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Czech Technical University in Prague

# Guidelines for the use of existing LCA data on building materials as generic data for a national context

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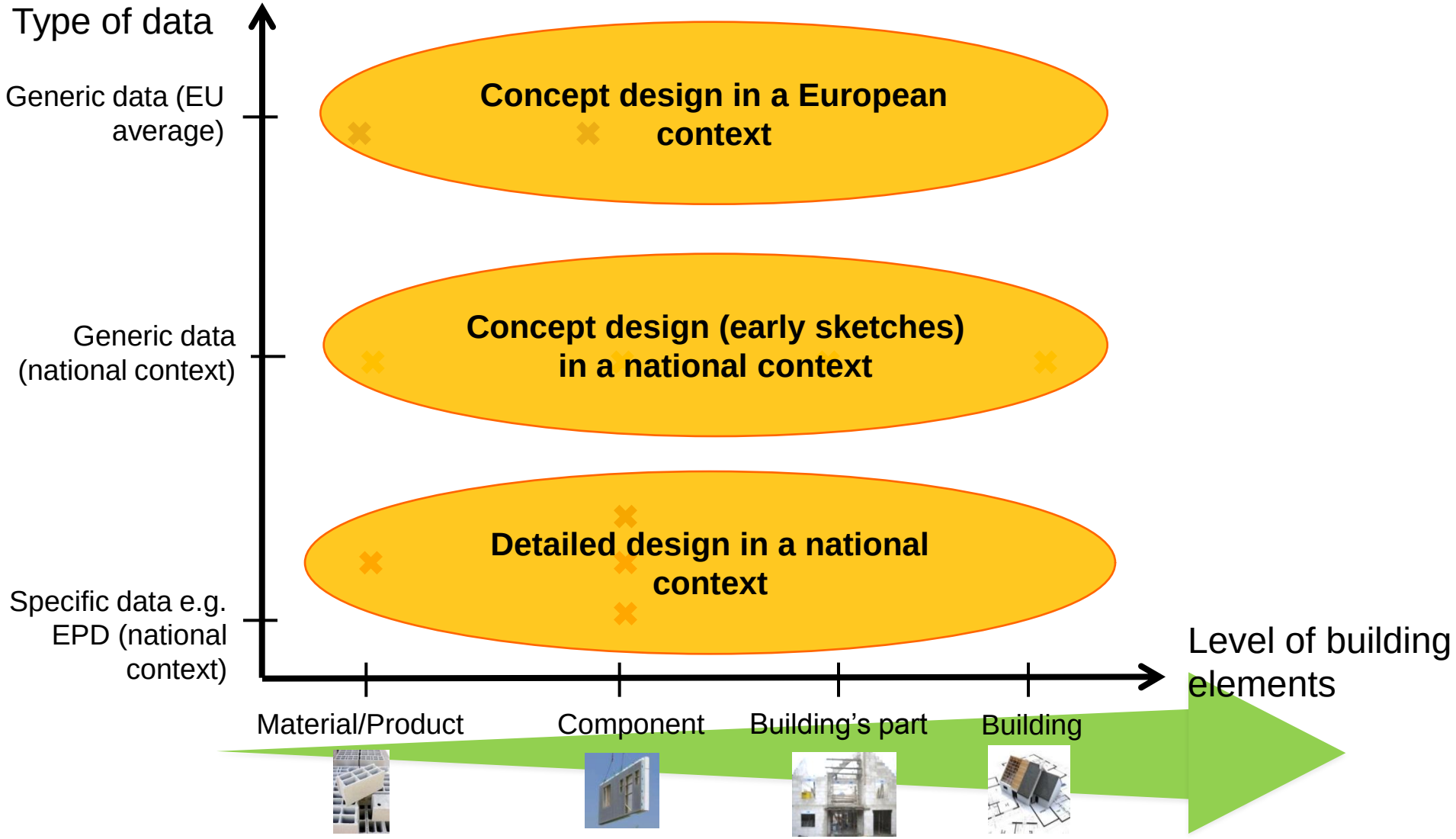
# Context of the study
# LCA of buildings for different goal and scope



