

# Transparency and Quality: Actual practice in LCA: Evidence from a review of EPD

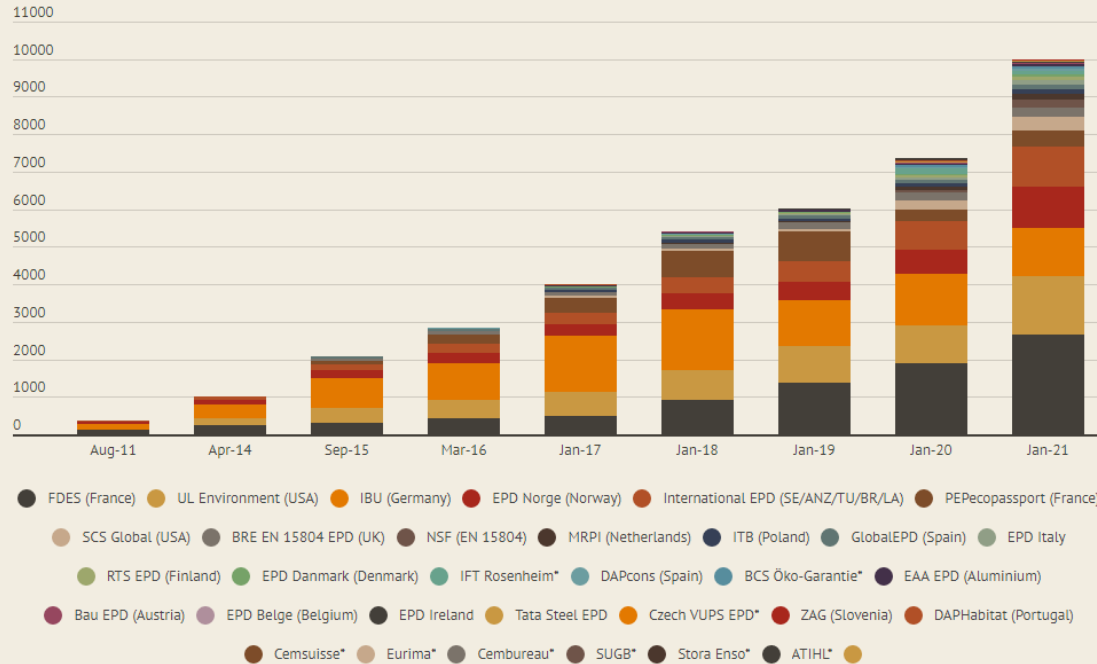
## LCA Discussion Forum #77

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# Increasing numbers of EPD

## Growth in numbers of Construction Product EPD to EN 15804

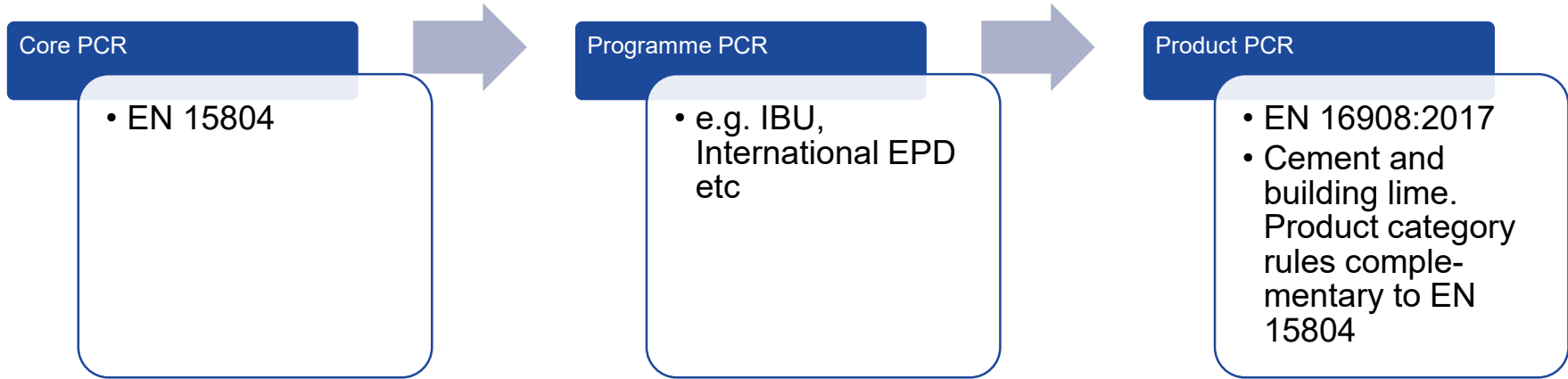


\* EPD Programmes not previously surveyed so no data provided before 2019.

