The Life Cycle Analyst's role in a Regional Expert Dashboard

Virtual Design & Carbon - An Open Tool Builders Forum

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Corporate responsibility services

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Presentation outline

1 Context

2 Life cycle assessment, a tool to support decision-making in the wood sector

3 Accounting for biogenic carbon in wood product assessment

4 Call to action

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Context

WHAT'S AN EPD?

- Summary document of a **product life cycle assessment** and all relevant environmental information
- The document constitutes a **competitive advantage** by contributing to the **achievement of points for building certification**
- Environmental information is **verified by independent third parties** (life cycle experts)
- EPDs are based on ISO standards and **Product Category Rules** guidelines (PCR)
- Results presented in a similar way to the **"nutrition" sheet**

Background on Environmental Product Declarations (EPDs)

2000s
In Europe, the first Environdec program operator is created and the first EPDs are published.

2010 to 2013
In the United States and Canada, the construction industry gets organized to carry out EPD programs following the emergence of new criteria for certification systems. A few EPDs are created.
In Europe, initiatives emerge in industry associations (particularly the cement).

2014 to 2015
Quebec takes action and industry organizations try to convince manufacturers to follow suit.
Several dozen EPDs representing several hundred products are conducted in the United States.
There is a gap between what is done abroad and what is done in Quebec, particularly in comparison to other industries such as cement.

2016 to 2018
In Quebec and Canada, wood industry EPDs are developed.

2020 to 2021
Implementation of laws in the United States requiring EPDs to be provided in construction project bids.

The **Buy Clean California Act (BCCA)** is an example of a requirement in place in **California** which requires targeted material manufacturers to **provide EPDs for their products in bids** for construction projects funded by the State.

EXAMPLES OF EPD PROJECTS FOR THE INDUSTRY

IN QUEBEC

- **4 EPDs at the industry level for QWEB**

Done for **3** manufacturers

Precast Open Wall Panel Light Wood Frame

Prefabricated openwork wooden floor joists with galvanized metal connectors

Prefabricated light wood frame roof trusses

Engineered wood

EXAMPLES OF EPD PROJECTS FOR THE INDUSTRY
IN CANADA

- **6 EPDs at the industry level for the Canadian Institute of Steel Construction (CISC)**

Fabricated Structural Steel Plates

Fabricated Hollow Structural Steel Sections

Fabricated Hot-Rolled Structural Steel Sections

Done for **77** manufacturers

EPDS APPEARS IN ALL PARTS OF CONSTRUCTION DESIGN

DEP

Superstructure

- Poutre et colonnes
- Platelage

DEP

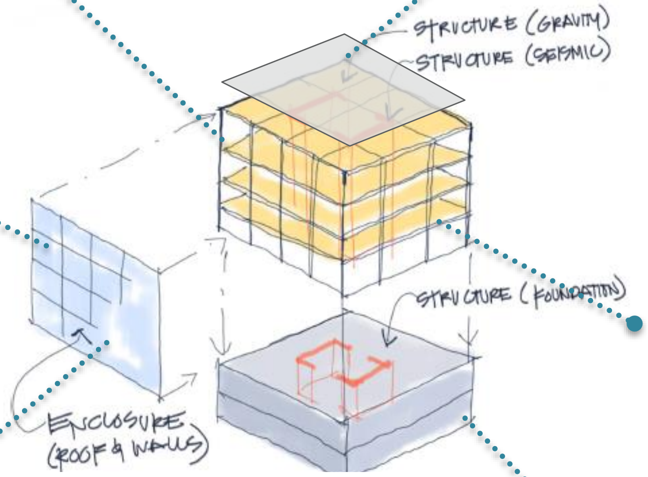
Enveloppe

- Panneaux de gypse
- Isolants
- Pare-air et pare vapeur
- Colombages et barre en Z
- Mur rideau
- Fenêtres

DEP

Revêtement

- Panneau



Source : LCA kicking carbon for credits, Greenbuild 2017

DEP

Toiture

- Panneau support
- Pare-vapeur
- Panneau
- Membranes

DEP

Structure (dalles)

