"German Network on Life Cycle Inventory Data - Set Up of a Data Collection"

inLCA/LCM, Seattle, Sept. 2003

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1. Introduction
2. Objectives
3. Examples
4. Summary
5. Outlook

Life Cycle Approach as Steering Instrument for Sustainable development

Environmental policy:

- **EU-integrated product policy (IPP): Communication June 2003**
- **IPPC: Best available technique REFerence documents (BREF)– EU task force on methodology: "Cross Media Issues"**
- **Future EU resource management policy**

Industry:

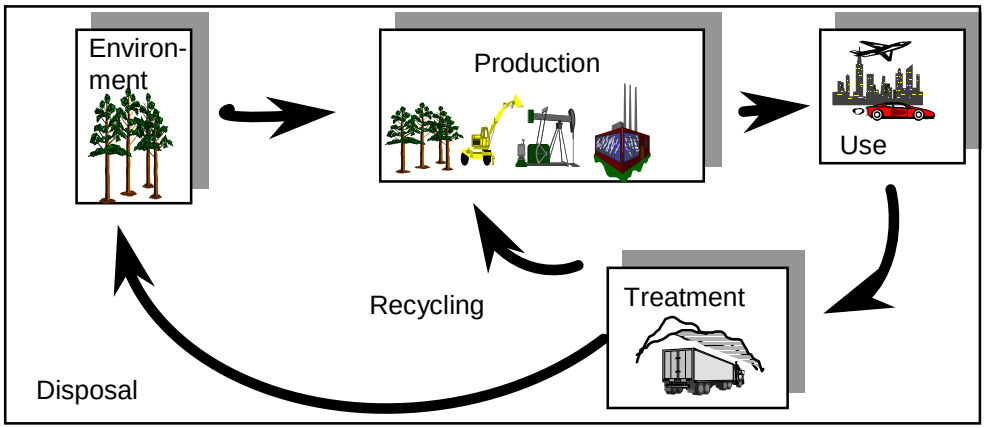
- **"Design for the Environment"**
  e.g. automotive, telecommunication, and electric industries,
  SFB 392 TU Darmstadt "Environmentally Sustainable Product Development"
- **Process Optimisation**
  e.g. BMBF joint project "Changeover of electroplating plants to low-loss process technology with parallel cost reduction"
- **Environmental Management**
  e.g. evaluation of environmental impacts EMAS

Consumers:

- **Ecolabel Type III**
  e.g. AUB Expert Committee on the Ecological Declaration of Building Products

"Life Cycle Assessment – Quo Vadis?"

BMBF, 31. Mai 2001



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- Extensive studies in a number of economic and consumer goods sectors
- Various data inventories in databases and EPD tools
- Advanced methodology
- Standardization

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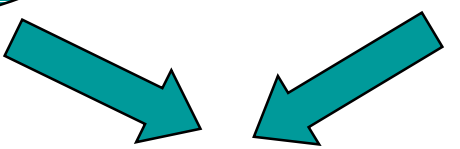
- No effective administration and further use of findings obtained
- Splitting of know-how, lacking compatibility of data inventories
- Standardization sets general frame only, hence, various methodological approaches

⇒ Uncertainty of users of LCA results

BMBF:
Life cycle assessment
as an instrument of resource-efficient management
"Economy-related sustainability"

FZK:
Life cycle assessment
as R&D issue in the HGF Earth and Environment research area, Program 6 "Sustainability and Technology"



Continuity and scientific infrastructure for research on the supply and use of life cycle inventory data

- Long-term perspective by integration in HGF
- Network of experts
- Coordination of individual activities