# Introduction

- Review the larger groups of EPD data now available
- Focus on structural products (cement and concrete, steel timber)
- Extending the work on cement and concrete, (<https://journal-buildingscities.org/articles/10.5334/bc.59/>)
- Identifying aspects of poor practice in application of
  - methodology
  - LCA practice or
  - or transparency.

# Cement: context



- EN 16908 addresses **co-product allocation** and **use of secondary and waste fuels**
- Use economic allocation. “If a low value co-product is being used as an input into a production process, allocation rules are used to understand the impact connected to that product”
- Declare use and impact of secondary fuels. Declare use of imported energy from co-incineration of waste. Recommend to provide information on impact of co-incineration of waste below table.

# Cement: transparency of methodology

EPD	Treatment of waste incinerated in the kiln	Treatment of secondary fuel	Treatment of CO <sub>2</sub> e from NR waste	Treatment of CO <sub>2</sub> e from secondary fuel NR
Austrian average cement EPD 13 Cements Sweden EPD 3 Sia Cemex Latvia EPD 3 Cembureau EPD	Not explained	Reported as use of a secondary fuel	Included in GWP, but provided as additional information	Assumed included in GWP
German Average Cement EPD Holcim Germany EPD	Not explained	Reported as use of a secondary fuel	Excluded from GWP, but provided as additional information	Assumed included in GWP
French Average CEM I EPD	Not reported	Reported as use of a secondary fuel	Excluded from GWP and not provided	Not included in GWP, but reported as additional information
Swiss Average Cement EPD	Considers all alternative fuels are wastes. Reports amount as additional information		Excluded from GWP and not provided	
Other cementitious EPD	Not explained			

Note: GWP, global warming potential; NR, non-renewable.

From Anderson, J., & Moncaster, A. (2020). Embodied carbon of concrete in buildings, Part 1: analysis of published EPD. *Buildings and Cities*, 1(1), pp. 198–217. DOI: <https://doi.org/10.5334/bc.591>

# Cement: transparency of methodology

## Co-product Allocation to pulverised fuel ash and blastfurnace slag

Lack of transparency over allocation

Most cementitious EPD state that they use allocation according to EN 15804

This could either mean:

- No allocation from electricity or steel production as “low value” co-product
- Economic allocation from electricity or steel product as “low value” co-product

### Cembureau EPD 2015

#### Allocation rules

The rules of EN 15804 apply.

- In the case of blast furnace slag, a co-product from steel production used as a cement constituent, **economic allocation was applied.**
- In the case of fly ash, a co-product from electricity production used as a cement constituent, **economic allocation was applied.**
- In the case of artificial gypsum, a co-product from electricity production used as a sulfate agent, **economic allocation was applied.**

For the co-products given above, the contribution to the overall revenue of steel or electricity production is very low (<1%). **Environmental impacts from the joint process on the co-product are neglected in the cement LCA.** Subsequent processes (e.g. granulation and grinding of blast furnace slag) are entirely allocated to the co-products.

### Cembureau EPD 2020

#### Allocation rules

The rules of EN 15804 apply.

- In the case of blast furnace slag, a co-product from steel production used as a cement constituent, economic allocation was applied.
- In the case of fly ash, a co-product from electricity production used as a cement constituent, economic allocation was applied.
- For artificial gypsum, allocated impacts from the joint process are neglected in the cement LCA due to its very low impact.

Subsequent processes (e.g. granulation and grinding of blast furnace slag) were entirely allocated to the co-products.