- Béton
- Barres d'armatures

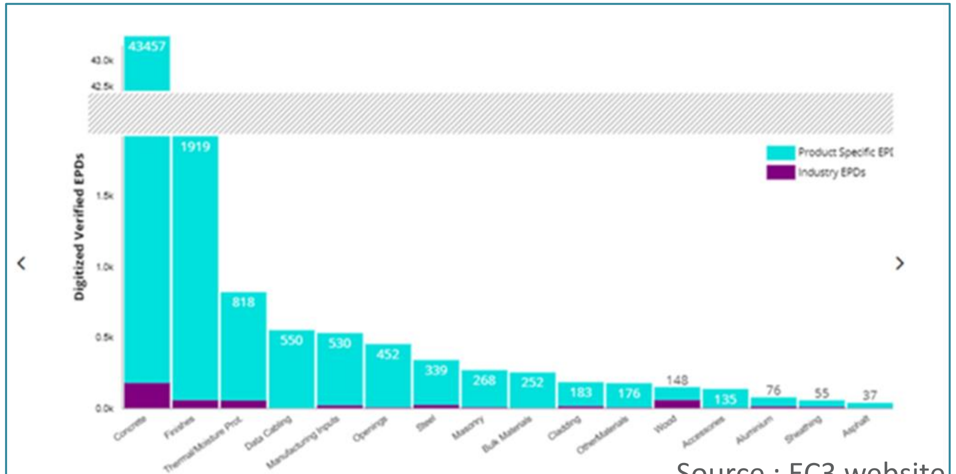
DEP

Structure (fondation)

- Béton et barres d'armatures
- Panneau isolant
- Membrane

Current status of EPD publication by sector

TWO MAIN CHALLENGES



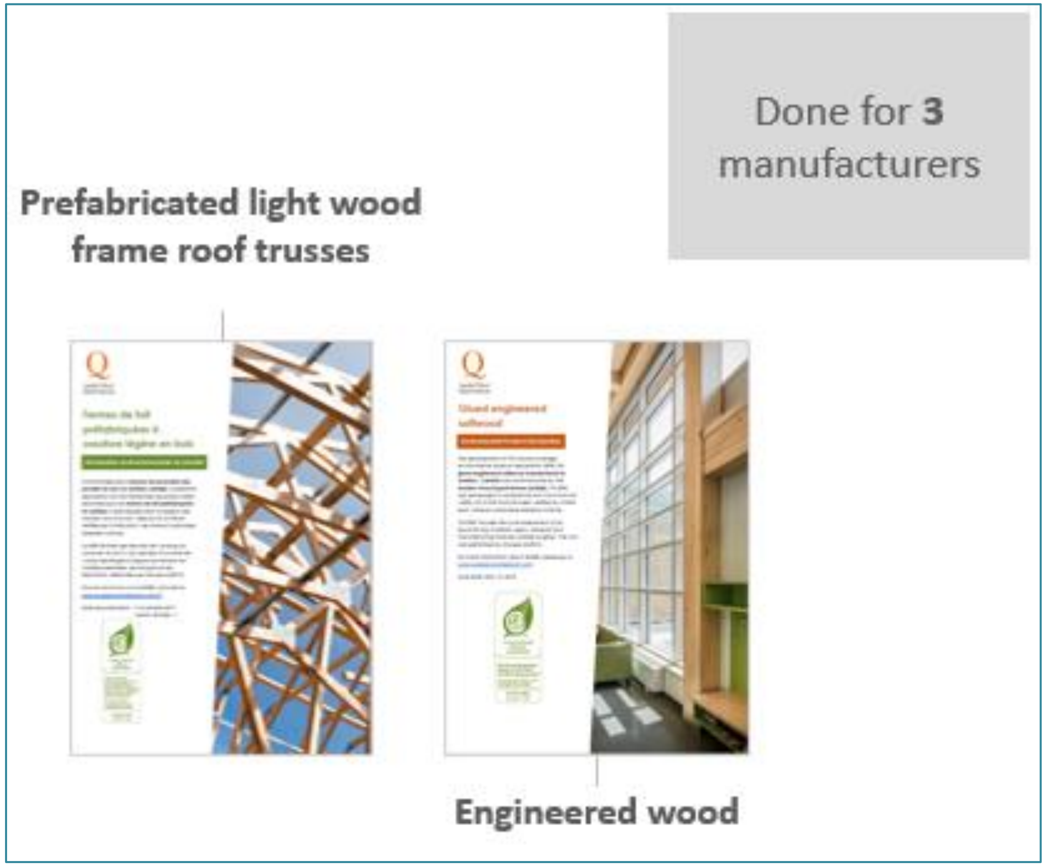
Source : EC3 website

EC3 database of EPDs is dominated by **concrete, finishes and thermal barriers**. Few wood-based product EPD are available