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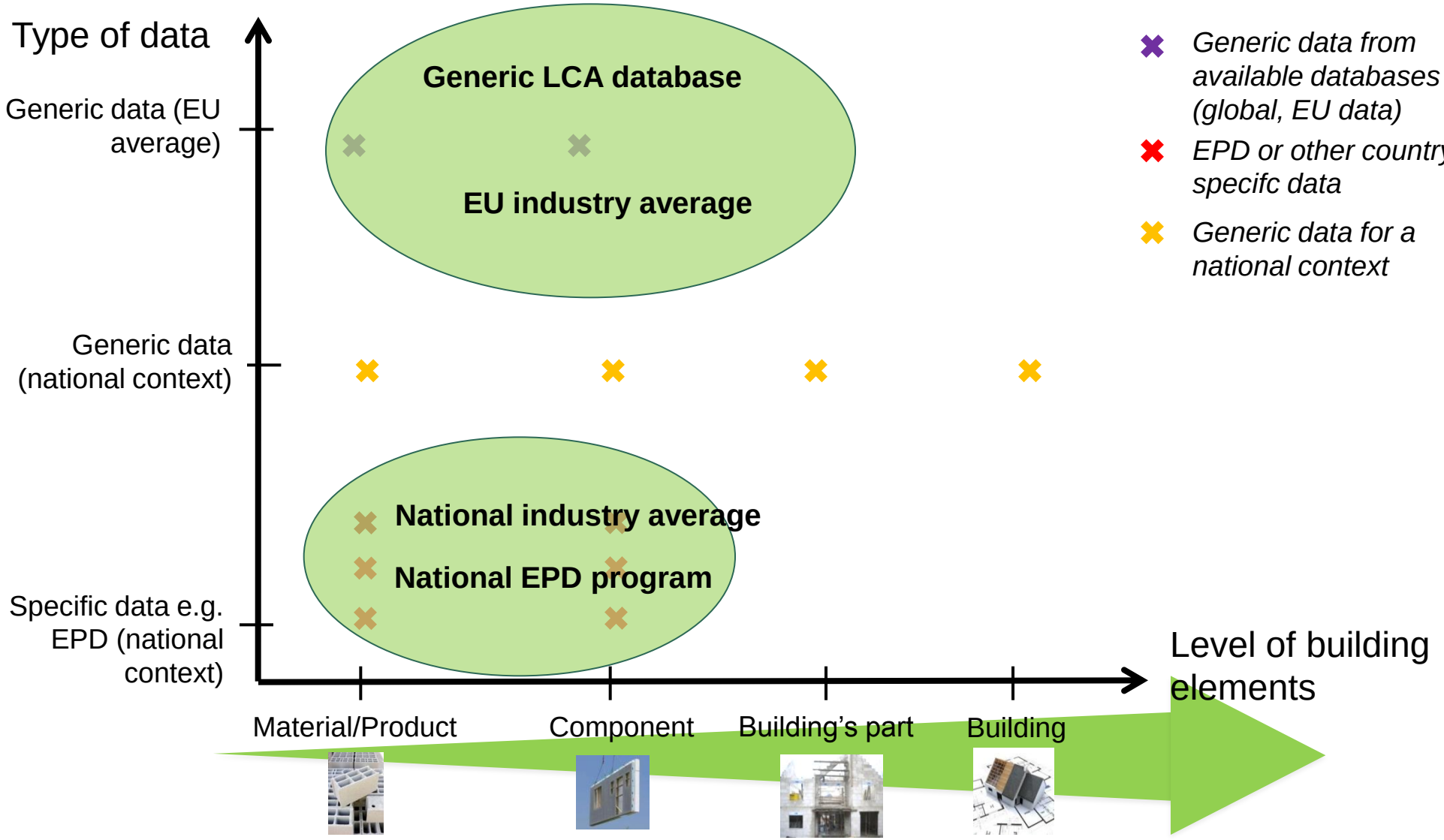