## Steel : Context

### **Use of Secondary Material (EN 15804):**

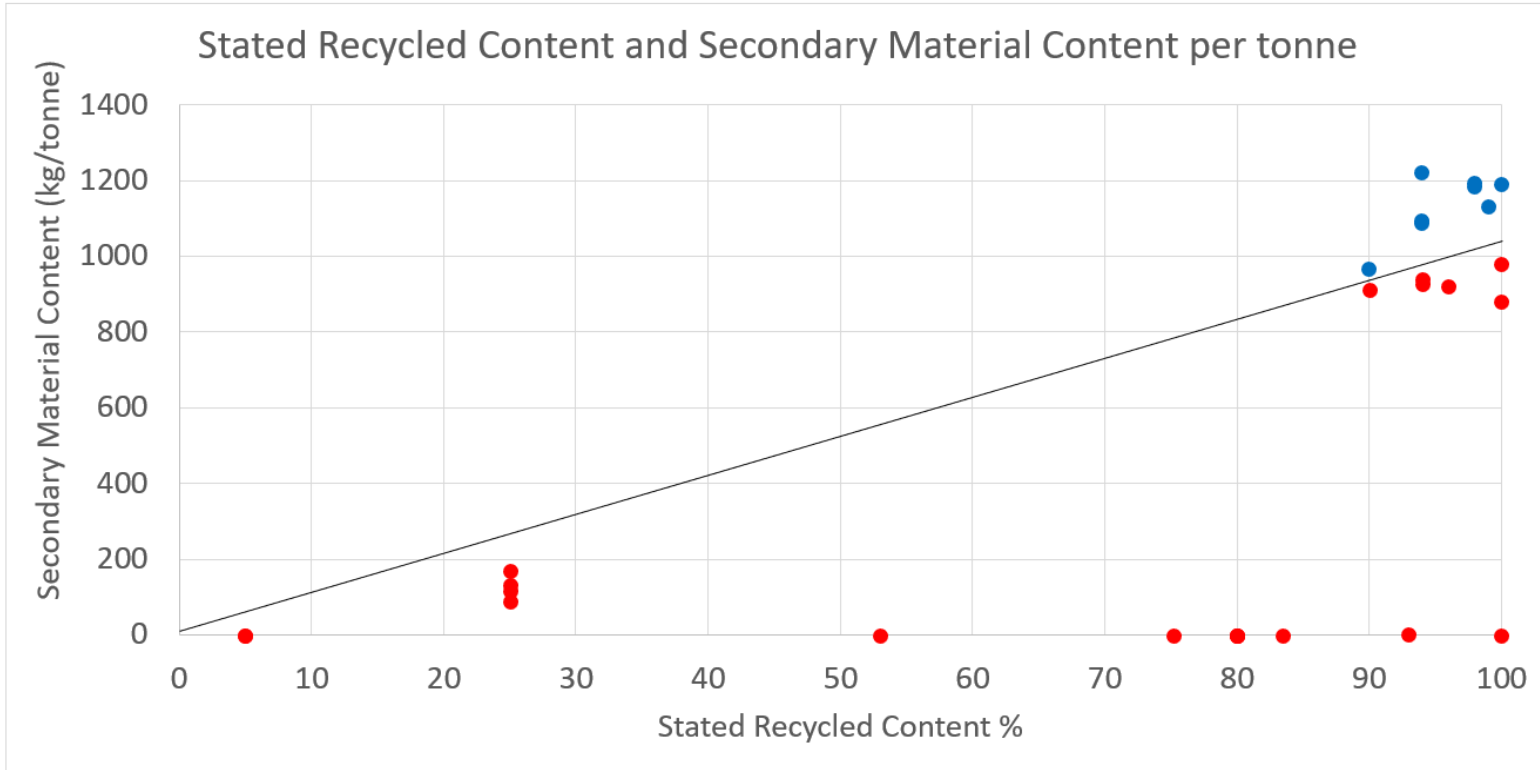
Mass of material entering the product system which has been recovered from previous use or from waste which substitutes primary materials

### **Recycled content (ISO 14021)**

Proportion, by mass, of recycled material in a product or packaging. Only pre-consumer and postconsumer materials shall be considered as recycled content.

