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PROJECT GROUP IWKS

WORKSHOP CHALLANGES AND OPPORTUNITIES IN THE TREATMENT AND MANAGEMENT OF ARSENIC IN THE MINING INDUSTRY

Fraunhofer Project Group IWKS

09th June 2016, Santiago de Chile

Dr. Gert Homm

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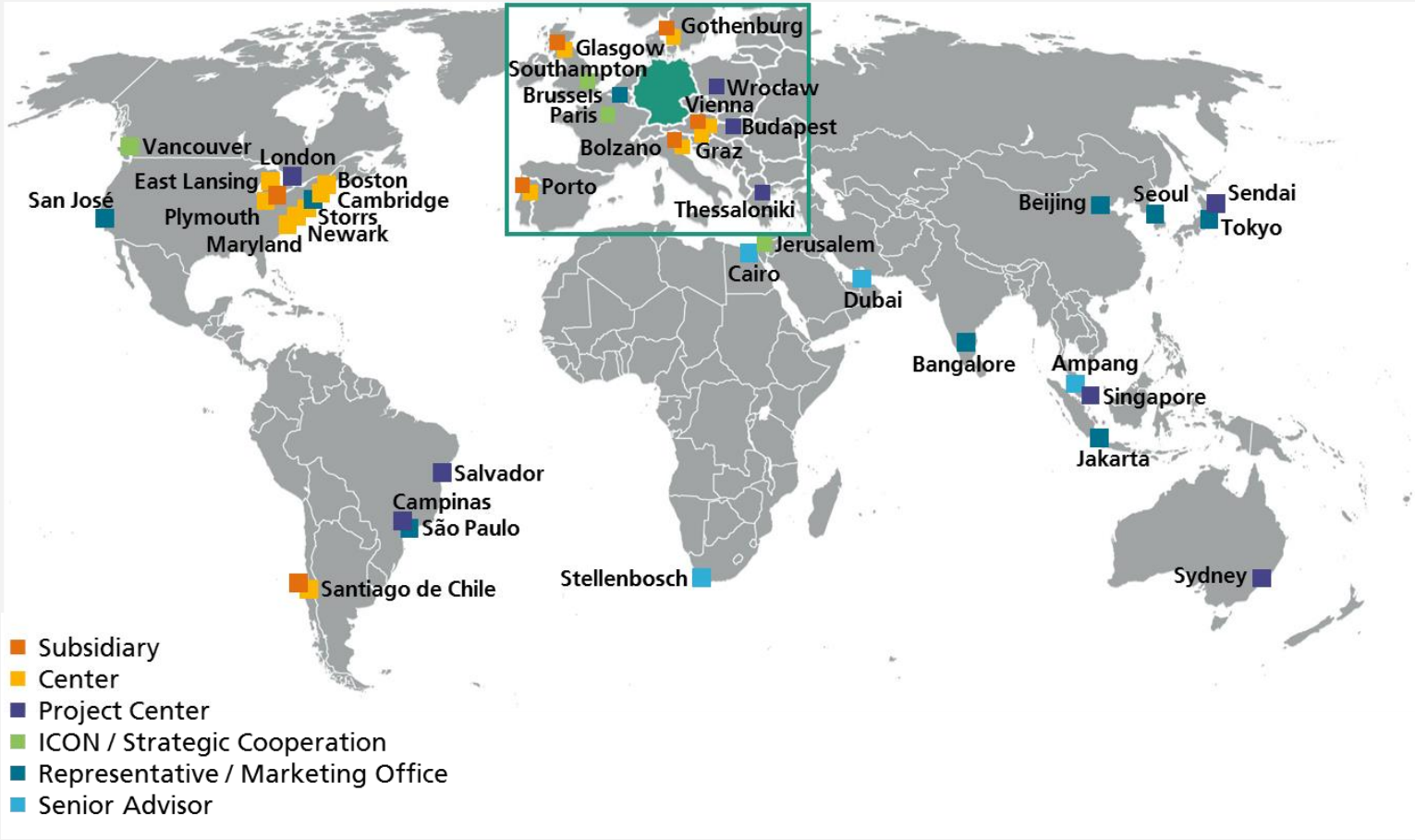
FRAUNHOFER SOCIETY – THE BIGGEST ORGANIZATION IN EUROPE FOR APPLIED RESEARCH AND DEVELOPMENT