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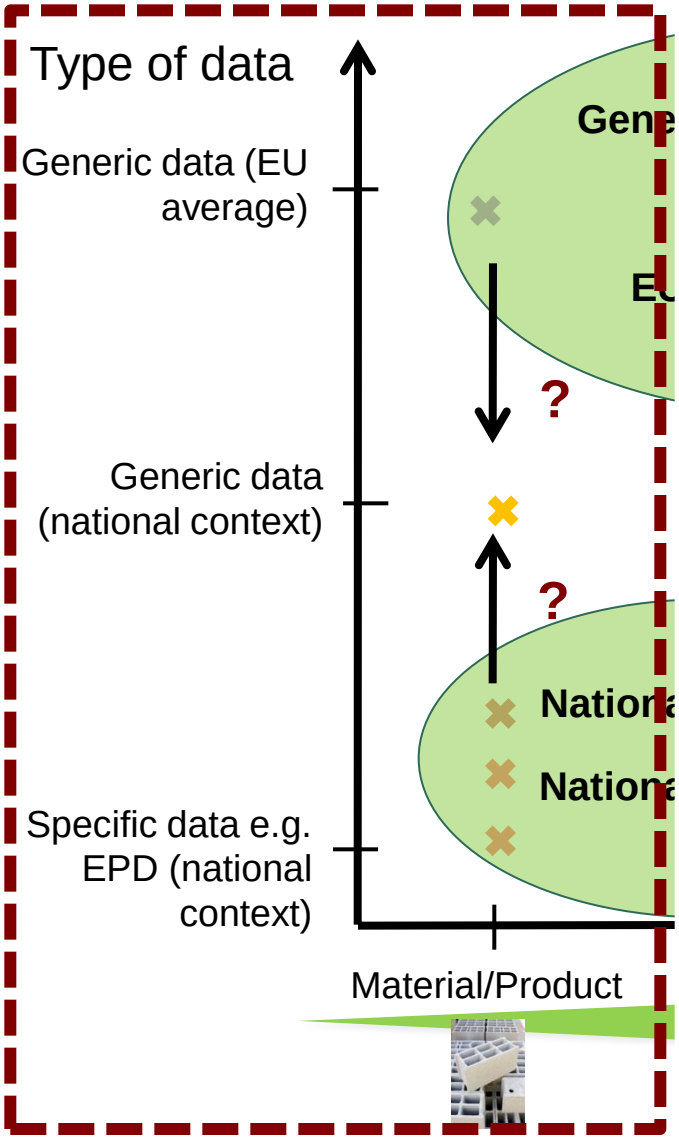


**Aim of the study:**

**Propose guidelines for the choice of existing LCA/EPD data as generic data for a NATIONAL CONTEXT.**

**Scope of the study limited to the building materials and products and cradle-to-gate system boundary.**

# Background of the study

**Existing LCI database developed at CSTB** - generic Ecoinvent and French EPDs for building products data grouped in one database using harmonized LCI and LCIA parameters.

**=> Preliminary comparisons** of LCA data from Ecoinvent x INIES made, showing large variability

**=>** Analysis of **applicability** of either contextualized Ecoinvent or French EPDs **as generic data for a national French context** needed

- to fulfill the need of a consistent and representative generic data

# Background of the study
## 1 data is better than no data for a national context

- **Conduct new LCA** studies for every building material sold on each national market e.g. in the European context

  ✘ Not always feasible under given time/cost constraints

- **Use of existing LCA or EPD** data either country-specific, european average or generic data from available LCA/EPD databases

=> Implement **data quality indicators** according to CEN/TR 15941 [1]

**2 main criteria** of data quality to keep in mind:

- **consistency** (methodology, cut-off rules, etc.)
- **representativeness** (geograph., technol., time-rel.)

*[1] CEN/TR 15941 Sustainability of construction works – Environmental product declarations – Methodology for selection and use of generic data*

# Background of the study
# Wording according to the ILCD Handbook: specific, average, generic data

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**French context and EPD system**

**1 manufacturer, 1 commercial reference** →

**Group of manufacturers, arithmetical mean** →

**Most of Ecoinvent data** →

**Overview**

In LCA, specific, average and generic data sets are often differentiated. In practice typically a combination is found. The "pure" concepts are nevertheless explained here, as they imply relevant differences in data collection, modelling, documentation, and review.

