EFG/UNECE conference:
International cooperation on natural resources

9 & 10 February 2017 | Brussels

UNFC as an enabler for management of anthropogenic resources

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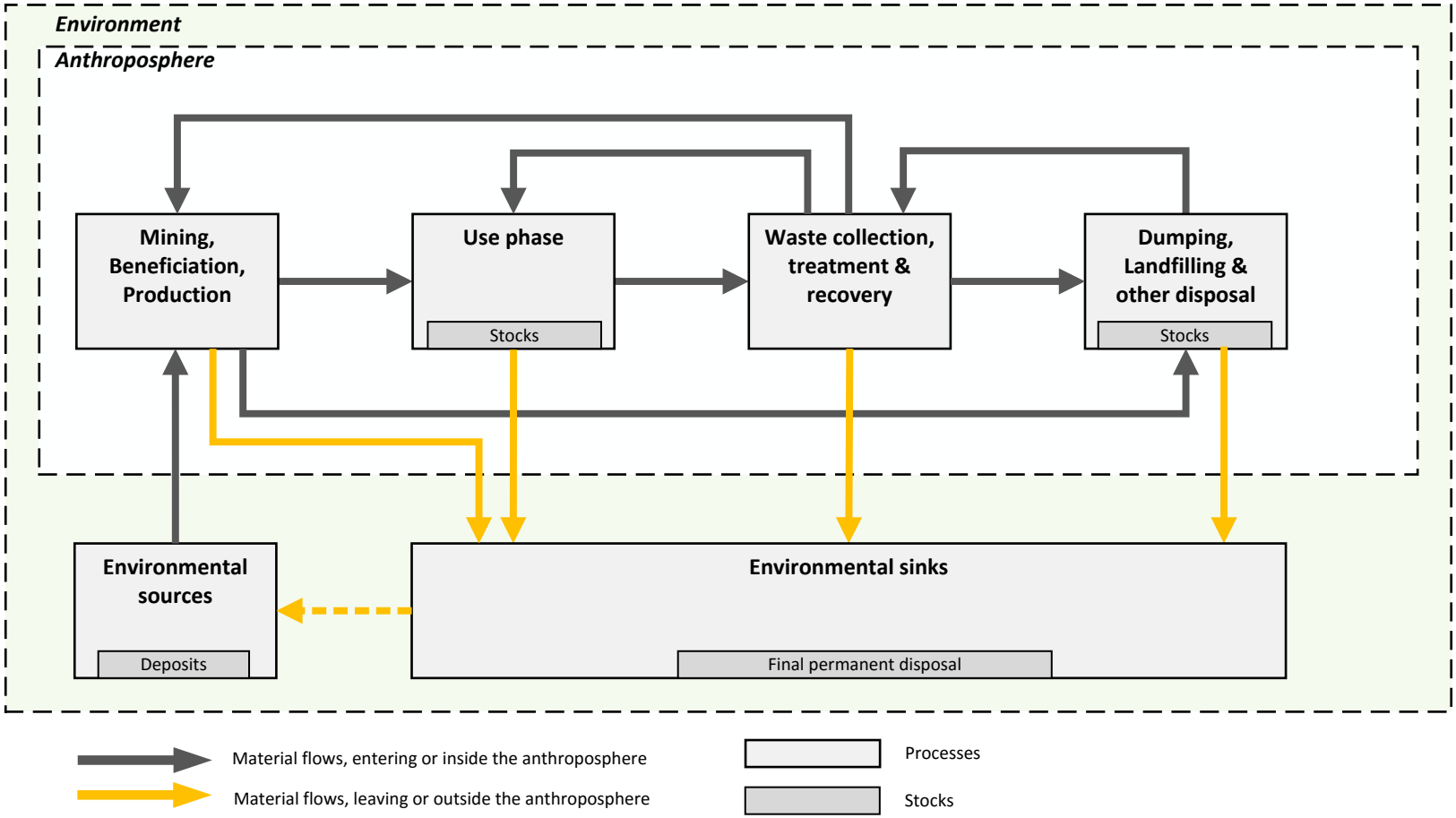
Resource management

Optimizing primary and secondary raw material supply, utilization and disposal.