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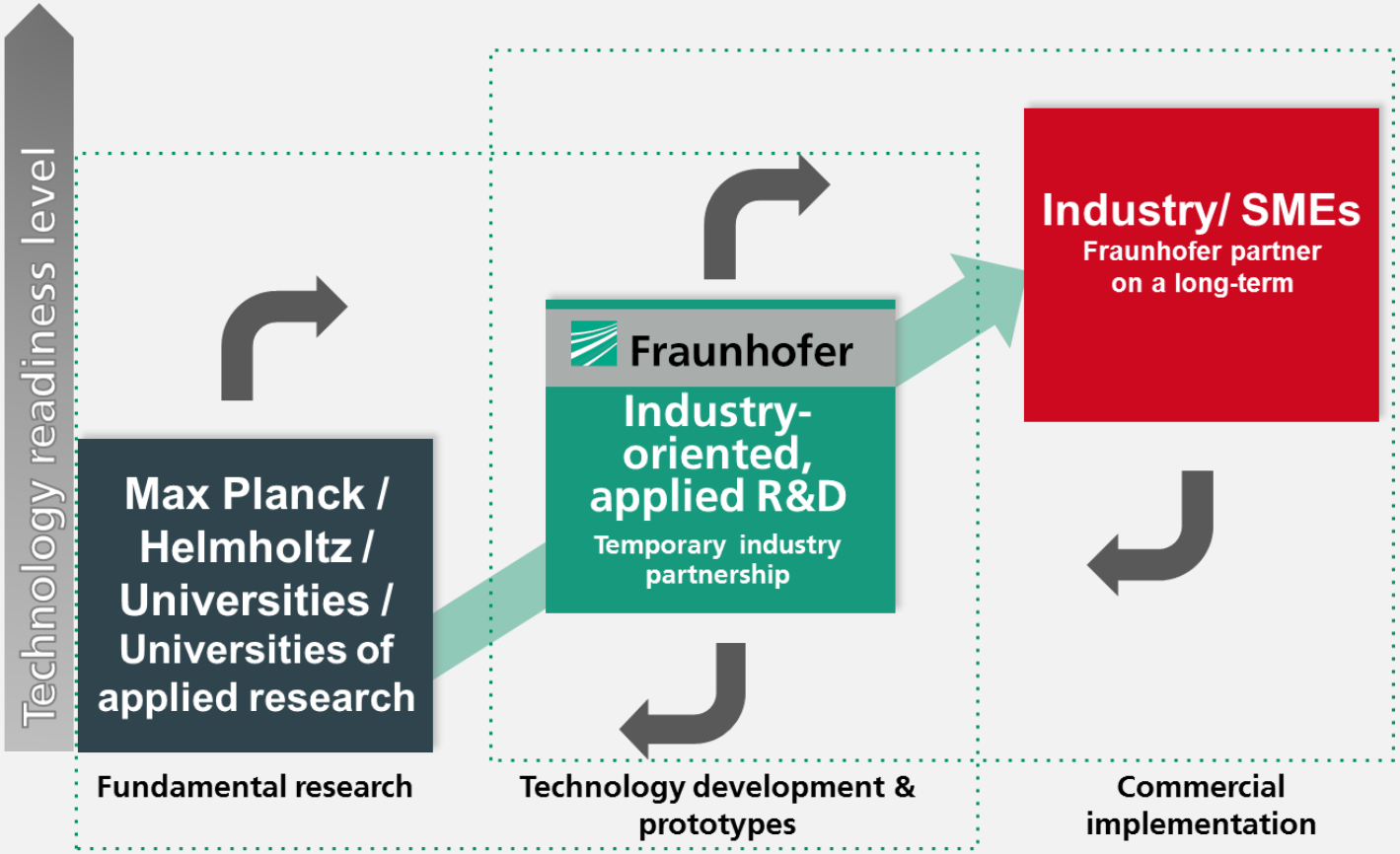
Fraunhofer Society – R&D-Partner for Industry: On Demand and Long-Term