**Terms and concepts: Specific, average and generic data sets**

**Specific data**

A specific data set in its pure form represents a single process (e.g. a specific technology as operated on a given site) or system (e.g. a specific product model of a single brand) . It exclusively contains data that has been measured at the represented process. For data sets on whole systems that would means that all data for all processes has actually been measured.

**Average data**

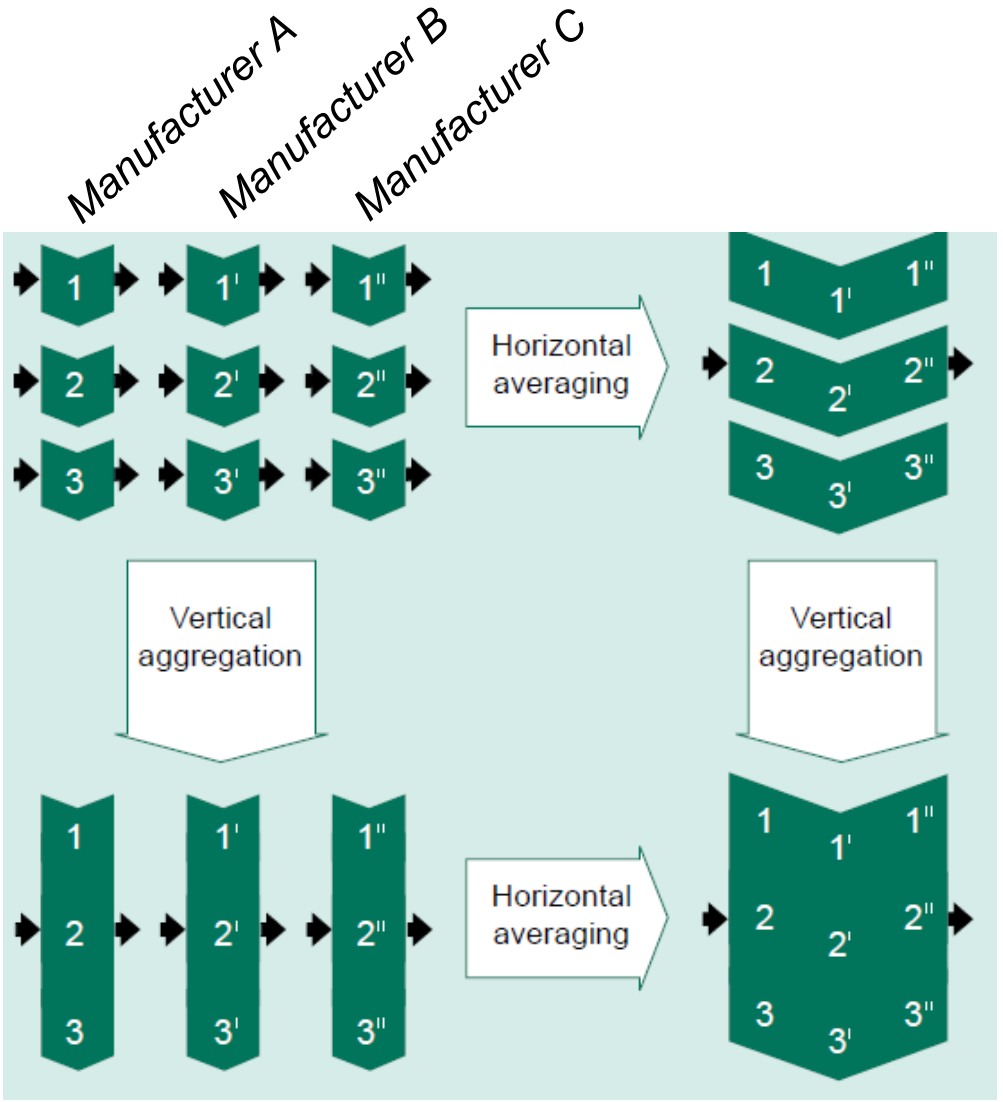
An average data set ideally combines different specific data sets and/or other average data in an averaging way to represent a combination of processes (e.g. different waste incineration technologies) or systems (e.g. a products group). The averaging can - among others - go across technologies, products, sites, countries, and/or time.

