



Science Arts & Métiers (SAM)

is an open access repository that collects the work of Arts et Métiers ParisTech researchers and makes it freely available over the web where possible.

This is an author-deposited version published in: <https://sam.ensam.eu>
Handle ID: <http://hdl.handle.net/10985/14097>

To cite this version :

Fernanda Belezario SILVA, Olga Satomi YOSHIDA, Rachel HORTA ARDUIN, Carolina Almeida SOUZA, Cládia Echevenga TEIXEIRA - Uncertainty sources in the life cycle assessment of construction products in Brazil - 2017

Any correspondence concerning this service should be sent to the repository
Administrator : archiveouverte@ensam.eu



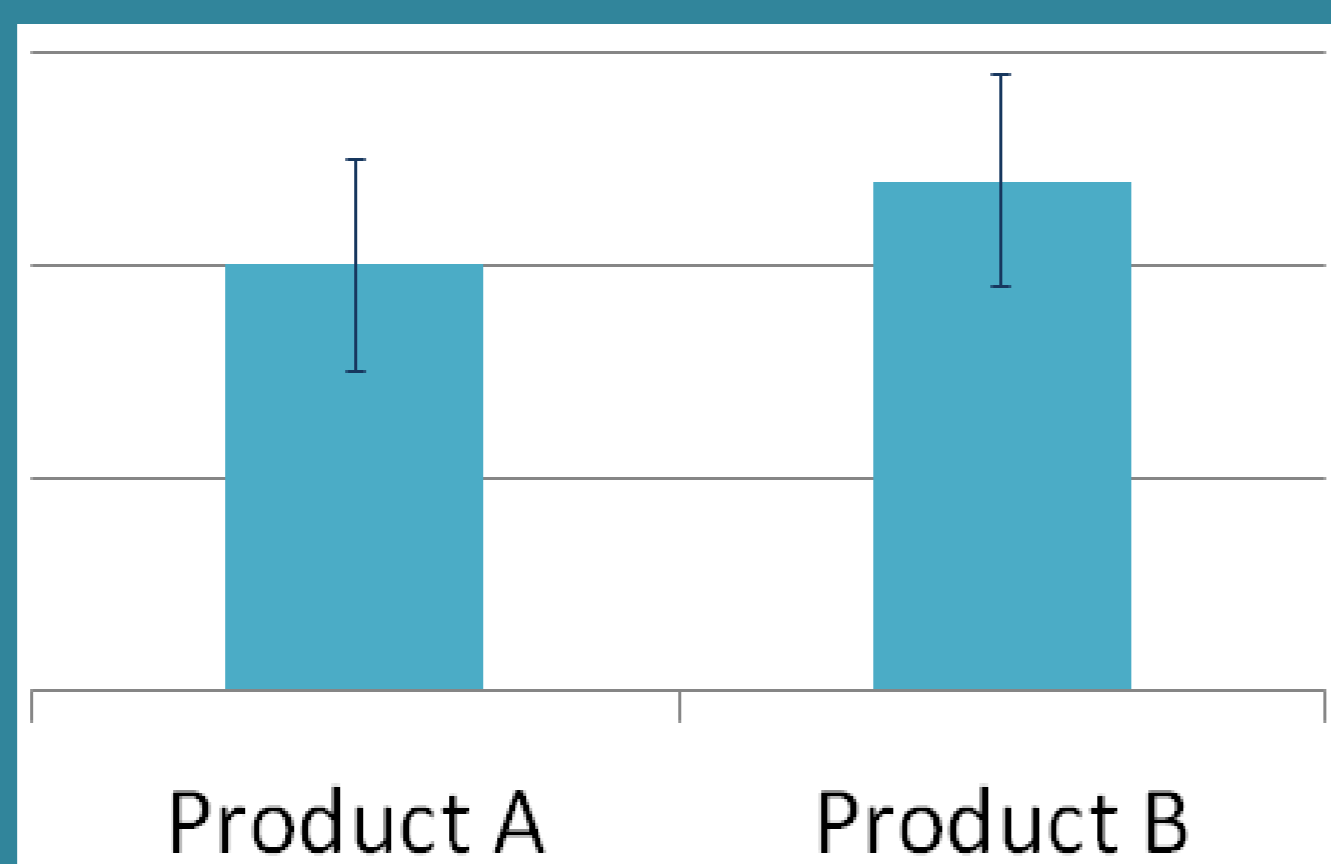
Uncertainty sources in the life cycle assessment of construction products in Brazil

MSc. Fernanda Belizario Silva*, PhD. Olga Satomi Yoshida*, MSc. Rachel Horta Arduin**, MSc. Caroline Almeida Souza*, Elisabeth Donega Diestelkamp*, PhD Cláudia Echevengua Teixeira*, PhD. Luciana Alves de Oliveira*

* Institute for Technological Research. São Paulo, SP, Brazil.
 ** Arts et Métiers ParisTech, I2M, UMR 5295, F-33400 Talence, France
 [fbsilva@ipt.br]

Context and Goal

- Uncertainty estimation is important in LCA, especially when comparing product alternatives