Securing raw material access

EU Raw Materials Initiative

Fair and sustainable supply of raw materials from global markets.

Sustainable supply of raw materials within the EU.

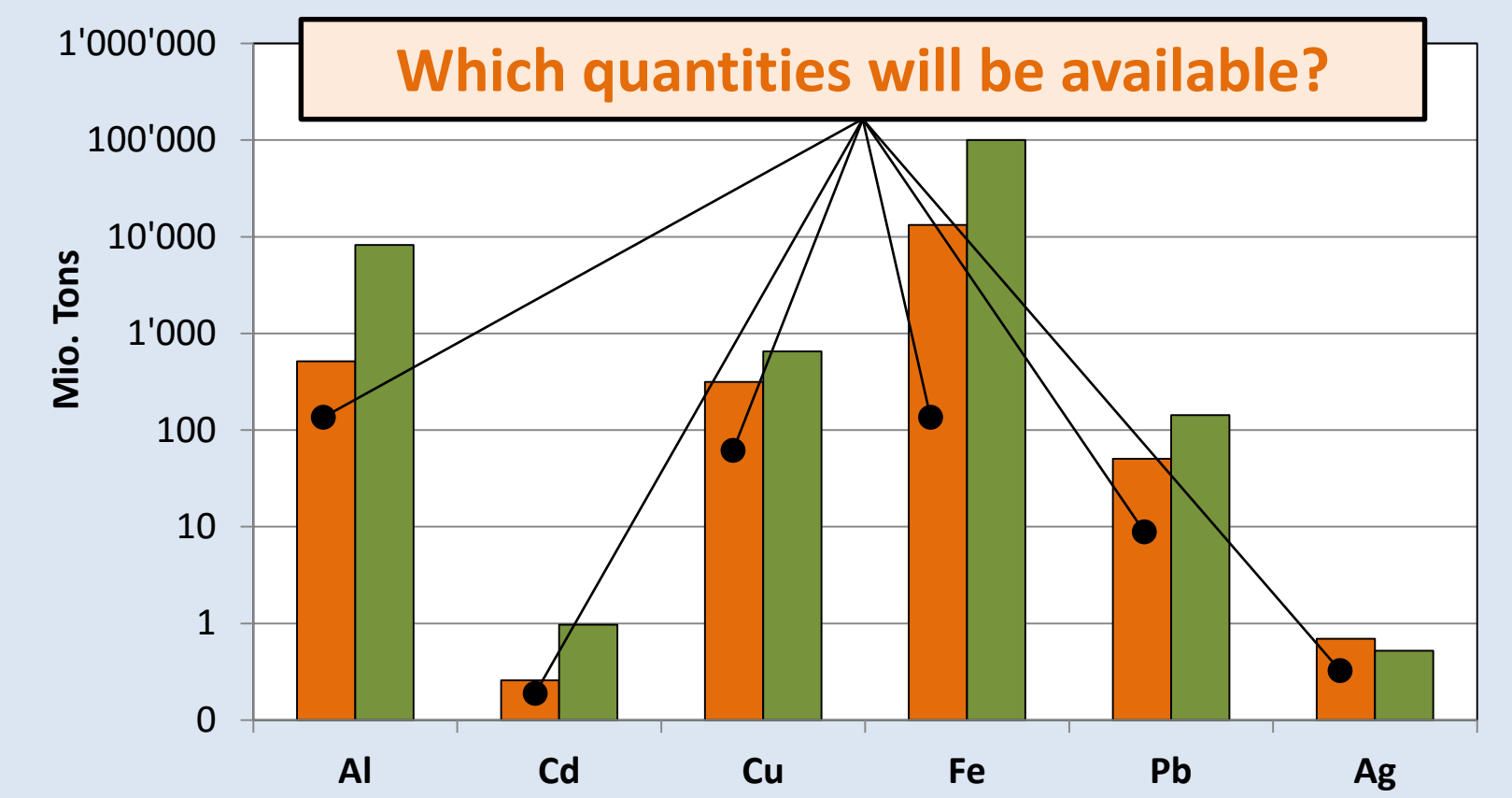
Resource efficiency and supply of "secondary raw materials" through recycling.