**Generic data**

A generic data set has been developed using at least partly other information then those measured for the specific process. This other information can be stoichiometric or other calculation models, patents and other plans for processes or products, expert judgement etc. Generic processes can aim at representing a specific process or system or an average situation. Both specifically measured data and generic data can hence be used for the same purpose of representing specific or average processes or systems.

*Taken from ILCD Handbook, Detailed Guidance for Life Cycle Assessment, chapter 7.5. Developing generic LCI data, page 246*

# Background of the study
# Averaging of industry data (principles)




*Taken from UNEP/SETAC Life Cycle Initiative, Global Guidance on Life Cycle Assessment databases*

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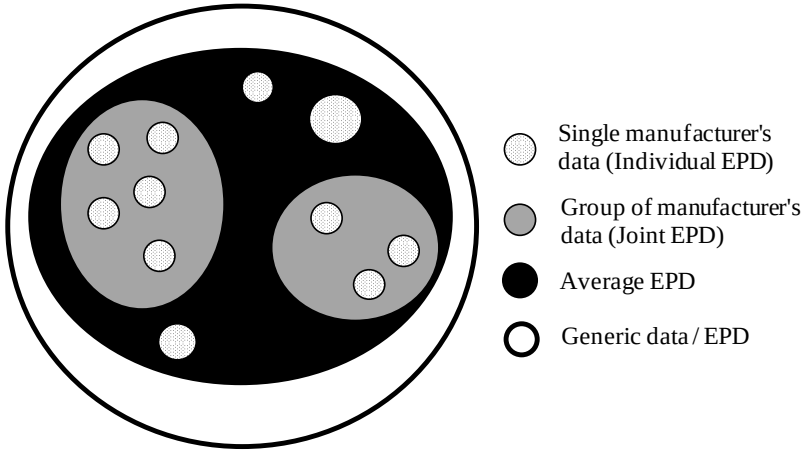
# Guidelines for the use of existing LCA/EPD data as generic data - Methodology

1. **Data collection from available LCA/EPD databases**
2. **Selection of a sample of data to be used as generic data**
   - Averaging of EPD
   - Contextualization of existing generic data
3. **Data quality assessment**
   - Representativeness (geographical, temporal, technological)
   - Completeness (in a view of a generic data)
   - Consistency (background database used, methodological choices etc.)
   - Reliability
   - Plausibility
4. **Comparison of LCI and LCIA indicators and variability assessment**

# Case study - French context - Glass wool
## 1. Data collection

- **Identification of LCA and EPD data** in available databases

- **Collecting different LCA data**
  - different sampling levels:
    1. specific to a manufacturer
    2. representing an average
    3. generic data



# Case study - French context - Glass wool
# 2. Selection of a sample of data to be used

a) Use of **country specific EPDs** for building materials

- Different datasets were considered as generic data, see the table below

b) Use or adaptation (contextualization) of country-specific or European **generic data**