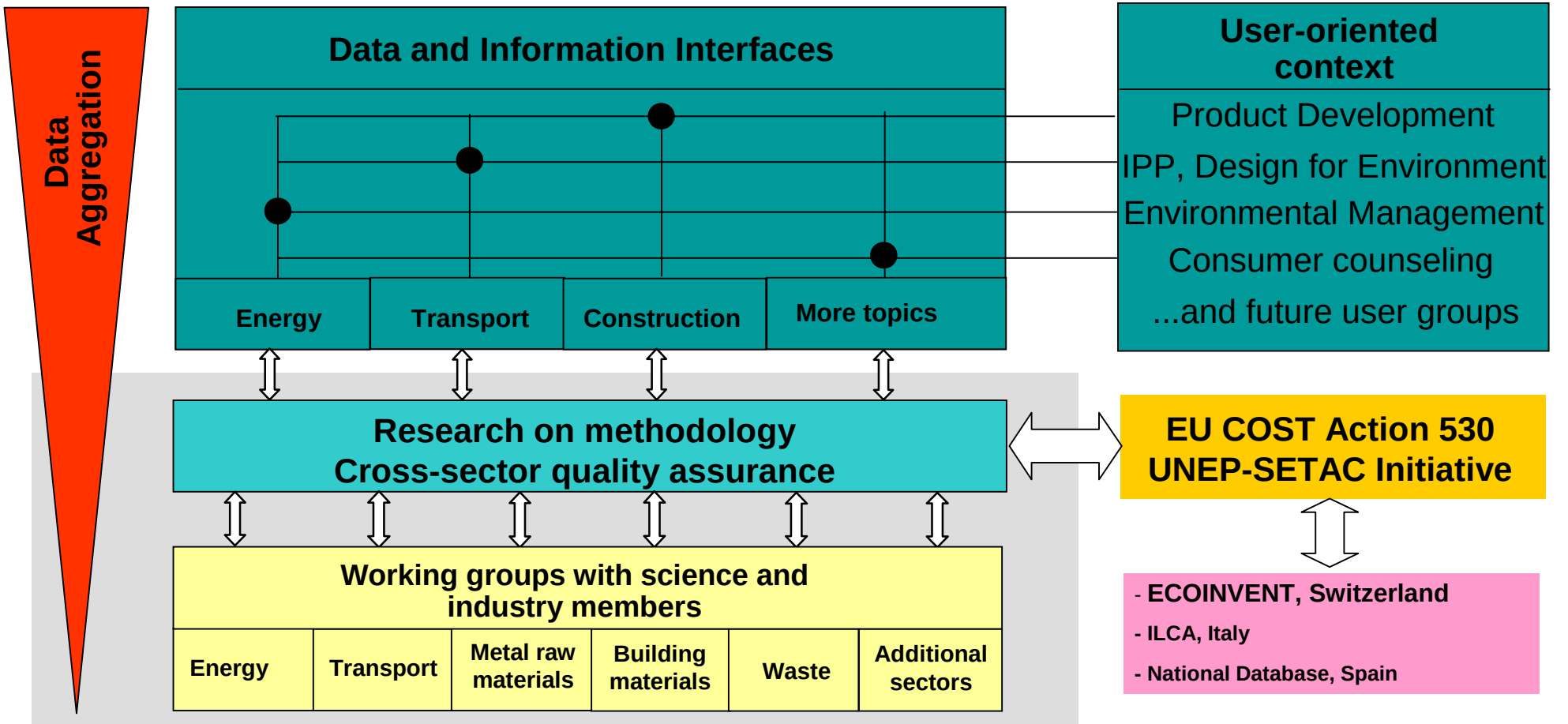
Preliminary Study "Quality Assurance and User-oriented Supply of Life Cycle Inventory Data"

- Term: 3/02 – 12/02
- Scope: Life cycle Inventory Data
- Tasks:
  - Contacting major stakeholders / demand analysis
  - Development of long-term concepts and implementation models
  - Presentation of results at a workshop (11-18/19, 2002)
- Resources: 3 members of staff

Partners

- 3 Helmholtz-Centers (FZ Karlsruhe, FZ Jülich, DLR Stuttgart)
- 9 Universities and technical colleges
- 11 Companies and industry associations (mainly metal, energy, building materials)
- 5 non-university research organizations
- 3 Federal organizations: Environmental Agency (UBA; several units) Federal Agency for Geosciences and Resources, Statistical Office

"German Network on Life Cycle Inventory Data"