Need for information

Integrated information on the availability of primary & secondary materials that reach future commodity markets.

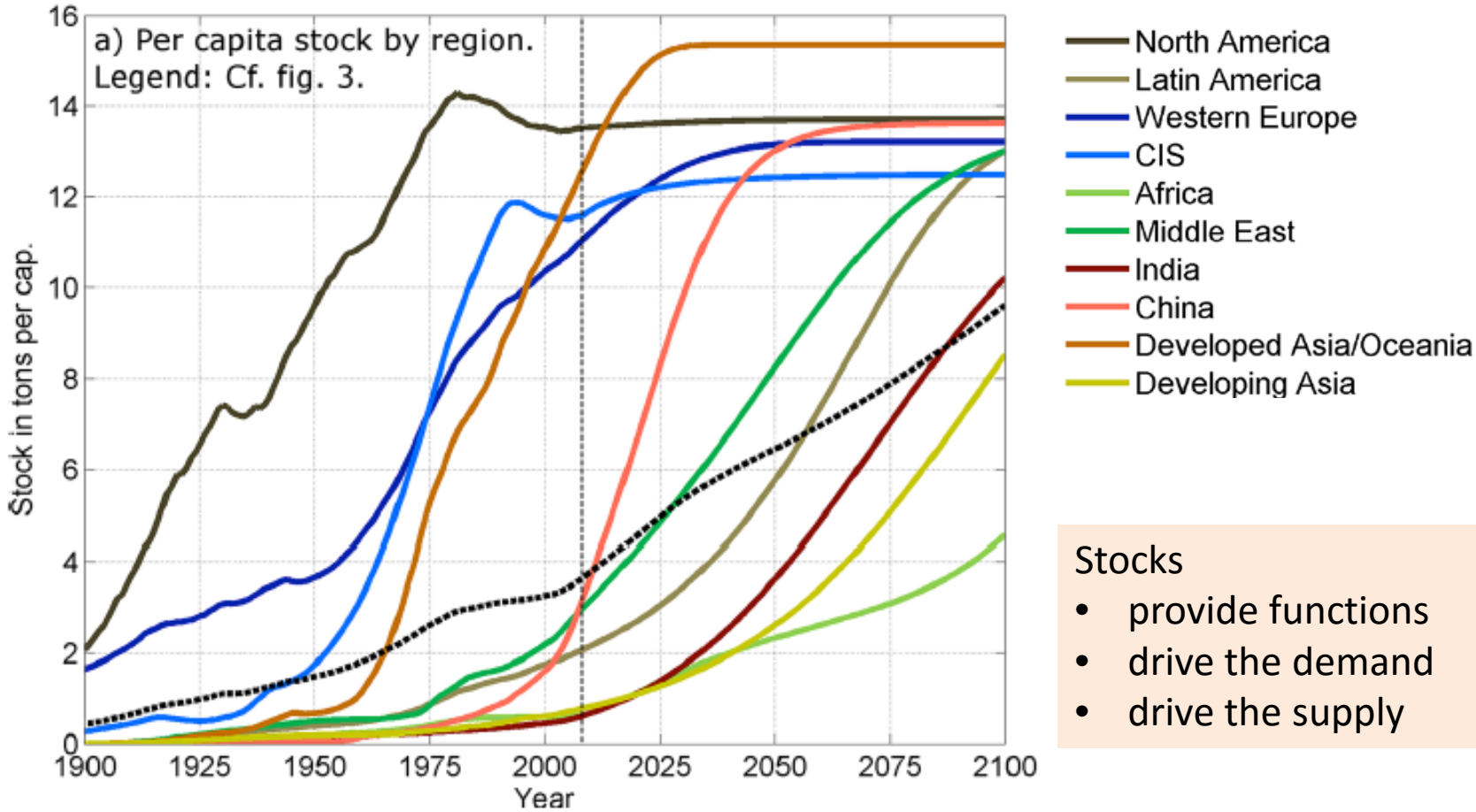
Metal deposits

Anthroposphere vs. Lithosphere



Graedel, T., 2010. Metal Stocks in Society: Scientific Synthesis. United Nations Environment Programme, Nairobi.
USGS, 2013. Mineral commodity summaries. United States Geological Survey (USGS), Reston.