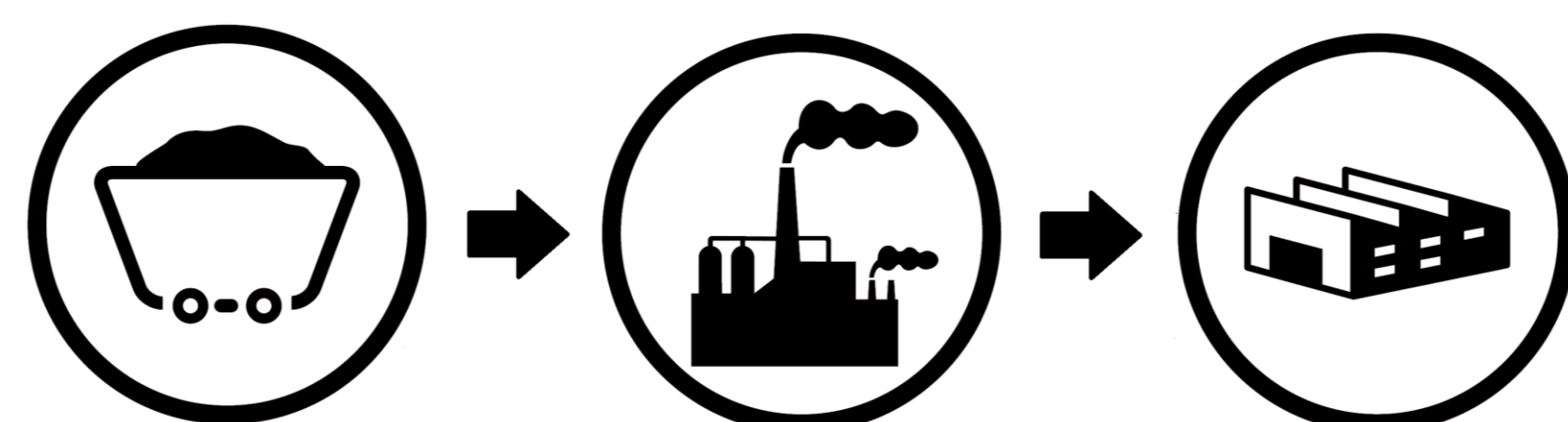


- Question : what is the main source of uncertainty in LCA : the process itself or upstream and downstream processes?
- Analysis of 09 construction products in Brazil

Methods

- LCI : product manufacturing - primary data collection (factory / literature) | upstream and downstream - Ecoinvent 3.2 global datasets
- Data quality assessment : Pedigree matrix universe: 01 factory (EPD)
- LCIA : IPCC 2013 - 100 years' timeframe
- GWP coefficient of variation : Monte Carlo sampling with 10.000 interactions
- CV distribution between itself and upstream / downstream processes : ANOVA

Construction products



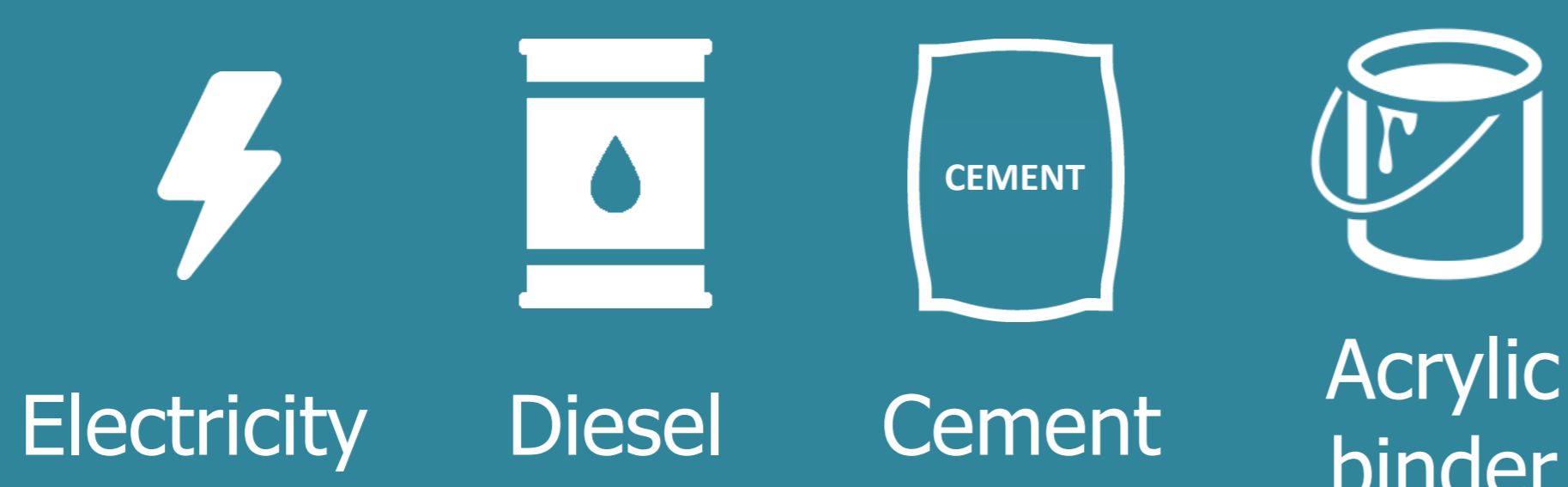
Materials extraction Materials manufacturing Product manufacturing

cradle-to-gate

Results

CV of GWP (%)	Upstream or downstream (%)	Process itself (%)	
10.4	78	22	Clay block
21.1	95	5	Sand
15.1	65	35	Gravel
13.0	82	18	Concrete block
21.8	97	3	Concrete
18.2	78	22	Mortar
9.5	60	40	Acrylic painting
18.3	13	87	Sawnwood (native)
16.5	23	77	Sawnwood (planted)

Main contributors to uncertainty



Conclusions

- CV values for GWP indicator range from 9,5% to 21,1% - importance of considering uncertainty in LCA studies
- Upstream processes are a major uncertainty source in LCA of construction products
- Improving data quality of construction products requires better data for upstream processes: importance of a national database to increase LCA reliability
- Main upstream contributors: can help to define priorities for data collection