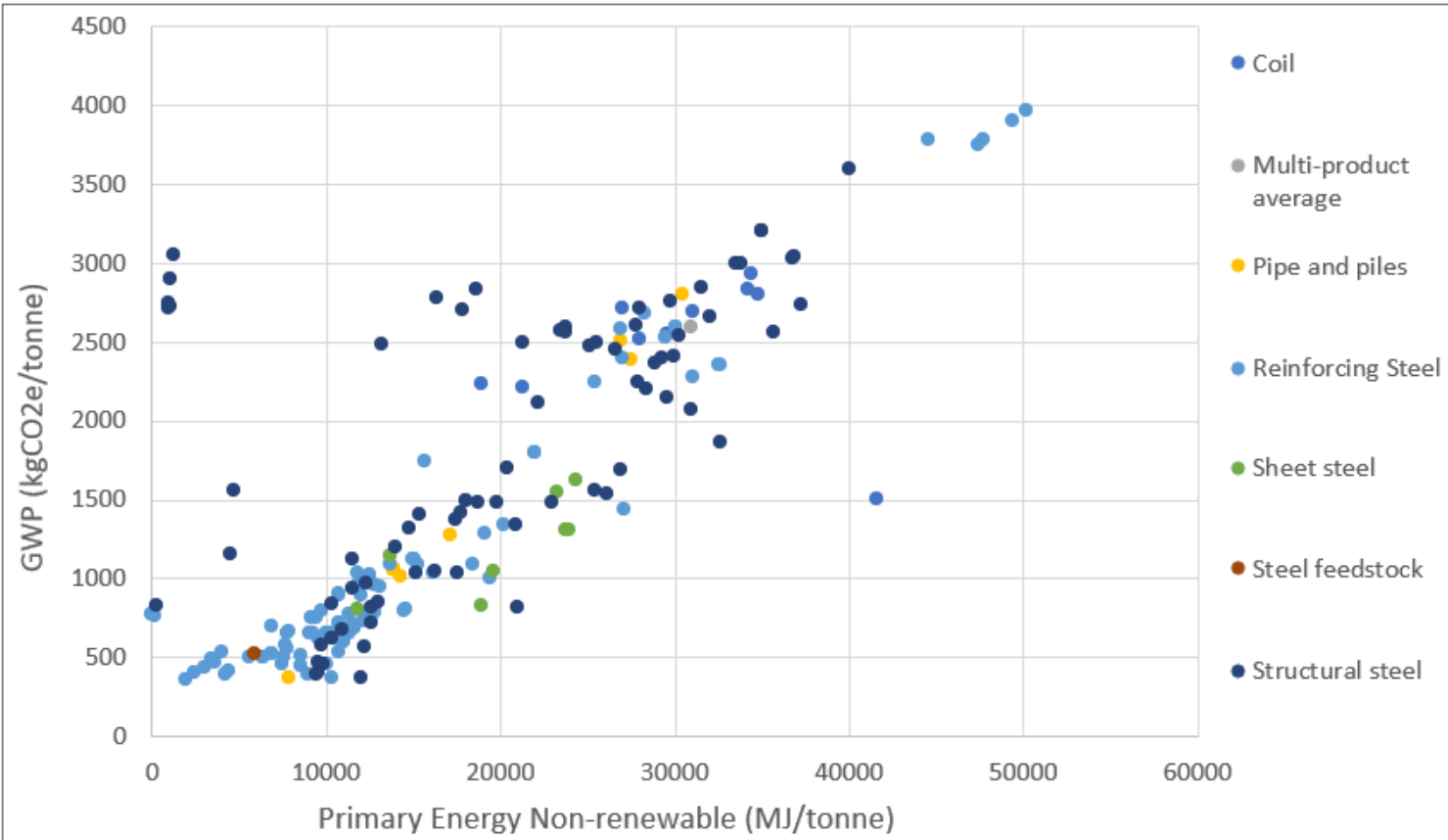
Due to losses, a steel product with 100% recycled content will need more than 1 tonne of secondary material (steel scrap) to make 1 tonne of steel.

