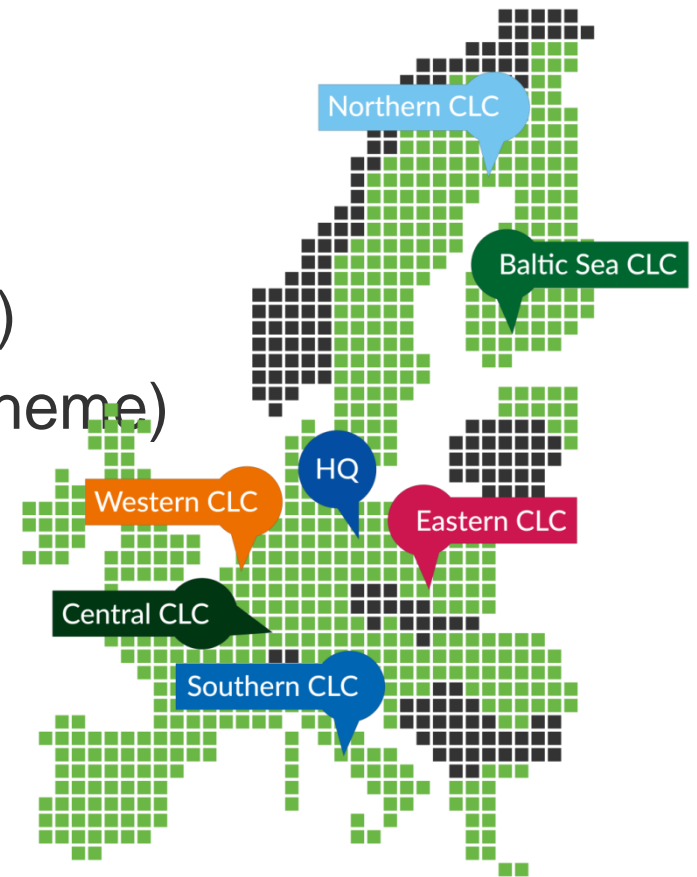


The business partners include many world leading companies, and they collectively represent more than 700,000 jobs and a total annual turnover in excess of EUR 200 billion.

KIC EIT Raw Materials

Organisation

- EIT RawMaterials e.V., Berlin
- EIT RawMaterials GmbH
- 6 Co-Location Centres (GmbH's)
- EIT RIS (Regional Innovation Scheme)
- ESEE-Region (MU)
- **Consortium > 100 Partner**



KIC Added Value Activities (KAVA)

- Projects built on previous R&D results (TRL > 5)
- Funded by the EIT (20 – 80 million €/year)
- Project examples
 - New tools/ technologies for exploration and production (from TRL 5 to 7/8)
 - Education projects (Joint Degrees, Entrepreneurship aspects)
 - Start Ups and pilot plants

Horizon 2020

- **“Technical projects”**
 - SLIM: Sustainable low impact mining
 - Iterams: production of geopolymers from mine tailings
 - SIMS: Sustainable Intelligent Mining Systems

- **“Framework conditions projects”**
 - MIN-GUIDE

Summary 1

- Make the raw materials industry sexy to attract the most talented young people for this sector (digitalization of mining)
- Move the image from an old problem creating industry to a value creation and solution provider industry
- Make society aware that green technology, energy efficiency, etc. is based on the sustainable availability of suitable raw materials

Summary 2

- For the foreseeable future raw materials are physically available in deposits, also in Europe
 - Through engineering education, R&D and national and international political promotion, Europe could re-establish an important raw materials industry
 - Raw Materials Production in Europe has a great potential to contribute to Europe's re-industrialization initiatives