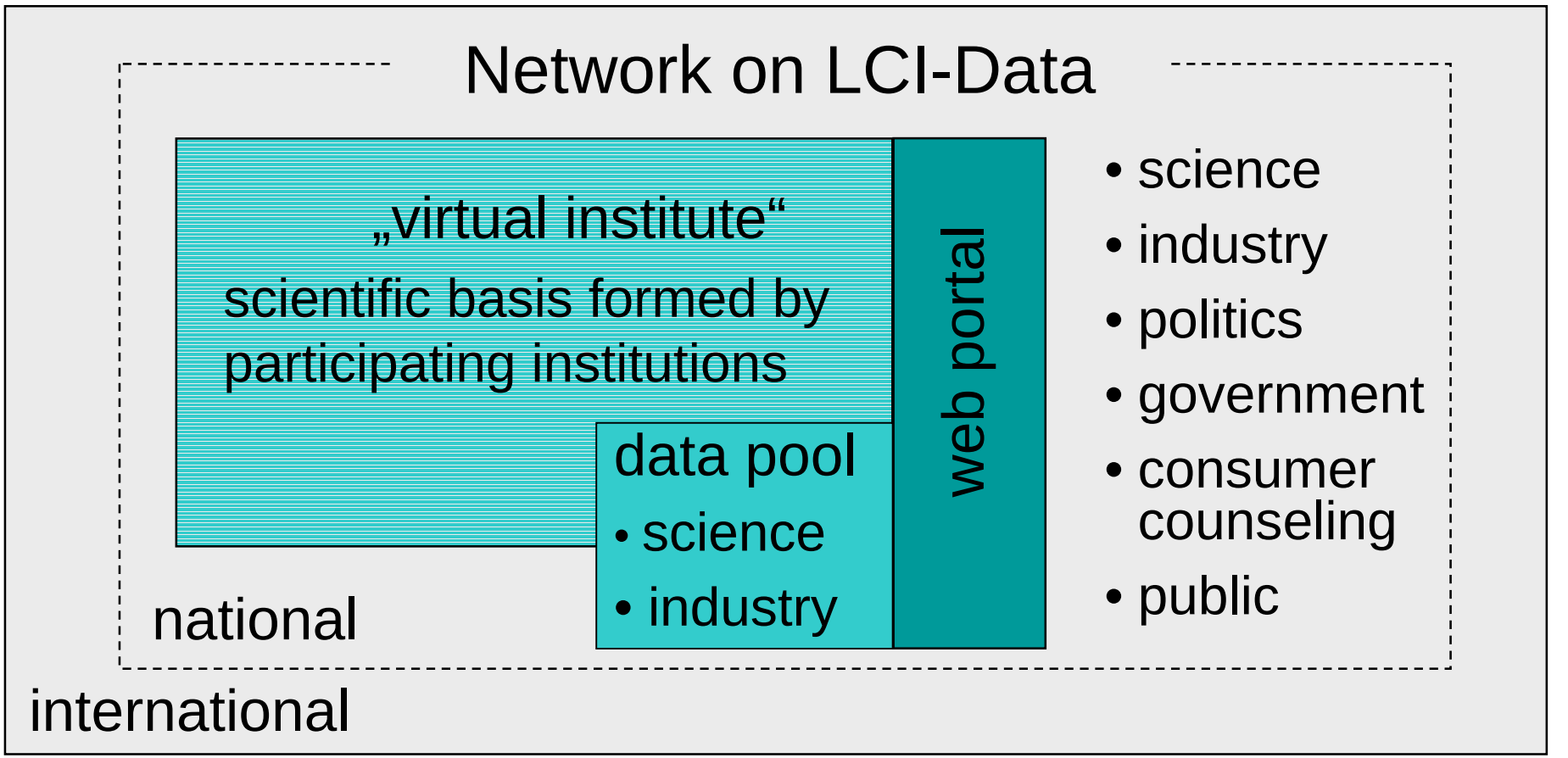
HGF Impulse and Network Fund

- September 2002:
  Promotion Initiative from the president of HGF for cross linking of Helmholtz-Centres with universities by foundation of a

„Common Research Center and common (virtual) Institute“

- Funding the start-up phase of a common Center/Institute (240.000 €/a for max. 3 years)
- Joint proposal by ~20 scientific institutions
- Approval in October 2003

"Virtual Institute"



