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OVERVIEW OF RESOURCE TOPICS IN LCA AND MFA

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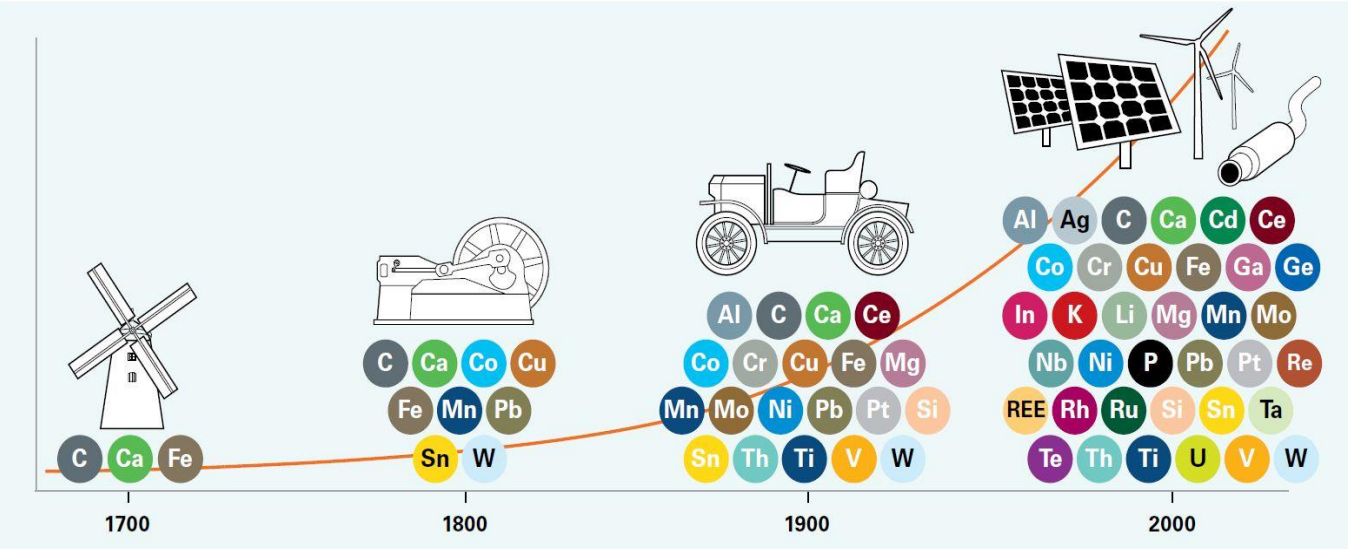
Starting situation

- **Economic activities demand resource use**
- **Extraction rates increasing**
- **Number of resources in use increasing**
- **Complex products are also complicated in recycling**



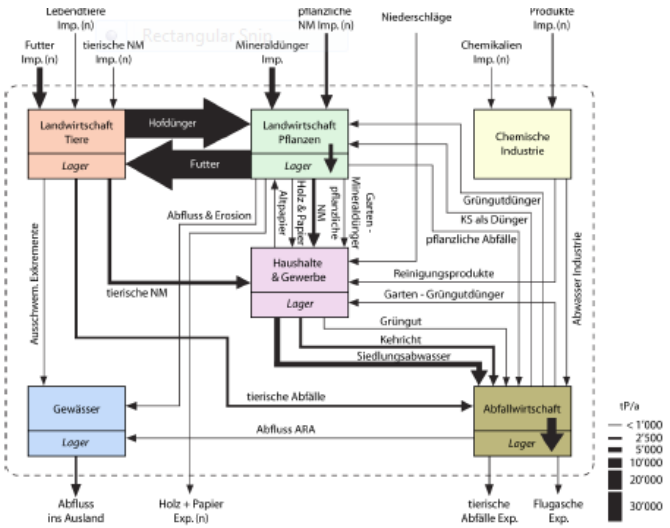
Source graph: Achzet et al. 2011, copied from PhD thesis Anna Stamp

Abiotic resources – what is the problem?