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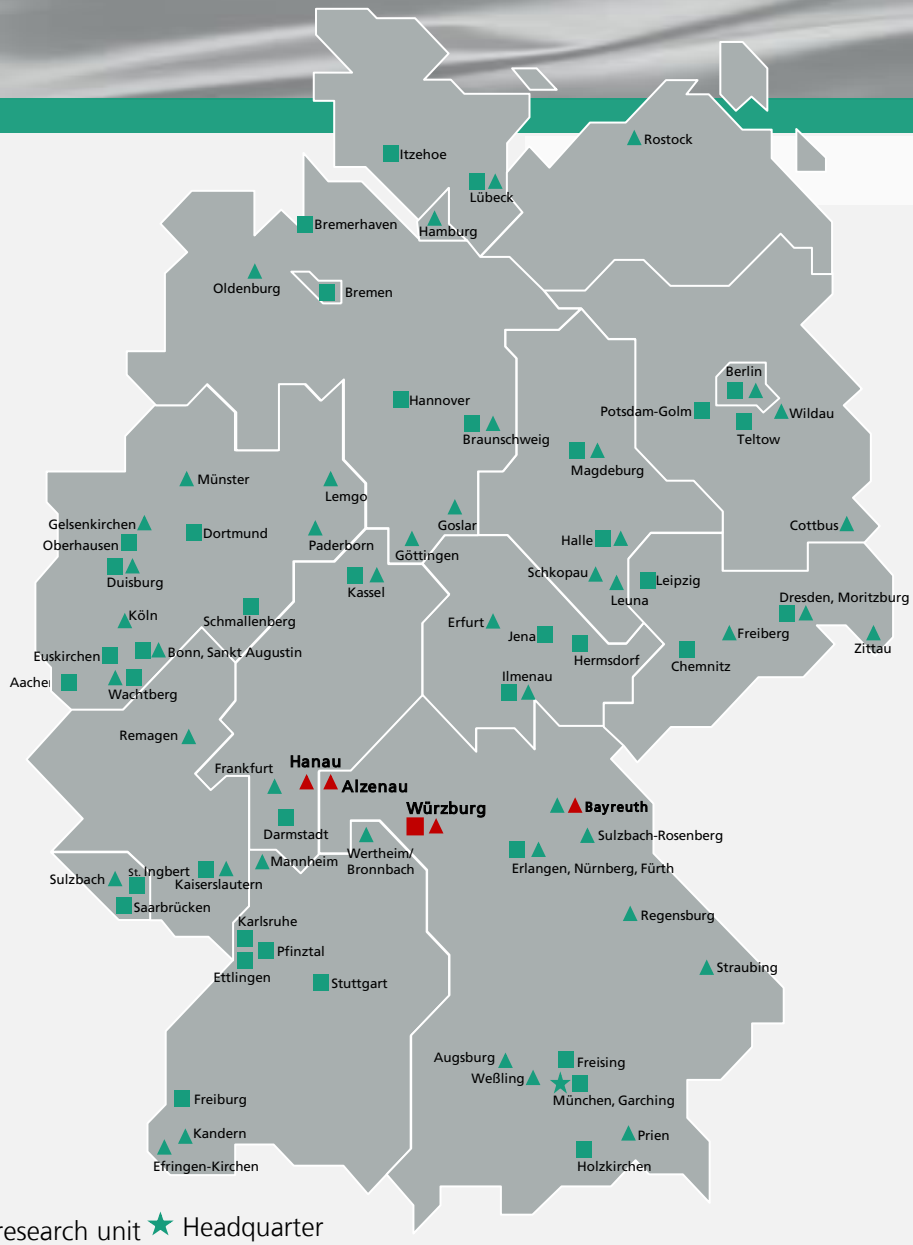
FRAUNHOFER GERMANY

- Biggest organization in Europe for applied research and development
- 66 Fraunhofer Institutes, at more than 80 locations
- About 24.000 employees (focus: scientists and engineers)
- Research volume 2 billion € / year