# Steel EPD: poor reporting of use of Secondary Material

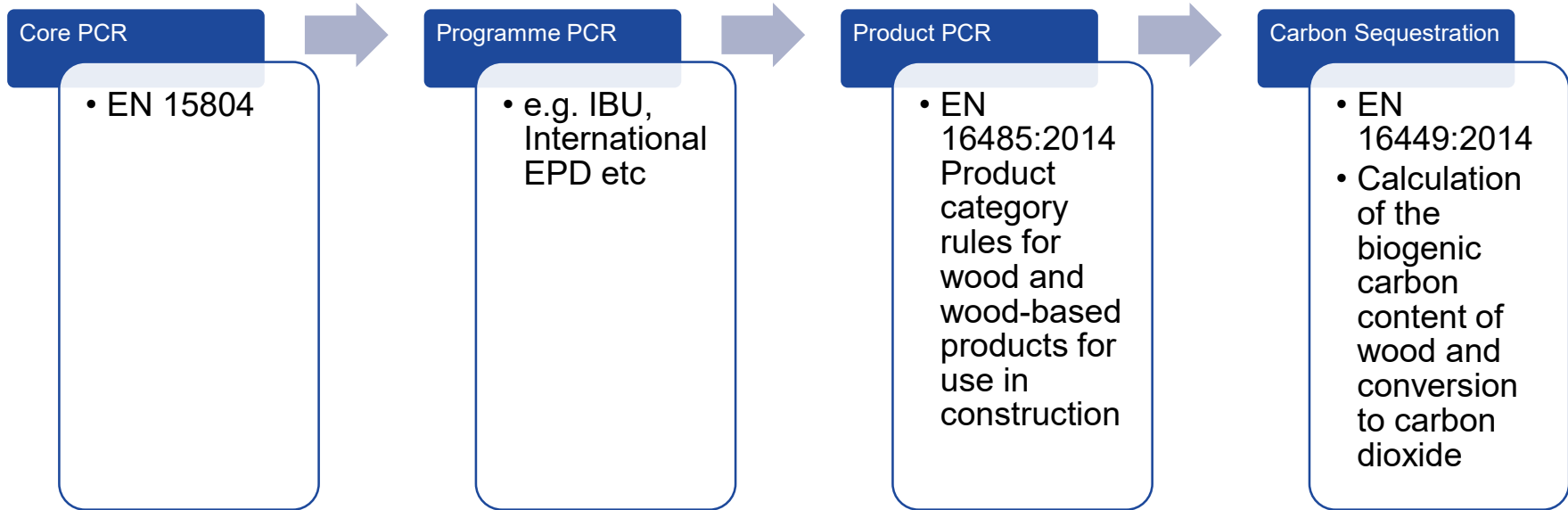




# Steel EPD: potential errors in Primary Energy Reporting



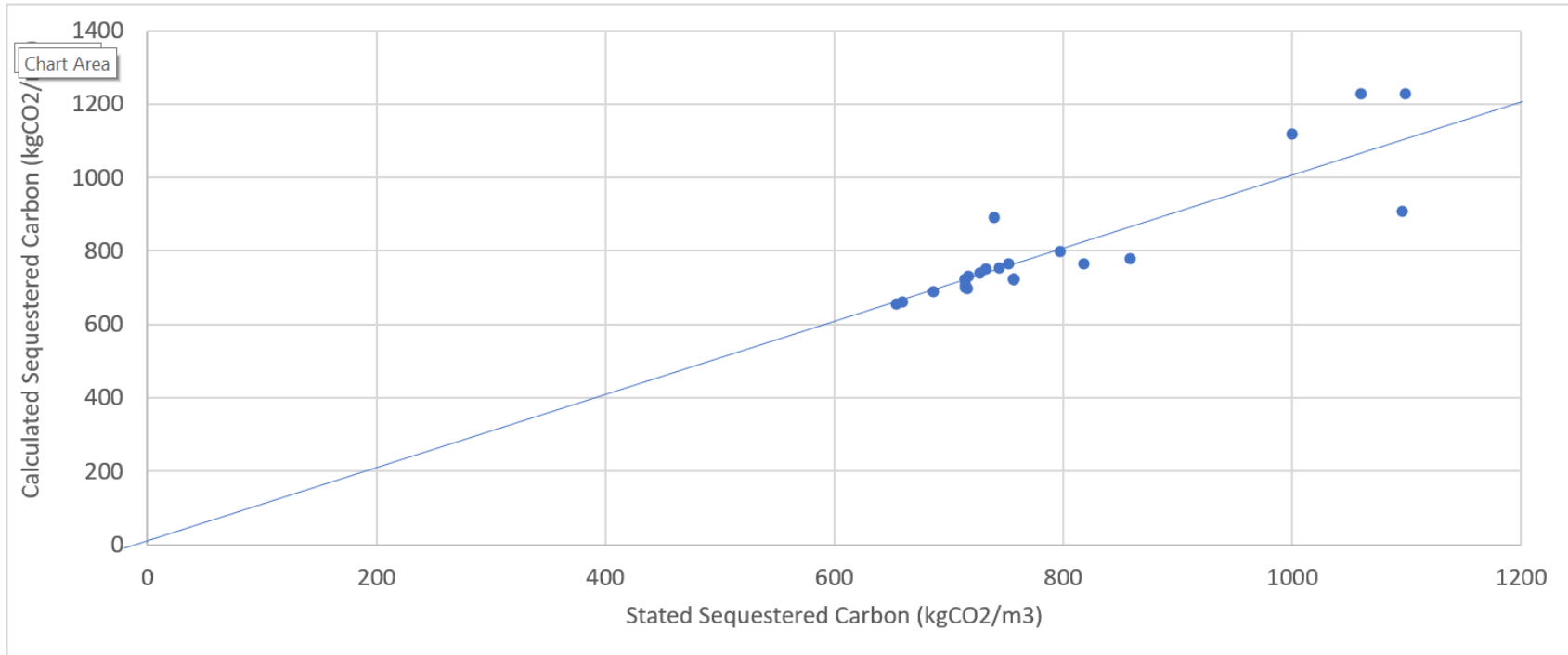