- Resources may be dissipated
- Resources may be depleted… „To Peak or not to peak?“
- Renewables may be exhausted
- Resource extraction and use have other impacts

Material flow analysis (MFA)

- Tool for resource monitoring and management
- Describes stocks and flows of resources → creates systems understanding
- Mathematical model of temporal developments of flows and stocks
- Helps to recognize resource scarcity (on a regional level) and to identify recycling potentials



Graph from Binder, de Baan, Wittemer 2009

„How much of a resource is available from primary and secondary sources and who are the users?“

Criticality

- **Approach for priorization of resources**
- **Set of indictors with 3 dimensions:**

  1. Supply Risk (SR): Geological, technical, economical, social and regulatory, geopolitical

  2. Vulnerability to Supply Restriction (VSR): Importance, substitutability, susceptibility

  3. Environmental Implications: Human health, Natural environment

- **User perspective**

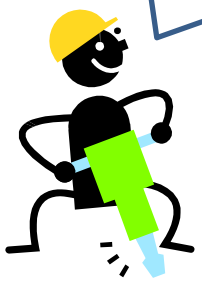
„May resource X not be accessible for me in the future?“

Life Cycle Assessment (LCA)

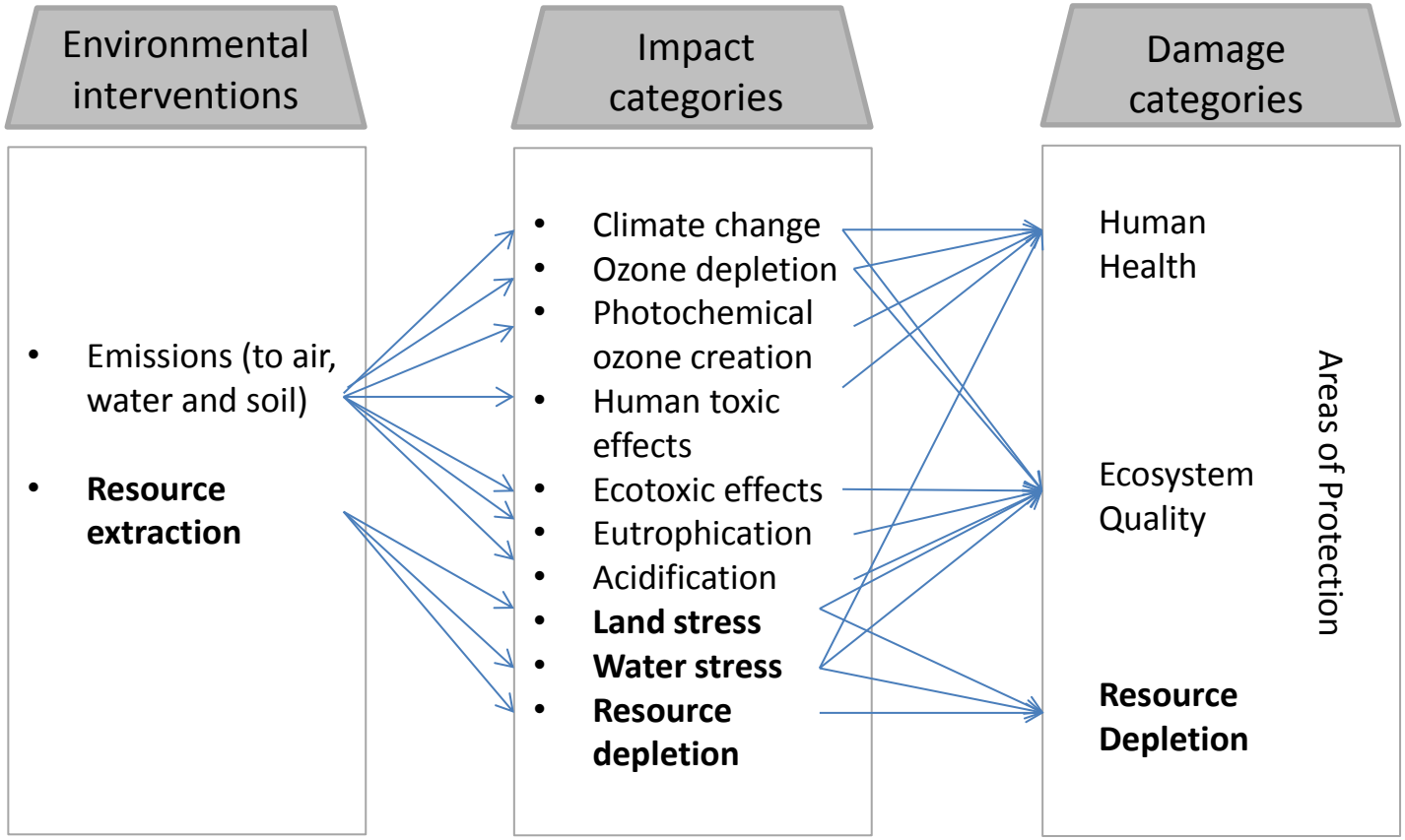
- **Comparison of products or scenarios with regard to their (resource) impact → no absolute statements**
- **Depending on method used, assessment in terms of**
  - Another reference resource
  - Scarcity of the respective resources
  - Additional energy needed for future resource extraction
  - Additional impact caused by this additional energy use
  - Addtional costs
- **Considers also other environmental impacts of processes attached with handling and unse of resources (climate change, toxicity etc.)**