■ Institute/independent research unit ▲ Other research unit ★ Headquarter

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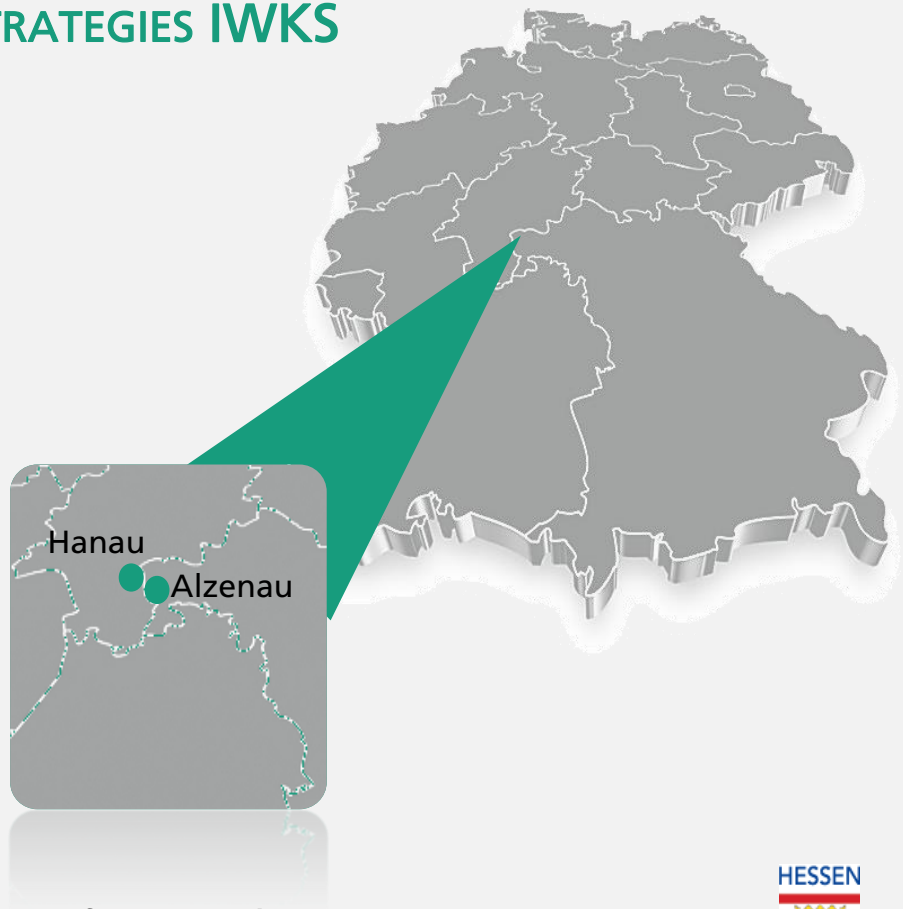
FRAUNHOFER PROJECT GROUP MATERIALS RECYCLING AND RESOURCE STRATEGIES IWKS

- Founded 2011
- Start-up phase 2012-2017
- Parent Institute:
  Fraunhofer ISC –
  Institute for Silicate Research
  in Würzburg
- Locations:
  Alzenau (Bavaria)
  Hanau (Hesse)