- Strategic Targets till 2006 -

- **Data Supply:**

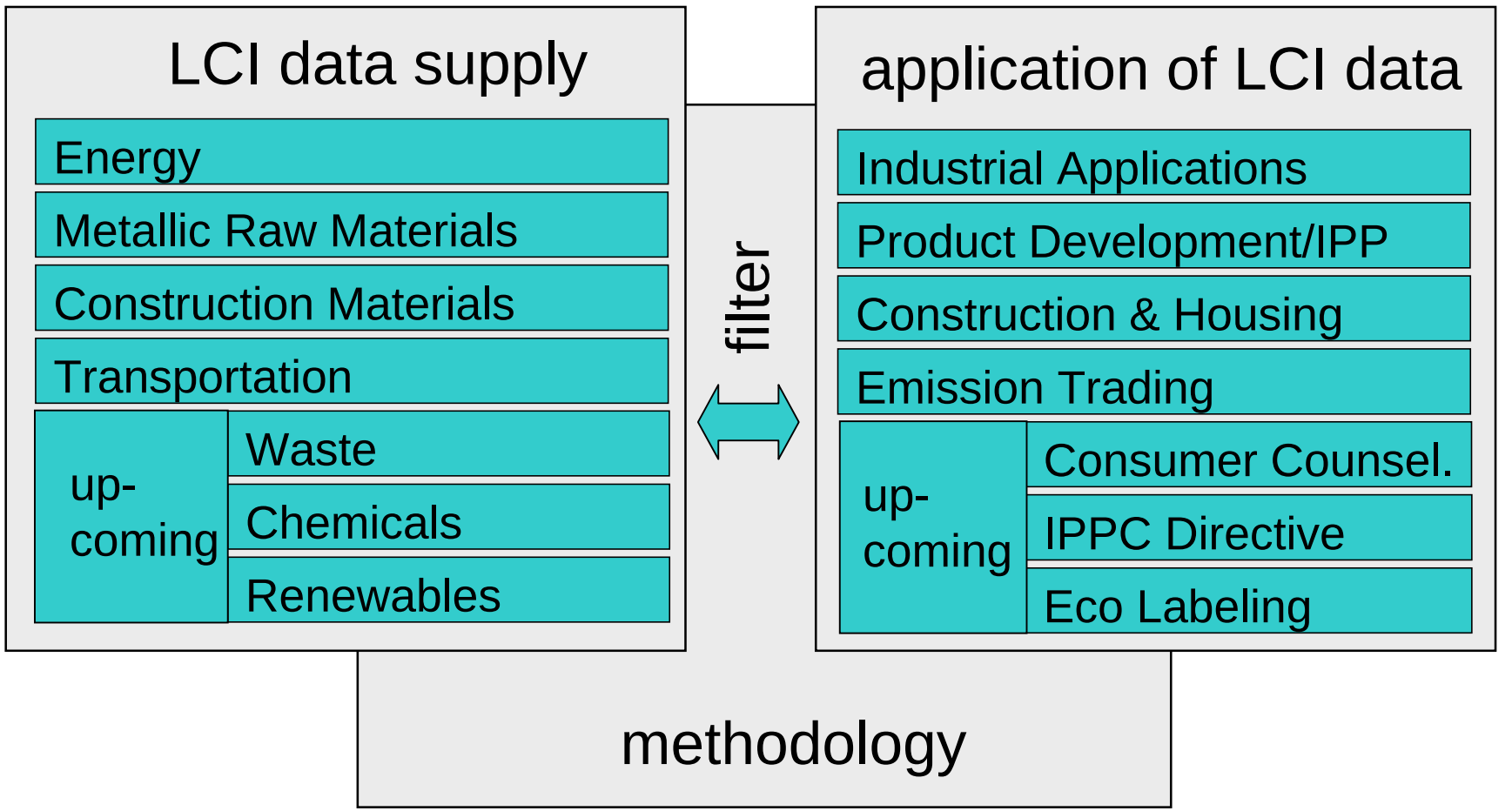
  Supply of a core set of permanently updated data within a durable organization model

- **Data Utilization:**

  Defined views on data for different application areas fostered by coordinators within the network