Lack of “easily” available data for architects, engineers and non-LCA practitioners

In general, according to PCR, EPDs refer to a **single material**, **whereas wood** is mostly part of an **assembly**

IMPORTANCE OF REGIONALIZED DATA



Industry-average EPD do not emphasize well the potential difference from one manufacturer to another

Specific EPD allow :

- **the manufacturer** to understand what is the most important contributor to its impact
- **the user** of the product to have access to the exact data for modelling its own impact

2 Life cycle assessment, a tool to support decision-making in the wood sector

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LIFE CYCLE ASSESSMENT : THE BASE ON AN EPD

WHAT IS MEASURED?

From more than 500 flows...

CO_2 PM VOC

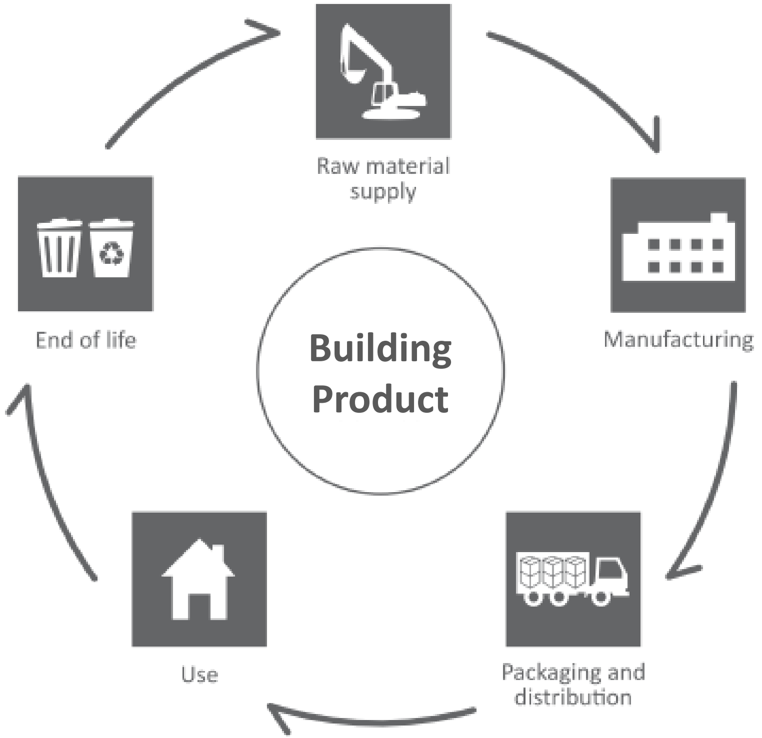
PO_4 SO_2

NO_3 Metals

Oil

Solid wastes

Pesticides
(emissions to soil)



... to a few indicators

CO_2 **Global warming**

Water consumption

Resource use

Waste generated

Life cycle assessment compliant to:
ISO 14 040/14 044
EN 15978 for LCA of a building

System boundaries – Process included

LCA can help fill the data gaps

LCA specialist ask questions to gather info for every stage of the value chain :

Raw material supply

- Forestry management practice
- Use of machinery

Transport of raw materials

- Transport of raw (ex. roundwood)

Manufacturing

- Energy consumption at the plant (electricity, natural gas and propane)
- Water consumption
- Waste management at the plant (transport of waste to recycling facility)
- Ratio of wood vs other materials