Steel stocks-in-use



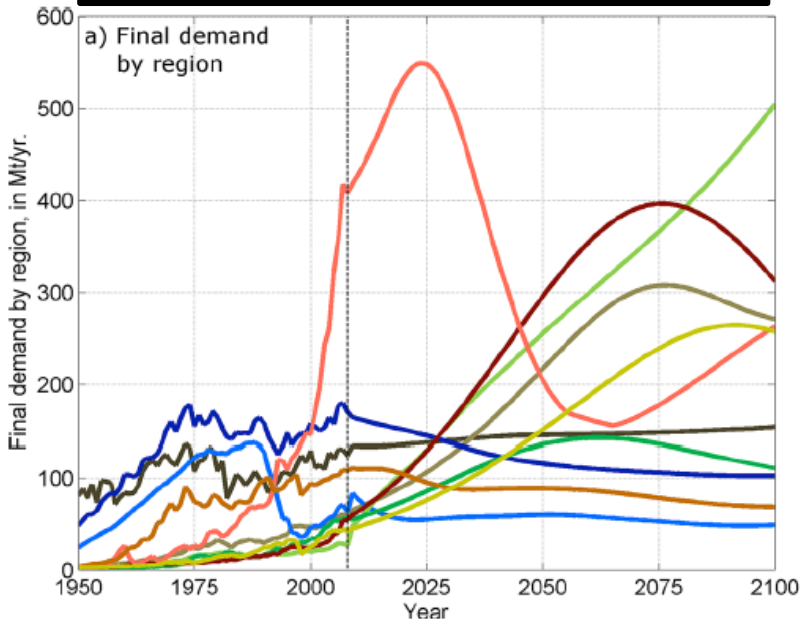
Stocks

- provide functions
- drive the demand
- drive the supply

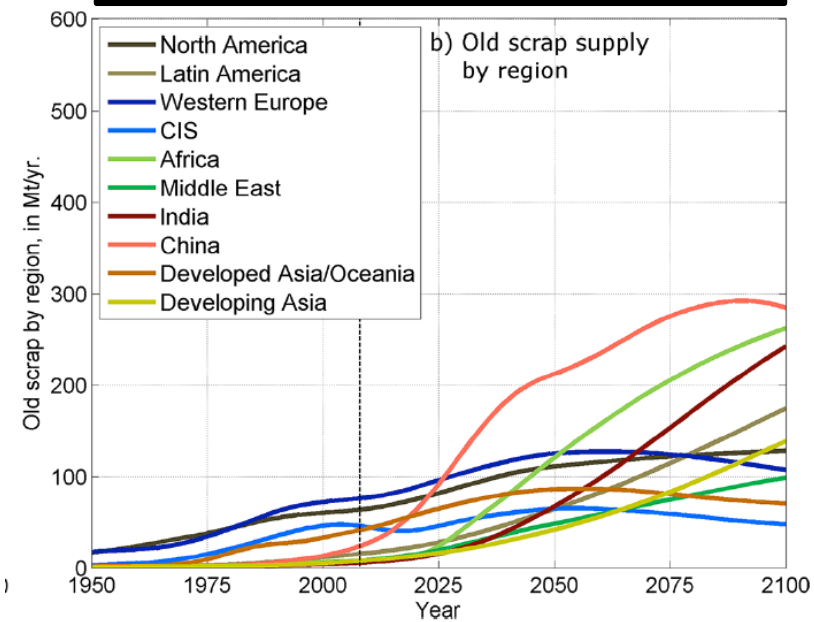
Pauliuk, S., R. L. Milford, D. B. Müller and J. M. Allwood (2013). "The Steel Scrap Age." Environmental Science & Technology **47**(7): 3448-3454.