# Timber: context



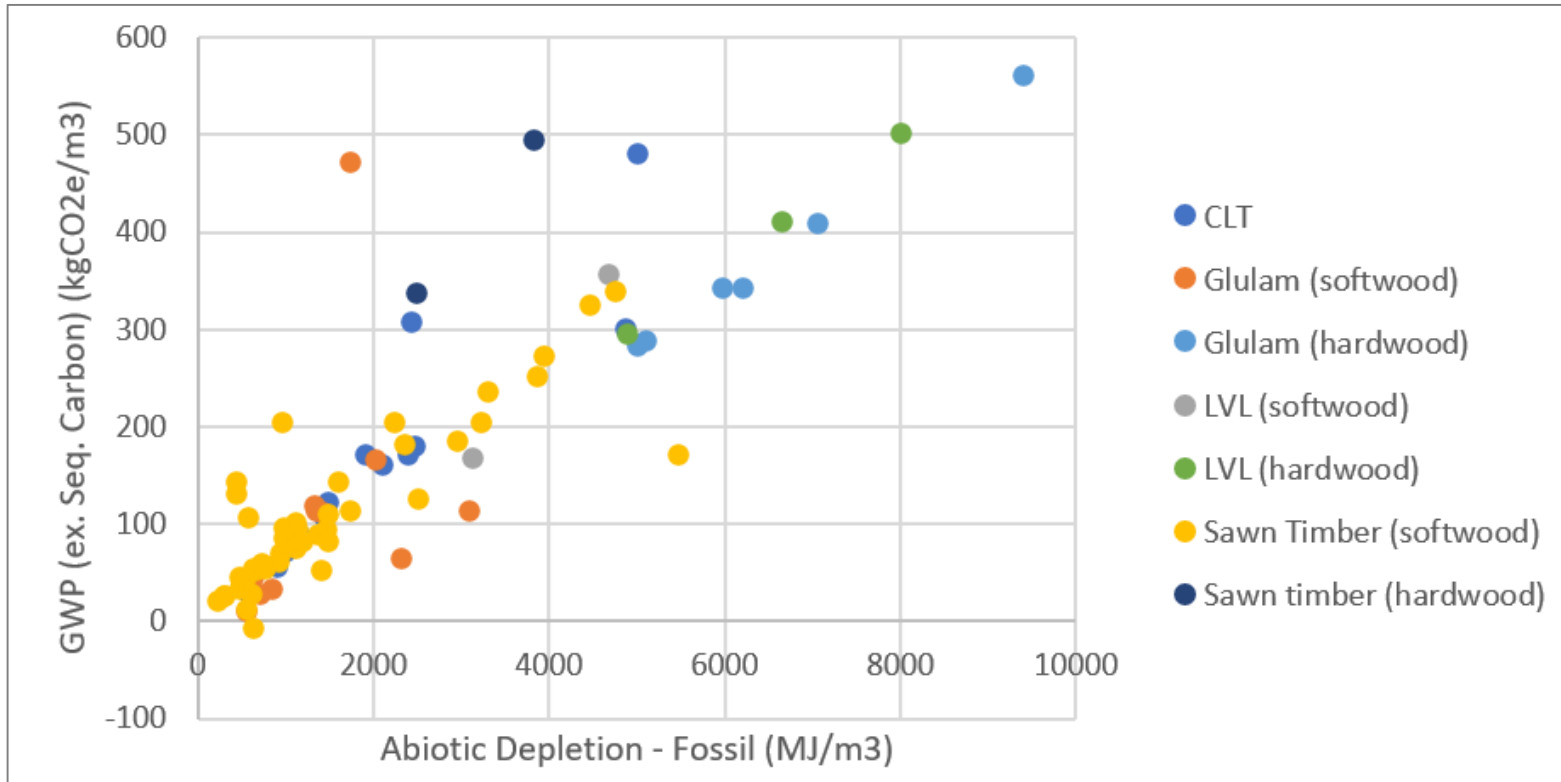
- Provides method for calculation of sequestered carbon within the product and packaging
- Biogenic carbon is  $0.5 * \text{dry mass of timber}$
- Sequestered carbon = biogenic carbon \*  $44/12$