Distribution

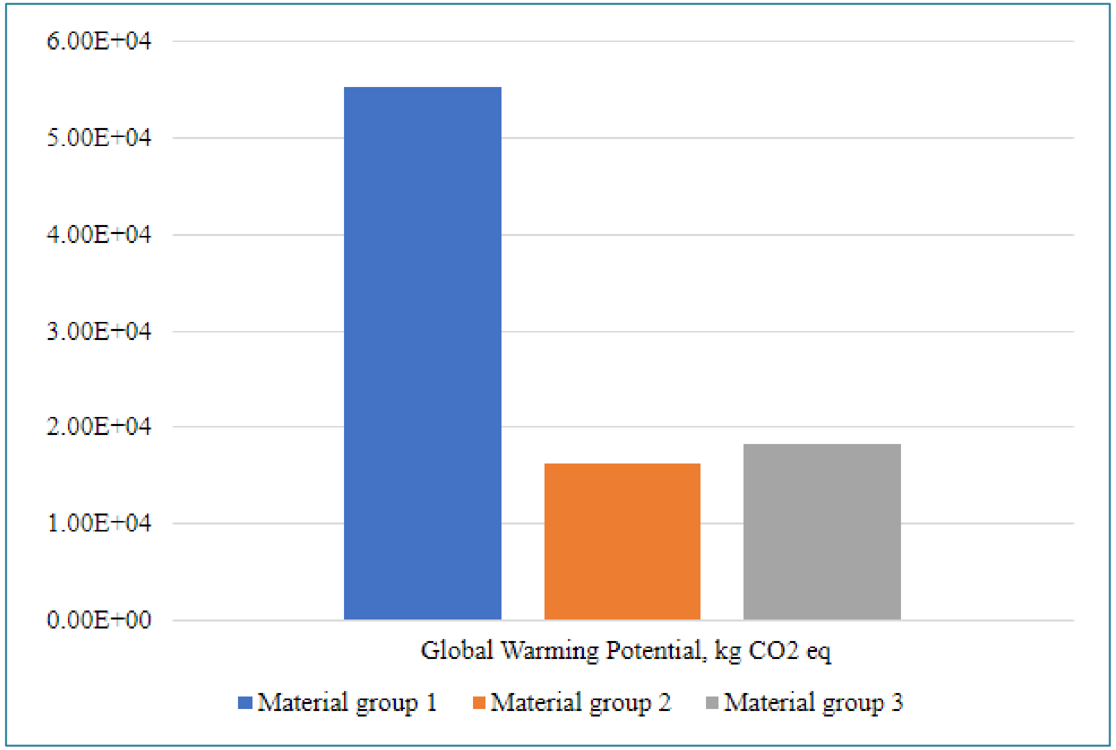
- Transportation to a storage facility and then to final user

End of life management

- Disassembly opportunities
- Landfilling and recycling
- Transport to end-of-life treatment facilities

The use stage is excluded because its impact is considered negligible for wood products.

How to ensure an equivalent and fair comparison using LCA?



Group 1 : Concrete

Group 2 : Gluelam/CLT

Group 3 : LVL/CLT

At **material level** : functional equivalence

At **building level** : performance and functional equivalence

Source : Mofolasayo, A. (2022) A Comparison of Life Cycle Impact of Mass Timber and Concrete in Building Construction

3 ACCOUNTING FOR BIOGENIC CARBON IN WOOD PRODUCT ASSESSMENT

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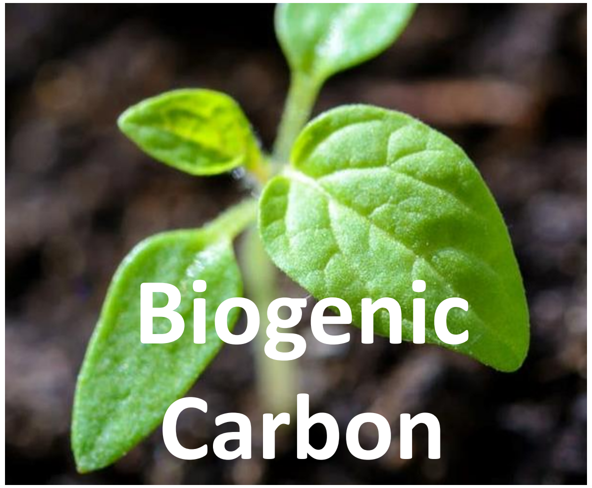
WHAT IS IT ?