Steel demand and supply

Demand

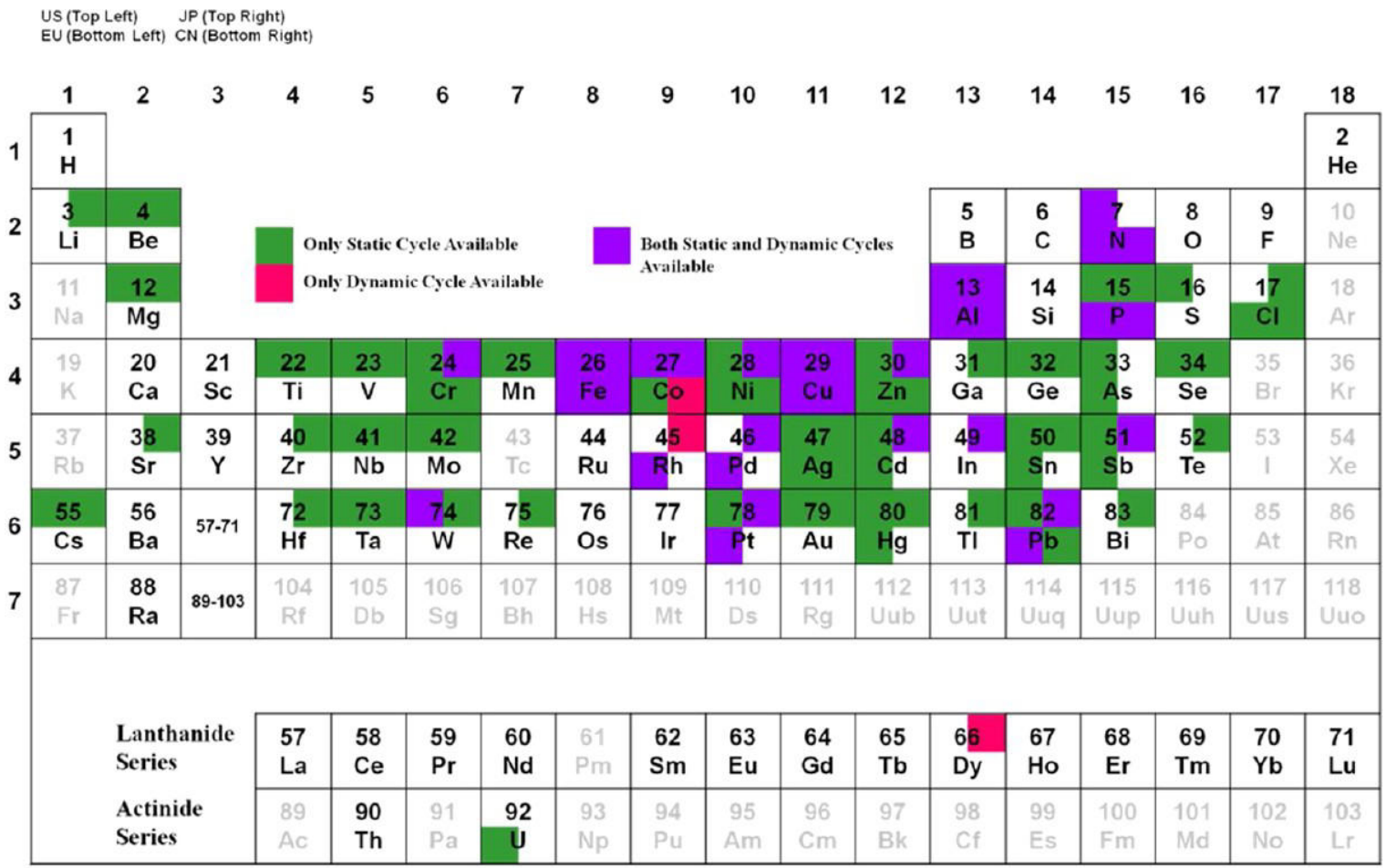


Old scrap supply



Pauliuk, S., R. L. Milford, D. B. Müller and J. M. Allwood (2013). "The Steel Scrap Age." Environmental Science & Technology **47**(7): 3448-3454.