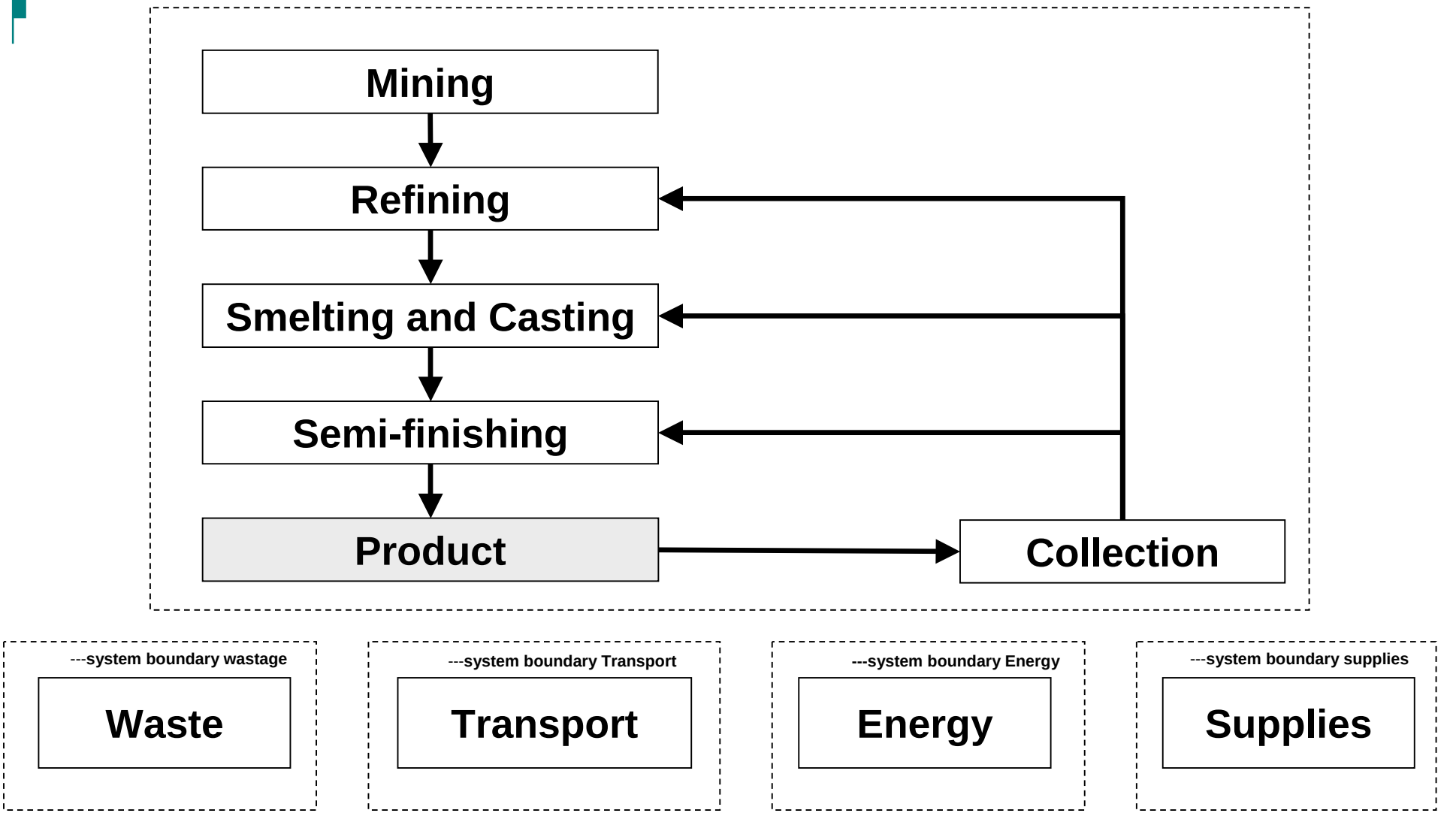
- **Integration in international activities**

Work Programme



Example WG Metallic Raw Materials

- Coordination: Dr. W. Kuckshinrichs; Forschungszentrum Jülich, Programme Group Systems Analysis and Technology Evaluation (STE)
- Participants: industry, associations, LCA-practitioners, university/research-institutions
- Objectives
  - Terms of Reference
  - selection of important alloys based on national exchange relations (Fe, Al, Cu, Zn, Mg)
  - Development of a non-metal-specific process-chain scheme
  - pilot study aluminium


