



# **North American Industry Database Projects**

## **The Aluminum Experience**

**Paola Kistler & Gerald Rebitzer, Alcan Inc.**

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# Aluminum: Strong LCA Messages (Examples)



- To produce 1kg of ingots from scrap only 5% of GHG are emitted, compared with ingots produced from primary metal
- 1 kg of aluminum which replaces heavier materials in a car has the potential to save 20 kg of CO<sub>2</sub>e

# History of Global Data Collection in the Aluminum Industry



- The worldwide collection of aluminium data to be used in life cycle assessments was initiated by the IAI Board in **1998** with the following resolution:
  - “The Board of Directors of the International Aluminium Institute [(IAI)] desires that the Institute develop as complete an understanding as possible of the positive contributions that the aluminium makes to the environmental and economic well-being of the world’s population; of any negative economic or environmental impacts that its production may cause; and of the balance between these positives and negatives during the entire “life cycle” of the material.”

# Inventory for Global Primary Aluminum Production: Goal and Scope Definition



- The intended purpose of this inventory report is to accurately characterize resource consumption and significant environmental aspects associated with the worldwide production of primary aluminium. It reflects the fact that primary aluminium is a globally traded commodity
  - The collected data will serve as a credible basis for subsequent life cycle assessments of aluminium products
  - Accordance with internationally accepted practice (ISO 14040 series standards)
  - Peer-reviewed data set
  - Only horizontally aggregated to ensure confidentiality requirements of single companies (so that process data are transparent)

# Comprehensive Data Collection for Different Life Cycle Phases



- Data collection through Aluminum Associations
- Upstream processes
  - Worldwide: main steps in primary aluminum production
    - Bauxite mining, production of alumina, production of primary aluminum:
- Downstream processes
  - Europe: main semi-fabrication steps
    - Encompasses several industrial processes for the production of rolled products, extrusions, wire, tubes, forgings and castings
- Use phase processes
  - Worldwide data collection on quantity of aluminum used in major applications: transport, building and construction, packaging and engineering
  - Quantification of environmental benefits of light-weighting
- End of life phase:
  - Worldwide recycling data on all major applications

# Aluminum Industry Supplier of Data to Public and Commercial databases



- The aluminum industry recognized the benefits of LCA early
- Standardized data gathering throughout the industry
- Peer-reviewed datasets
- Supply of the data sets through the associations to public and commercial databases free of charge

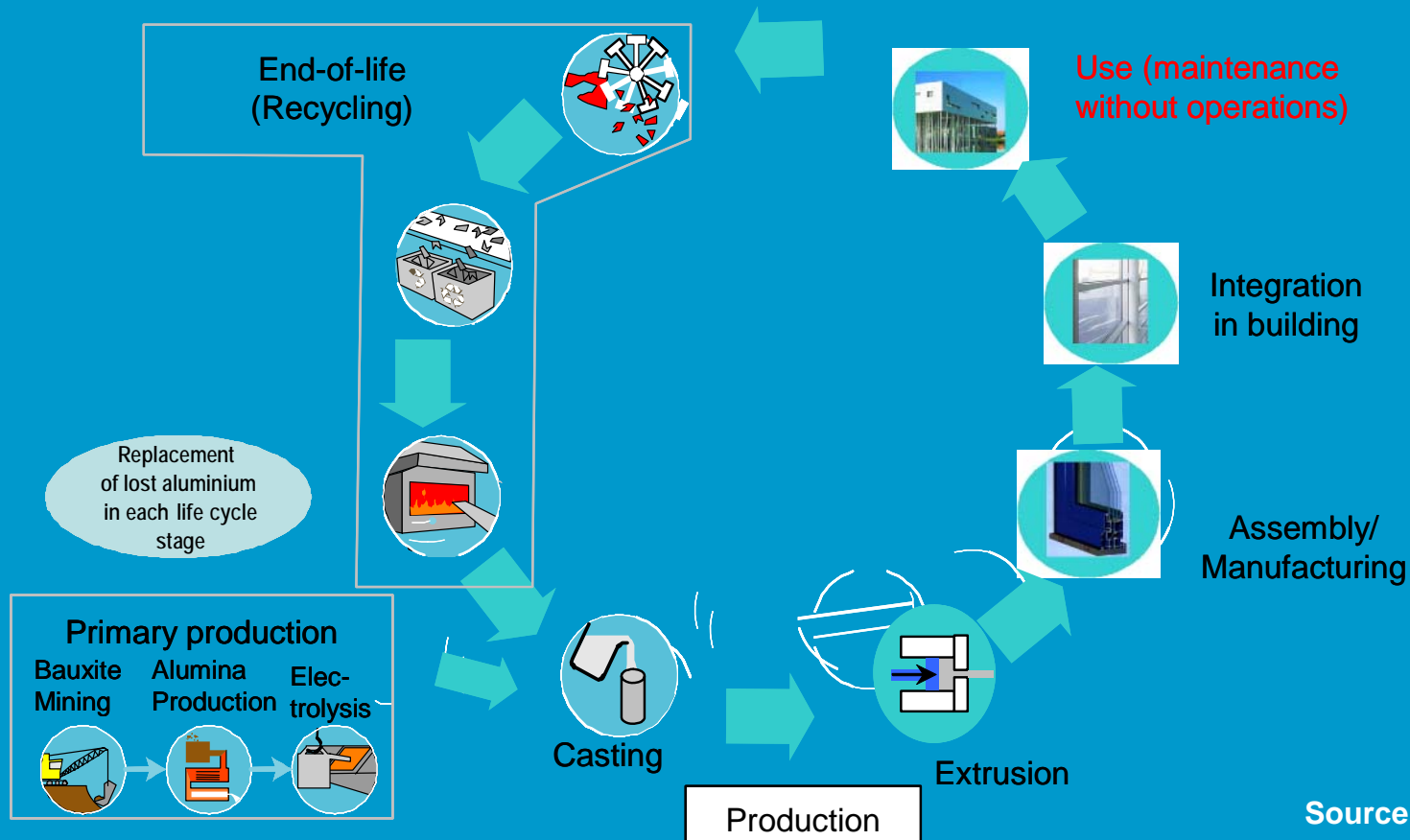


- **But use of the correct data doesn't guarantee correct results**  
→ appropriate modeling for the goal and

# Problems in Use of Inventory Data from Public/Commercial Databases (I)



## Treatment of Recycling



Source /EAA 2006/

# Problems in Use of Inventory Data from Public/Commercial Databases (II)



- Appropriate use of national vs global data
  - Aluminum is a globally traded commodity
  - Model for energy generation
    - Grid mix
    - Specific electricity supply
  - Semi-finished products are rather traded regionally, e. g. Europe, North America, but technology is globally identical
- Updating data: some aluminum data have improved significantly, e. g. GHG emission (i.e. reduction of GHG emissions of primary aluminium production by 1 t CO<sub>2</sub>e per t of aluminum within five years)
- Difficulties to document and update meta-data (what are the assumptions, modeling choices, data references, etc. behind)
- User of databases responsible to define proper functional unit: material comparisons as kg material A vs kg material B misleading

# Conclusions



- Commercial and public databases should co-operate with aluminum associations (IAI, EAA) to obtain the best available data
- Data modules have to be sufficiently disaggregated and/or specific in order to enable the modeling of the specific product system, taking into account
  - Product/material recovery and recycling rates
  - Using the appropriate electricity mix
  - Relevance of global vs national inventories
  - Requirements of consequential modeling
  - Etc.
- Documentation of meta-data must not be neglected