Knowledge on anthropogenic material cycles

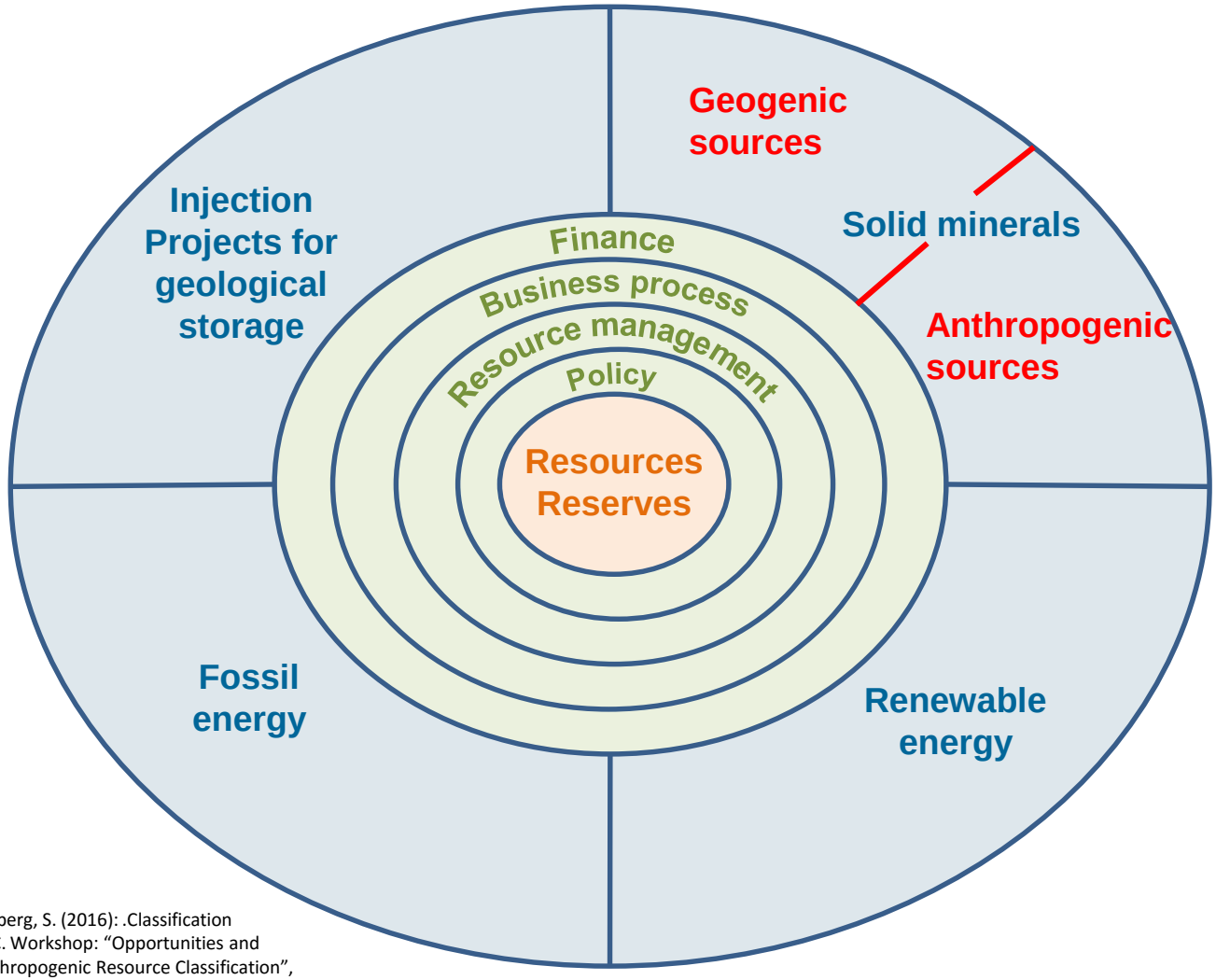


Chen, W.-Q. and T. E. Graedel (2012). "Anthropogenic Cycles of the Elements: A Critical Review." Environmental Science & Technology **46**(16): 8574-8586.