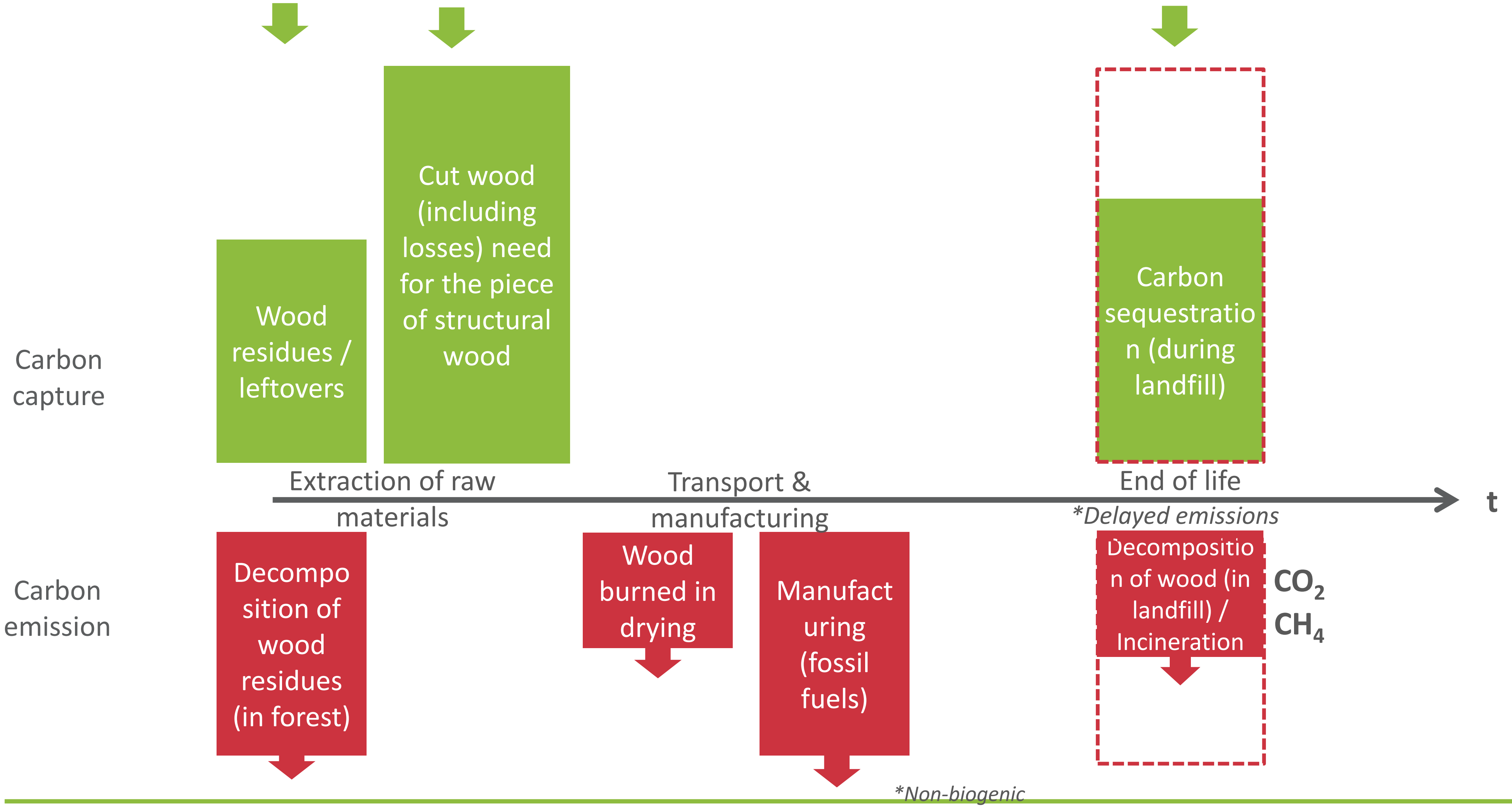


- Carbon that is captured from CO_2 during biomass growth
- Carbon dioxide that is produced by decomposition of biomass (burning, (an)aerobic decomposition)

- Can be translated in CO_2 éq. (x 44/12)

How to calculate biogenic carbon?

Carbon flows along the life cycle stages



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CALL TO ACTION?

Summary of needs

In LCA and within this team

- Access to quality regionalized data from every step of the value chain
- EPD for every wood product
- Range of values to estimate impacts for a new product (pre-EPD)
- Accurate quantification of carbon storage/emissions from leftovers wood cuts in forestry
- Frameworks for biogenic reporting in tools

What's next ?

In LCA and within this team

- Make LCA challenges and data known to more people
- Work together to fill the data and knowledge gaps
- Make sure new or non-standard products get evaluated
- Standardize biogenic carbon accounting and reporting
- Co-develop 'ready-to-use' assemblies for architects and engineers

Thank you!

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THE IMPORTANCE OF MAPPING WOOD PRODUCTION