Supported by State Ministries of Bavaria and Hesse

HESSEN

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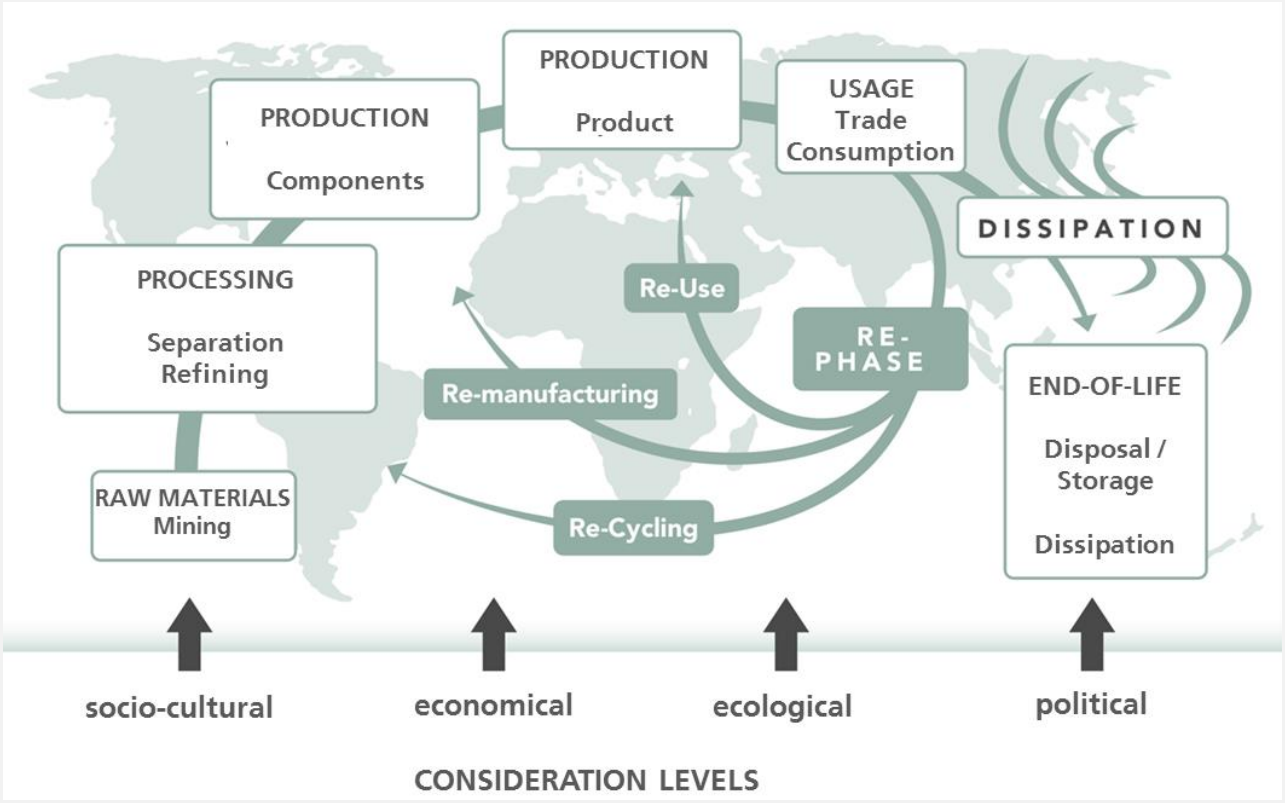
FOLLOWING THE SUPPLY CHAIN

- In the last 25 years the extraction of raw materials increased from 10 billion t to 15 billion t



Source: Reller, Zepf (2010)

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FRAUNHOFER PROJECT GROUP IWKS – DIVISIONS

- **Resource Strategies** – Securing the supply of raw materials
  - Resource efficiency
  - Material flow and waste management
  - Criticality studies
- **Sustainable Material Cycles** – Developing innovative recycling concepts
  - Recovery of valuable raw materials
  - Separation and sorting technologies
  - Design for recycling
- **Substitutional Materials** – Research on functional and energy materials
  - Substitution of critical elements
  - Development of innovative substitutes
  - Magnets, magnetocaloric, lighting and energy materials

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RESOURCE STRATEGIES

SECURING THE SUPPLY OF RAW MATERIALS

- Consulting services for the development of new concepts that optimize your production processes
- Resource efficiency strategies in terms of material flow, waste and sustainability management
- Static and dynamic material flow models
- Criticality studies and Life Cycle Assessment (LCA)
- Market and feasibility studies

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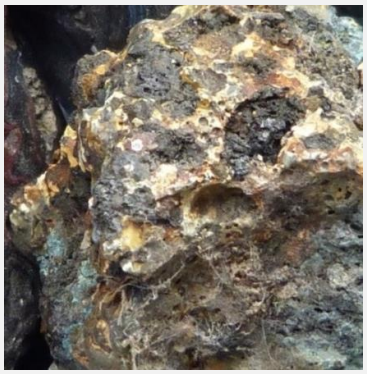
SUSTAINABLE MATERIAL CYCLES
DEVELOPING INNOVATIVE RECYCLING CONCEPTS