Life Cycle Assessment

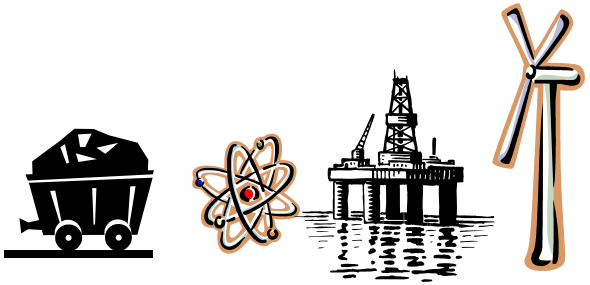
„Does my use of resources have impacts on the environment and humans (other than myself)? E.g. will other users be deprived of this resource (or is it more difficult for them to use the rsource)?“



Life Cycle Assessment



Existing resource indicators



- MIPS (Material Intensity per Service Unit)
- Cumulative energy demand CED
- Exergy → Talk Jo Dewulf
- Emergy/SED → Talk Jakob Rorbech,
- Statistical enthropy
- CML resource depletion, ILCD
- Ore requirement indicator
- Eco-indicator 99 surplus energy concept
- Recipe ore grade decrease and surplus cost concept → Thomie Ponsioen
- Swiss Method of Ecological Scarcity → Talk Rolf Frischknecht

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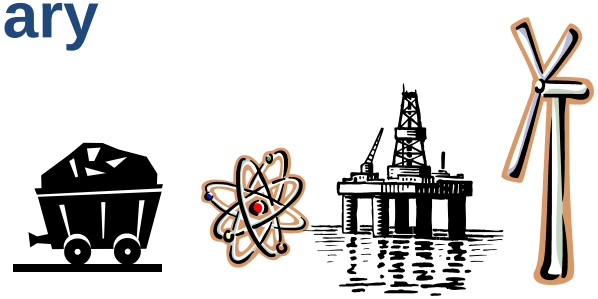
- Criticality → Talk Philip Nuss
- … → Laura Schneider

Existing resource indicators - summary



- „Environmental“ indicators address either
  - Scarcity,
  - Resource quality OR
  - Inherent property/ultimate resource
- Have a different degree of complexity
- Are applicable to varying number of resources
- Indicators differ in scope (e.g. consideration of geopolitical facotrs; social/economic factors)

Questions

- Is resource use an economic and/or environmental problem?
- What is the safeguard subject?
- What to assess? Scarcity? Resource quality?
- Is there an „ultimate“ resource? … Energy? Exergy? Money?
- Integrate renewable and non-renewable resources?
- How to include damages of potential resource limitations?
- How to deal with tradeoff between complexity and number of resources assessed?
- Who should bear the burden?

Thank you