# Timber EPD: potential errors in reporting Sequestered Carbon

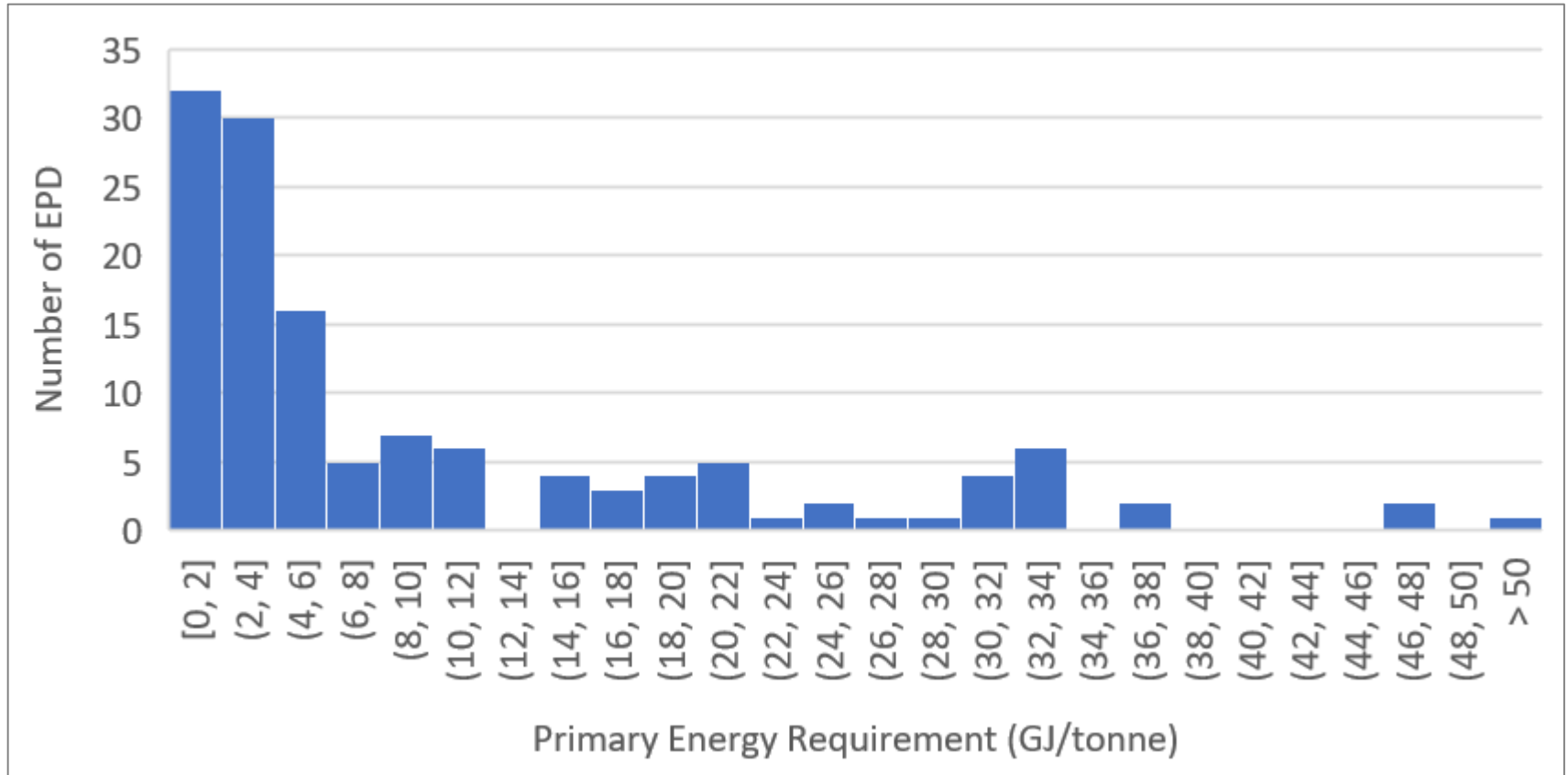
Using calculations based on EN 16485 and EN 16499, many of the solid timber EPD have calculated values more than 10% higher or lower than the stated values.