Mining
Refining
Smelting and Casting
Semi-finishing
Product
Collection
---system boundary wastage
Waste
---system boundary Transport
Transport
---system boundary Energy
Energy
---system boundary supplies
Supplies

Examples (2)

Pilot Study Aluminium

- Task Force with participants from the corresponding institutions and the Forschungszentrum Karlsruhe
- Comparative analysis of 3 different inventories for aluminium

  - European Aluminium Association (EAA)
  „Environmental Profile Report for the European Aluminium Industry“

  - Collaborative Research Center 525 (RWTH Aachen, FZ Jülich)
  „Ressource orientated analysis of material flows of metallic raw materials“

  - Federal Agency for Geosciences and Resources (BGR)
  „Materials Flow and Energy Required for the Production of Selected Mineral Commodities - Part Aluminium“

Comparison for Alumina Refining

	INPUT				OUTPUT				
	Electr.	**Bauxite**	**NaOH**	**CaO**	**CO2**	**NOx**	**SO2**	**Dust**	**HC***
	kWh/t	kg/t	kg/t	kg/t	kg/t	kg/t	kg/t	kg/t	kg/t
BGR	265,3	2368,4	94,7	94,7	957,9	2,1	9,5	7,9	na
EAA	313,1	2137,8	120,1	46,0	35,9	0,02	0,1	7,7	1*E-04
SFB525	495,0	1889,6	116,9	41,9	496,2	0,8	na	na	na

*HC= other than CH4, PAH

Differences due to:

- modelling methodolgy
- spatial and temporal boundaries
- cut-off criteria
- scope of survey on elementary flows
- recycling of scrap/wastes
- semi-finishing of products

Roadmap for Harmonisation

1. Definition of essential modules according to the general process chain
2. Identification and specification of non-metal-specific modules
3. Re-definition of Al-specific system boundaries
4. Proposal of geographical references
5. Determination of exchanges/elementary flows
6. Modelling of representative technologies
7. Proposal of a temporal data evaluation/update-scheme
8. Compilation of representative datasets
9. Review of data

Example WG Energy

- Coordination:

Dr. W. Krewitt; Dr. P. Viebahn; German Aerospace Center (DLR)

- Participants:

LCA-practitioners, university/research-institutions, industry

- Objectives
  - Terms of Reference
  - Pilot study „German Electricity Mix 2000“
  - Several ensuing projects regarding energy related applications (like geothermal energy, CO_2-sequestration, LCA and CO_2-trading ...)

Pilot Study: „German Electricity Mix 2000“

- Overall objectives:

  - Harmonization of LCI data for electricity generation, including full process chains for energy carriers and power plants

  - Method for annual updating these basic data

  - Handling methodological questions

- Current focus:

  Harmonization of data on coal supply life cycles, taking into account different coal properties, different regions of origin, different technologies for coal extraction and coal preparation, to provide standardized German data set

Starting Point: Coal Chain (1)

	PE* TJ/TJ	**CO2** kg/TJ	**CH4** kg/TJ	**SO2** kg/TJ	**NOX** kg/TJ	**NMHC** kg/TJ	**Partic. matter** kg/TJ
FFE	0,070	4.920	468	15,7	10,3	1,0	1,2
IFEU	0,075	5.140	313	31,9	35,8	1,8	3,9

*: excluding calorific value — IFEU 2003

Data comparison is based on

- Relevance of individual processes in relation to full fuel cycle
- Data variation for individual processes with the LCA-models used by different teams
- Data sources

Starting Point: Coal Chain (2)

Causes of differences (selection) and assessed effort of harmonization:

- "Easy" to harmonize: different regions of origin, shares of open pit and underground mining
- Medium effort required: different efficiencies and emission factors of mine power plants in Germany
- Probably research required: different efficiencies and emission factors of mine power plants in foreign countries, methane emissions (mining), emissions of seagoing vessels

Summary

- growing interdisciplinary and national activity
- broad stakeholder integration
- thematic focus on:
  - universal background-systems
  - specificities of different application areas
- scientific focus on harmonisation and integration of data

Outlook

- fund-rising for data acquisition
- defining the business case for the network
- implementing a pilot version for information infrastructure
- Workshop on LCI-Data Quality October 20-21 in Karlsruhe:

http://www.lci-network.de/lci-quality

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