- Electrohydraulic fragmentation
- Selective recovery of materials by gas phase reactions
- Selective separation of valuable materials from waste water
- Extraction and precipitation processes
- Extensive pool of applied methods for material characterization



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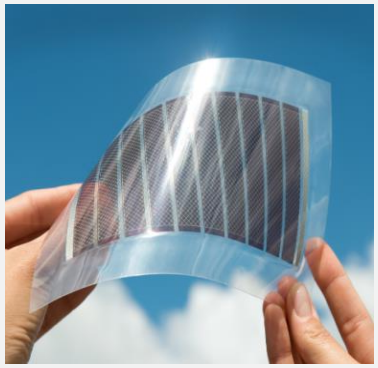
SUBSTITUTIONAL MATERIALS
RESEARCH ON FUNCTIONAL AND ENERGY MATERIALS

- Development and production of new magnetic materials containing RE elements and other critical materials
- Determination of specific properties of RE-based magnetic materials by chemical and physical characterization
- Development and production of novel magnetocaloric materials
- Development of new RE-based materials for the lighting and energy sector
- Advanced lightweight concepts for composite materials



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FRAUNHOFER PROJECT GROUP IWKS – SCIENTIFIC NETWORK

- **Fraunhofer Application Center for Resource Efficiency**
  (located in Aschaffenburg)
- **GERRI**
  (German Ressource Research Institute)
- **KIC Raw Materials**
  (Knowledge and Innovation Community)
- **EURELCO**
  (European Enhanced Landfill Mining)
- **ERECON**
  (European Rare Earths Competency Network)
- **Ressourcen Cluster Rhine-Main**
- **German Phosphorus-Platform (DPP)**
  (located in Alzenau)

hochschule aschaffenburg
university of applied sciences

GERRI
German Resource Research Institute

eit RawMaterials

EURELCO
EUROPEAN ENHANCED LANDFILL MINING CONSORTIUM

ERECON
STRENGTHENING THE EUROPEAN RARE EARTHS SUPPLY-CHAIN
Challenges and policy options

Ressourcen-Cluster Rhein-Main

DEUTSCHE PHOSPHOR PLATTFORM

GERMAN-CHILEAN STRATEGIC PARTNERSHIP

- Chile and Germany have good and intensive economic relationship since many years
- Germany is Chiles most important **trading partner** within the European Union
- Bilateral cooperations are wide-ranging, covering areas such as energy, environmental and climate protection, **science and research**, business, labour and social affairs
- Foundation of **Fraunhofer-Center** for Biotechnological Systems (2011) and Fraunhofer Solar (2014)
- Other Scientific cooperations with Max-Planck Society, Helmholtz, DLR, PTB …