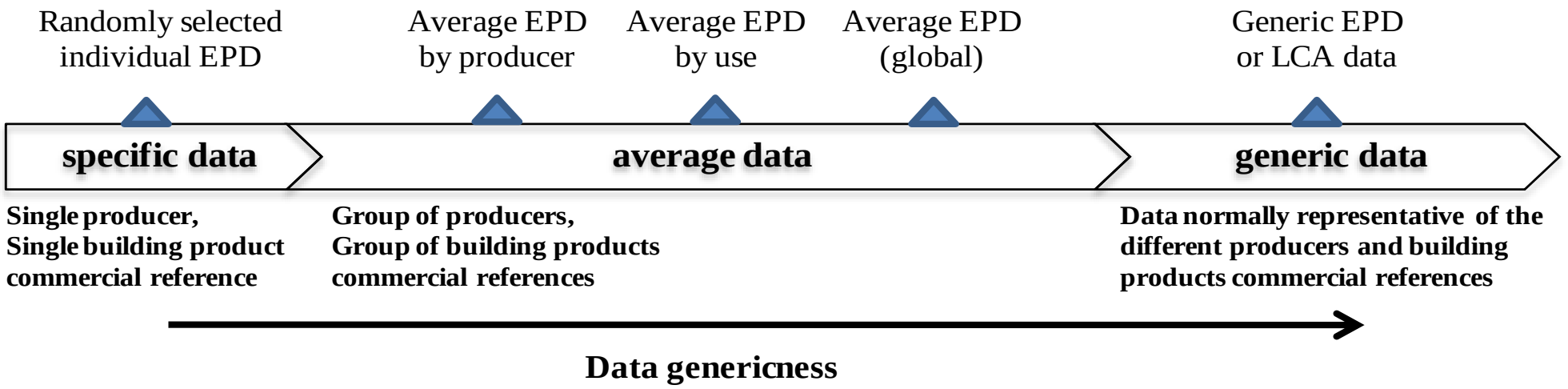
| Datasets under study | Data sources and assumptions |
|---|---|
| **Average EPD by producer** | 80 EPDs were divided into 4 groups according to their producers. Arithmetic mean of LCI and LCIA from all EPDs from each group was then made. |
| **Average EPD by use** | 80 EPDs were divided into 2 groups according to their use in a building – thermal or acoustical insulation. Arithmetic mean of LCI and LCIA from all EPDs from each group was then made. |
| **Average EPD (global)** | Arithmetic mean of LCI and LCIA from all 80 individual French EPDs for glass wool was made. |
| **Generic LCA data** | Generic dataset for glass wool from a generic database available in Europe (Ecoinvent version 2.0) |

# Case study - French context - Glass wool
# 3. Data Quality Assessment

| Data quality assessment | | | |
|---|---|---|---|
| **Data quality information** | | | |
| | *Temporal rep.* | 1993-2000 | 2006-2010 |
| | *Technological rep.* | The company worked on a very high technical level but the data refer to the situation before 1995. The energy for the melting process is mainly electricity and from natural gas. The amount of waste glass used as raw material is about 65%.<br>This module can be used for all different kind of glass wool materials. | French energy mix - representative for French LCA studies. Data from enterprises, processes and materials under study (i.e. identical technology). Standard production for France.<br>No publicly available information concerning the production process (confidential LCA report) |
| | *Geographical rep.* | Switzerland | France |
| | *Completeness* | Data are only from one company in Switzerland (Isover SA) | Data are taken from 4 different companies that sold glass woll on the French market |
| | *Reliability* | Internal critical review by Swiss Centre for Life Cycle Inventories according to ISO 14025 | EPDs according to ISO 14025, average EPD based on 53 verified and 44 not verified signel manufacturer's EPD by third party |

# Case study - French context - Glass wool
# 3. Data Quality Assessment

## Issue of **„data genericness“**




- depends on the percentage of market shares of given product – N/A in EPDs

=> 2 main **assumptions** made:

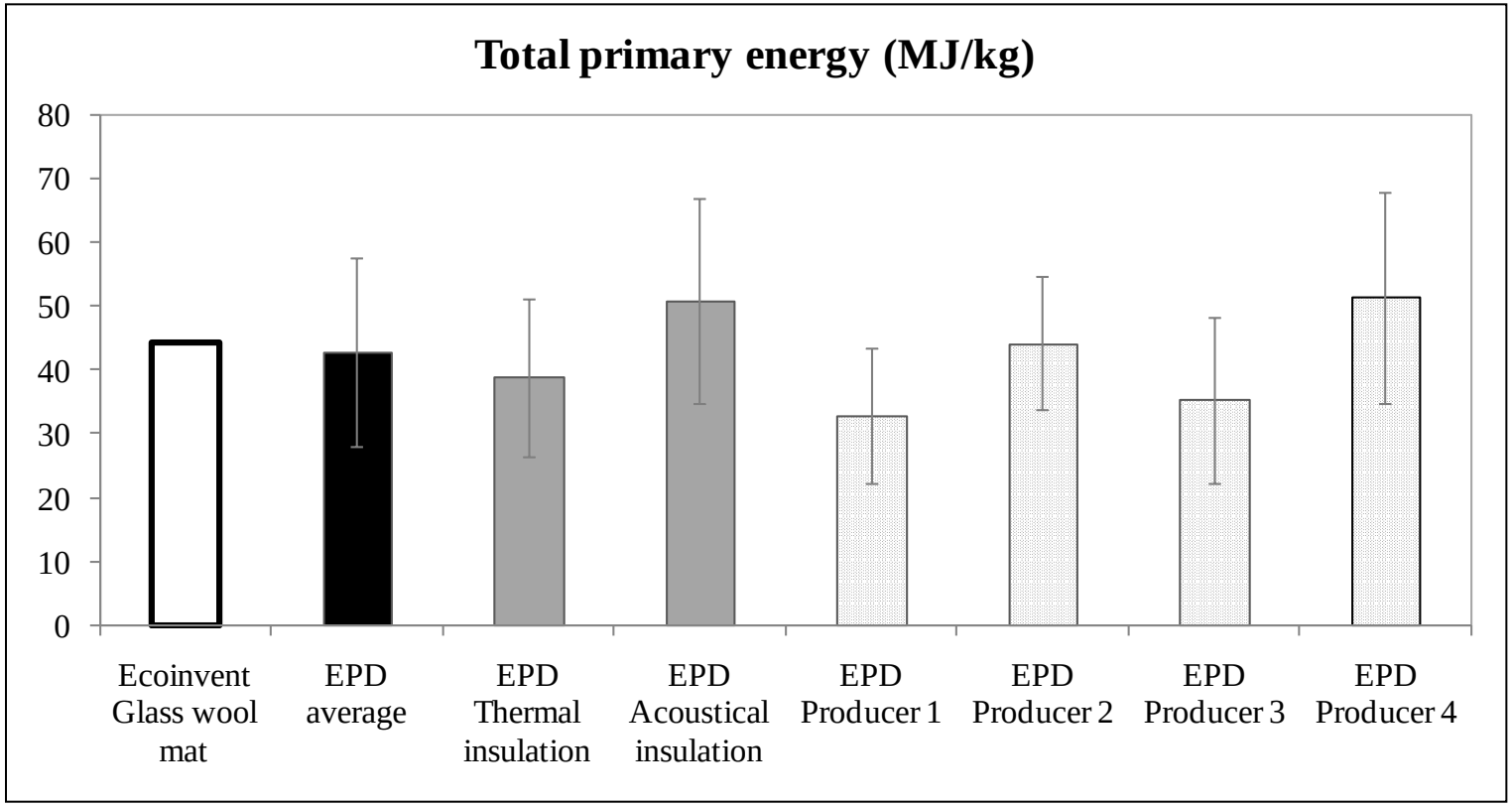
**a)** **4 major producers**, 80 products (represent large part of the market)

b) the same market share for each EPD (**arithmetical mean**)

# Case study - French context - Glass wool
# 4. Comparison of LCI and LCIA indicators and variability assessment

Comparison of environmental indicators:

- primary energy • water consumption • abiotic depletion
- global warming potential • waste...




- Deviations of the indicators of the averaged EPD cover the **variability**

# Limitations and advantages of the work

- Some **key parameters missing** in EPDs
  - market share
  - specified technology processes
  - => Question of representativity of generic data based on EPDs
    - assumptions need to be made concerning DQI
- **More case studies** needed
  - when only few, one or none EPD exists
- **For the generic data Ecoinvent**
  - only 1 company, less robust than an average of 4 companies
- **Variability of the products is covered** in the average EPD compared to Ecoinvent data in this case
- Average EPD cover **actually used products** on the national market
  - incl. technol., geograph., temporal repres.

# Conclusion

- Proposal of the **guidelines** for the practitioner was given
  - how to work with existing data to determine generic data for a national context and different objectives in a consistent way
- Importance of **meta data analysis** was highlighted
- The **weaknesses of the databases** and possible improvements of EPD information were find out
- The **benefits the databases** were examined – same methodology (cut-off rules, allocation rules...)
- For the glass wool case, **average EPD can well represent generic data**, but what about other cases?
- Need of **new LCA studies** for generic data

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**THANK YOU VERY MUCH FOR YOUR ATTENTION**

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