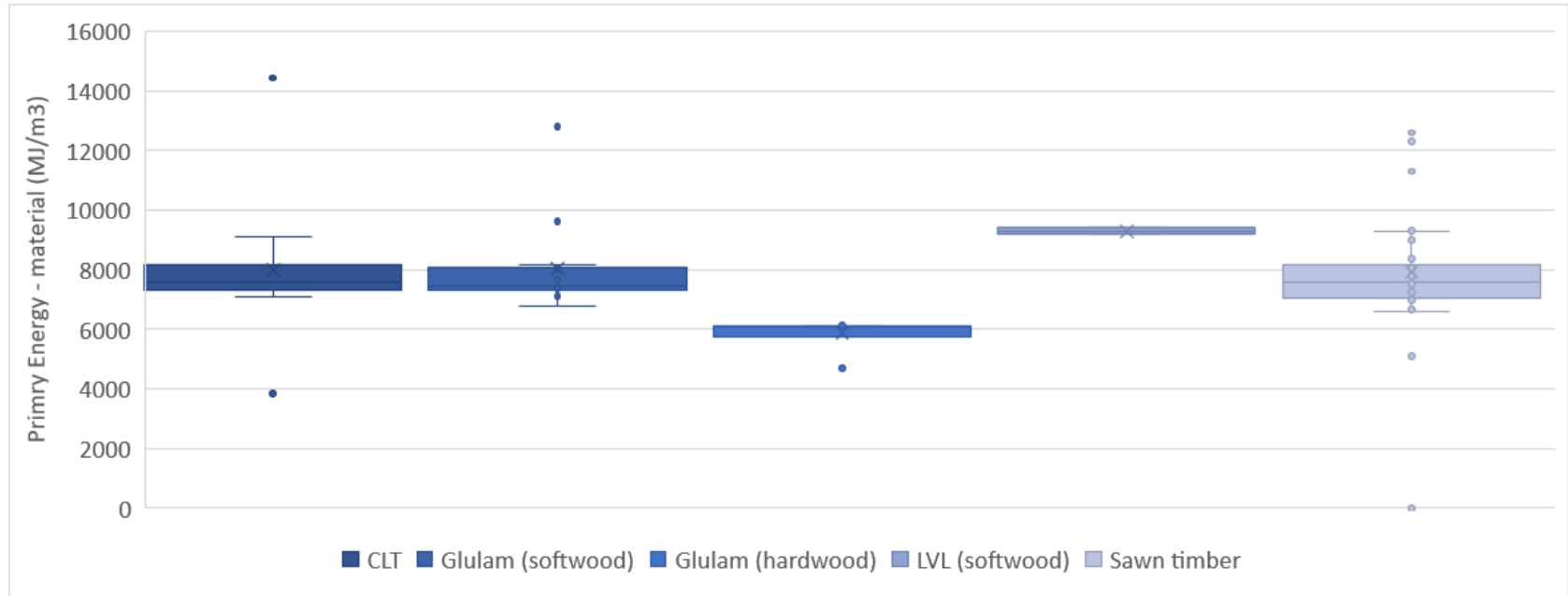
# Timber EPD: potential errors in reporting



# Timber EPD: potential errors in Primary Energy reporting



# Timber EPD: potential errors in Primary Energy - Material



Thank You



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