Lack of harmonized knowledge

- Multiple studies and data sources available.
- No common methodology to determine the availability of anthropogenic resources
  - Characterize stocks & flows in terms of quantity, quality and location.
  - Assess the feasibility for recovery
  - Assess the socio-economic viability

UNFC-2009: Domains of application



Adopted from Heiberg, S. (2016): .Classification according to UNFC. Workshop: "Opportunities and Challenges for Anthropogenic Resource Classification", Budapest, 6. October 2016.

Actuating the classification

MINING the EUROPEAN ANTHROPOSPHERE

MINEA

www.minea-network.eu

cost EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

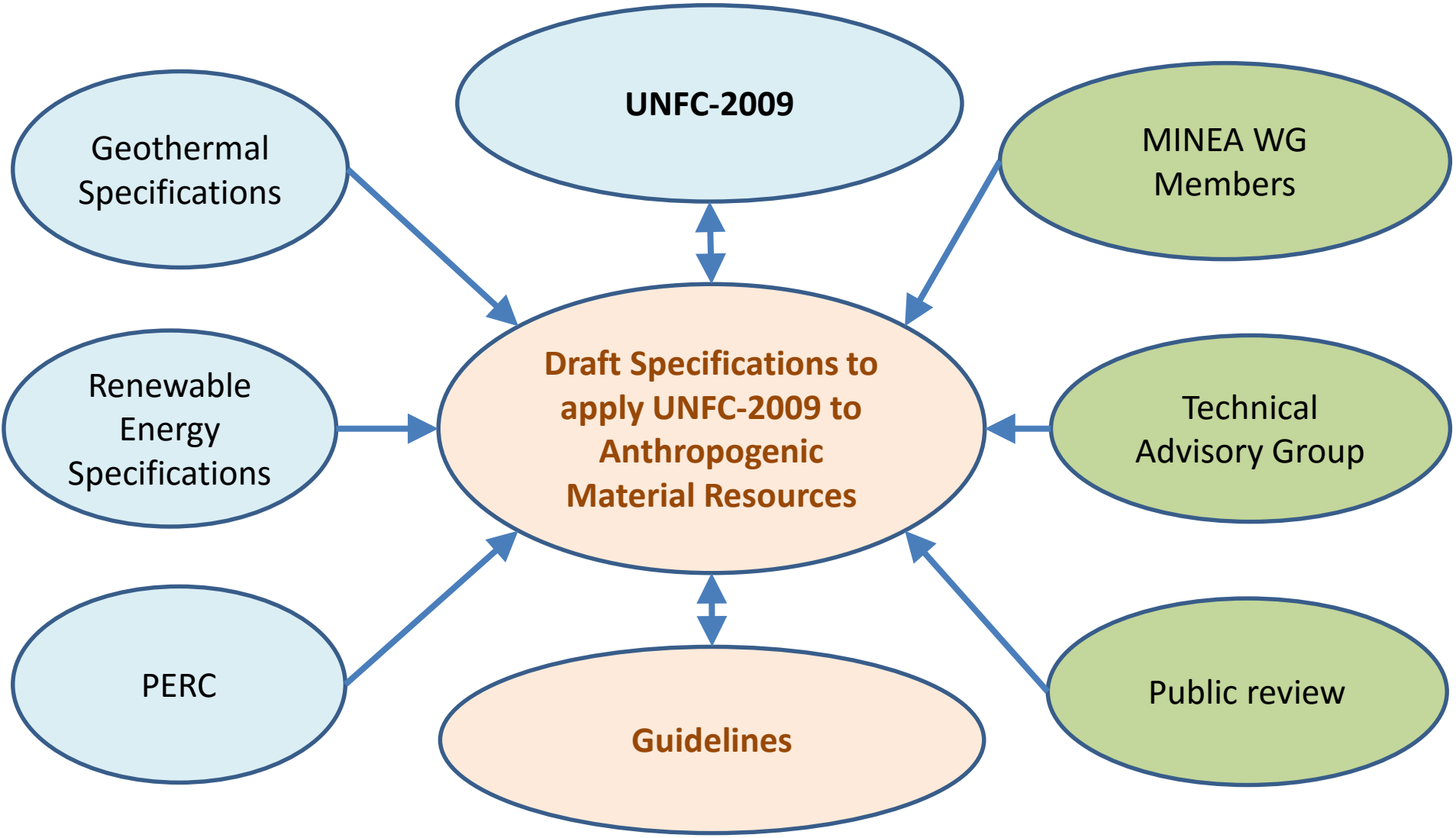
Working Group "Classifying Anthropogenic Material Resources"