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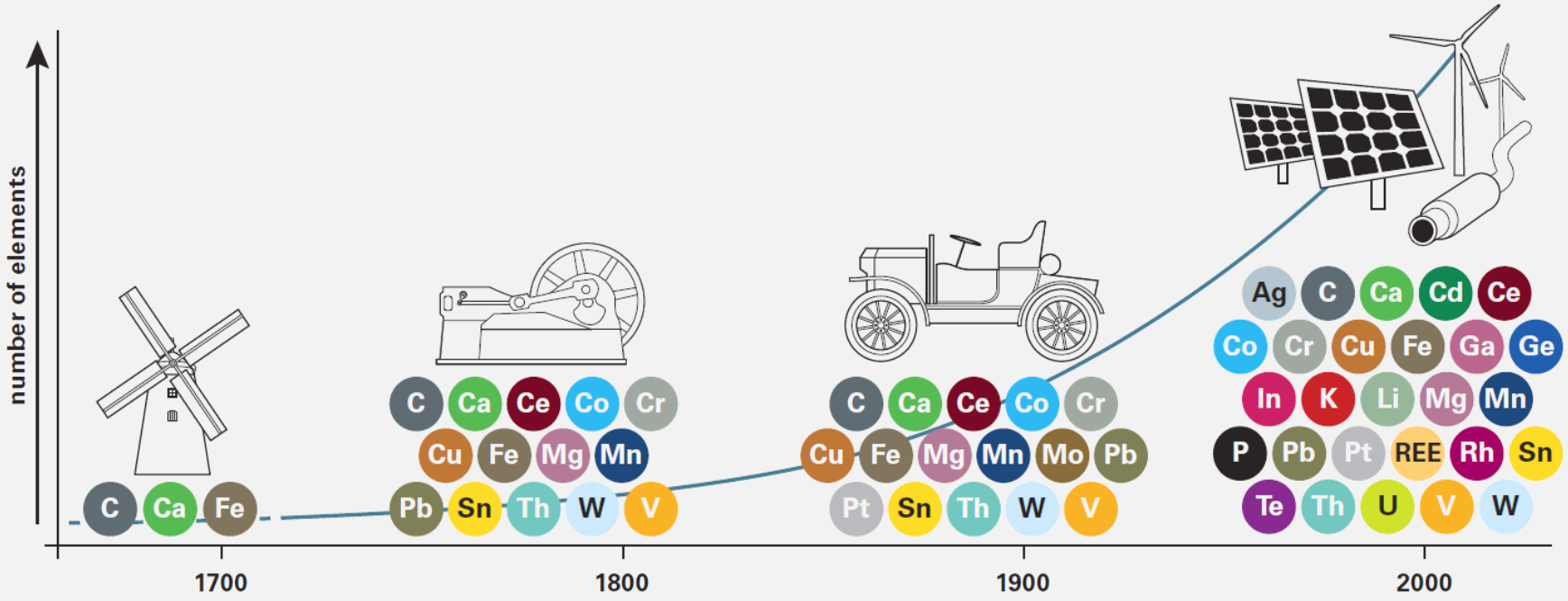
GERMANY – A HIGH-TECH NATION

- Modern industrial commodities consist of up to 40 different limited elements
- A secure supply of raw materials for the production of high-quality goods is essential



Source: Reller, Zepf, Achzet, Rennie (2011)

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Strategic Partnership between Germany and Chile

- Secure the supply of raw materials in both countries
- Strengthen the coverage of the entire value chain from mine activities to industrial implementation
- Accomplish process optimization regarding quality, productivity, environmental protection and cost effectiveness – Improve resource and energy efficiency in industrial processes
- Develop new technologies for the arsenic handling

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CLIENT II – INTERNATIONAL PARTNERSHIPS FOR SUSTAINABLE INNOVATIONS

OBJECTIVES

- **Put a spotlight on demand-oriented research** and development collaborations with select newly industrializing and developing countries with **interesting markets for German suppliers** of technology
- **Support international partnerships** and international research and development projects of companies, higher education institutions and non-university research institutions

Bundesministerium für Bildung und Forschung

FONA Forschung für nachhaltige Entwicklungen BMBF

PTJ Projektträger Jülich Forschungszentrum Jülich

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CLIENT II – INTERNATIONAL PARTNERSHIPS FOR SUSTAINABLE INNOVATIONS

PRIORITY COUNTRIES

- South America (in particular Brazil, **Chile**, Peru), Kazakhstan, Mongolia and Vietnam

PRIORITY TOPICS – RESOURCE EFFICIENCY AND SUSTAINABLE RESOURCE TECHNOLOGIES

- Securing the supply of raw materials with strategic economic importance
- Innovations to increase raw material productivity
- **Sustainable raw materials extraction and management**
- Increasing resource efficiency
- Substitution of scarce raw materials
- Completion of raw materials cycles and recycling

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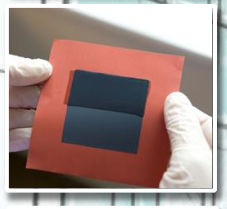
CLIENT II – INTERNATIONAL PARTNERSHIPS FOR SUSTAINABLE INNOVATIONS

DEADLINE:	**30th November 2017**
SELECTION PROCEDURE:	Two steps
SCOPE:	NO EXPLICIT LIMIT; TYPICALLY 80-100 PAGES
FUNDING PERIOD:	Max. 3 years
NOTES:	**Foreign project partners** must contribute their **own financing** for their project module or source the necessary funding in their own country Participation of **industry**, particularly SMEs, is **required**!



Thank you for your attention!

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