Managing data needs for a green built environment: Insights into global data sources and flexible data handling

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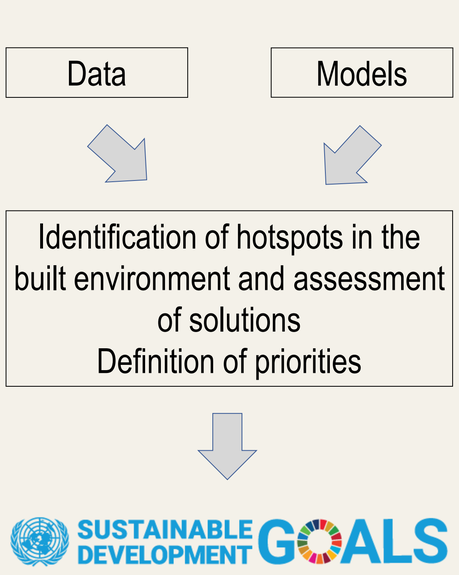
Introduction

The use of robust and reliable data is important to support the implementation of the UN Sustainable Development Goals.



There are several challenges with respect to data:

- Need for global data sources that can provide regionalised data
- Data interoperability, i.e., integration of data from different sources
- Harmonisation of formats, nomenclature, methodologies, and indicators

Challenge: regionalised data

- In many regions of the world, robust data and expertise to conduct sustainability assessments such as LCA are scarce or insufficient
- Due to local differences in raw materials, production / construction practices and end-of-life treatments, using European data can result in misrepresentation of the building sector for countries outside Europe, decreasing the relevance of the data as/to underpin decision support

Sustainable Recycling Industries project

The Sustainable Recycling Industries (SRI) programme, and its component on life cycle inventories (SRI-LCI) is one of the first attempts of providing freely available regionalised environmental life cycle data to such an extent. The SRI-LCI component aimed at improving the national capacity and data availability for life-cycle-based sustainability assessments in Brazil, Colombia, Peru, India and South Africa. The SRI programme was funded by the Swiss State Secretariat for Economic Affairs (SECO) and was implemented between 2014 and 2018. Phase I of the SRI was jointly implemented by the Swiss Federal Institute for Materials Science & Technology (Empa), the World Resources Forum (WRF) and the ecoinvent Association.

The main objectives of the SRI-LCI component:

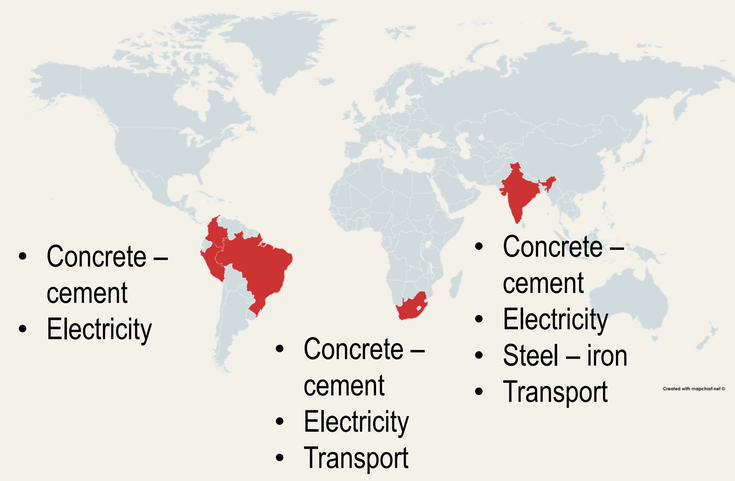
- capacity building and awareness raising
- data collection and inventory generation
- formation of expert and stakeholder networks.

Output of SRI-LCI component:

- a large number of trainings and events in all the regions
- 25 data collection projects
- over 1800 new datasets developed for the focus countries. These datasets are both available for national database initiatives and have been integrated in the ecoinvent database (version 3.6) to facilitate global access to these data.

SRI and built environment

Figure 1: Countries where the LCI component of the SRI programme was implemented and construction-related sectors with updated datasets



Challenge: different data formats

Environmental data are used in different design stages and in varying formats:

- Use in initial design stage, compatible format with Building Information Modelling required.
- Use in certifications, compatible format with Environmental Product Declarations (EPDs) required

Adaptation to the amended EN15804

The standard EN15804 provides core product category rules to achieve a harmonized structure for the EPDs of construction products, services and processes. The latest amendment of the standard EN15804+A2:2019 sets specific requirements to the data format and quality.
The table summarizes the challenges at a database level and the solutions applied.

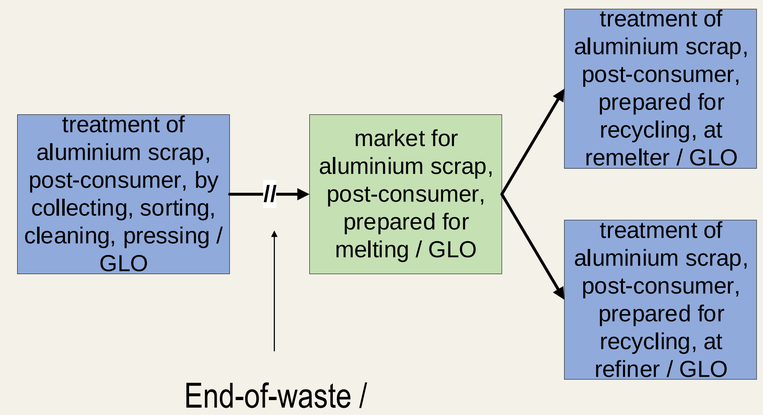
CHALLENGES	SOLUTIONS
Datasets should use the current ILCD format and nomenclature	Development of converter from ecoSpold2 to ILCD.
Data quality should be compliant with one of the two schemes in annex E of the amended standard. Generic data should include data quality assessment information.	The criteria in the pedigree matrix are compliant with the UN Environmental Global Guidance on LCA database development (annex E of amended standard)
Life Cycle Inventory (LCI) indicators for background data: transparent and harmonised calculation and easy user access	• New information is added in the datasets (e.g. Lower Heating Value, characterisation of waste to hazardous and non-hazardous based on the European Waste Catalogue) • The information about the LCI indicators is made easily available to the database users. The calculation of these resource flow indicators at the background database level contributes to a harmonisation in their calculation.
Support for new Life Cycle Impact Assessment (LCIA) categories	Collaboration with Fraunhofer Institute to ensure the appropriate application of LANCA (Land Use Indicator Value Calculation in Life Cycle Assessment) in the ecoinvent datasets

Implementation example – LCI indicators

Steps for the calculation of the indicator 'Use of secondary material':

- End-of waste criteria of the Waste Framework Directive of the Joint Research Centre are followed
- All secondary material inputs in the background datasets are tagged. The secondary material intermediate flows of the system are summed.
- The information is easily accessible to the user, with the creation of the indicator 'Use of secondary materials' in a new Life Cycle Impact Assessment method.

Figure 2: End-of-waste criteria applied to aluminium scrap treatment



Conclusions - outlook

- Global initiatives for environmental data collection are important for robust sustainability assessments to be used in decision-making
- Regional construction materials, such as bamboo, and regional technologies, manufacturing techniques, and designs should be integrated at a database level
- For an efficient use of the data at a design phase, connectivity with the BIM models is important

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