- Submitting Draft Specifications to apply UNFC-2009 on Anthropogenic Material Resources
- Guidelines
- Final Draft
- Public comments
- Official approval

1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2016				2017				2018				2019				2020			

UNECE

Developing the Draft Specifications



Draft Generic Specifications ToC

I. **Introduction**

II. **Anthropogenic Resource Definitions**

- Terms: Anthroposphere, Material System, Material stock, Material flow, Material Source, Material Product(s)
- Classes, Projects, Project lifetime etc.

III. **Definition of categories and supporting explanations**

IV. **Generic specifications**

Examples of discussion

- Corporate vs. National Reporting
- Projects with multiple Anthropogenic Material Products
- e-axes
  - Definition of the system boundaries for economic and environmental assessment of the recovery project.

Guidelines

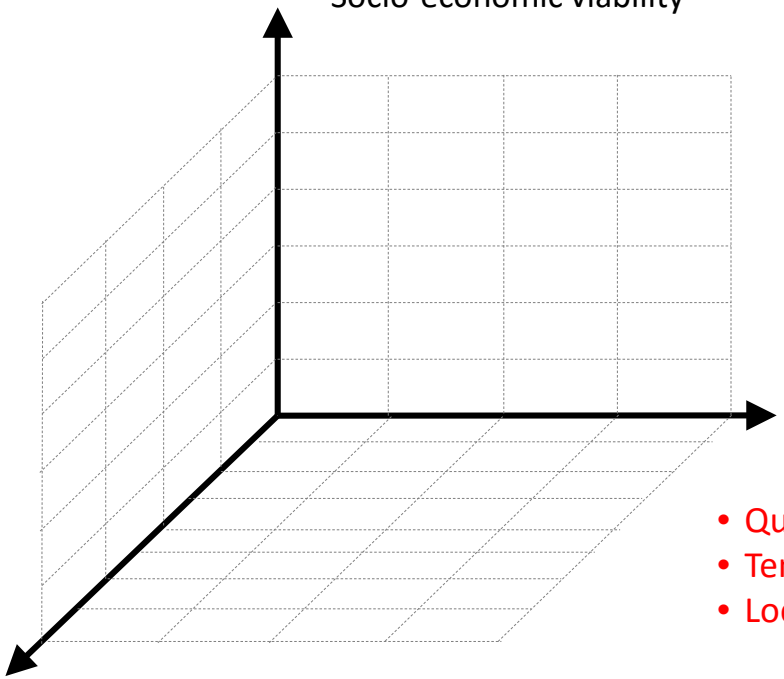
Developing case studies

- Domain of application
- Commodity-specific
- Source-specific

Identification of critical factors for the viability of material recovery projects

Looking for

- Existing case studies
- Candidates



Socio-economic viability

- Environmental profile
- Costs & revenues
- Ownership (legal access to the resource)
- Legal permissions (plant operations)

Knowledge on anthropogenic material system

- Quantity & Quality of resources
- Temporal availability
- Location

Feasibility

- Separation and recovery technologies

We do not need natural resources …

"…as such, but we need their functions or physical and chemical properties. To find solutions for functions, there are **three reservoirs**: the combined resources of the geosphere and the technosphere and the unlimited resource of human ingenuity."

Wellmer, F.-W. (2012). Discovery and Sustainability. Non-Renewable Resource Issues: Geoscientific and Societal Challenges. R. Sinding-Larsen und F.-W. Wellmer, Springer Netherlands.

Classification frameworks and the **EGRC/MINEA stakeholders have the power to integrate the three reservoirs.**