

# *Biogenic carbon and LCA of wood buildings:*

The need for meaningful calculations to incentivise good choices



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**Renuables**  
LCA // MATERIALS // ENERGY



# Why the need to display a benefit - now?

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Policy



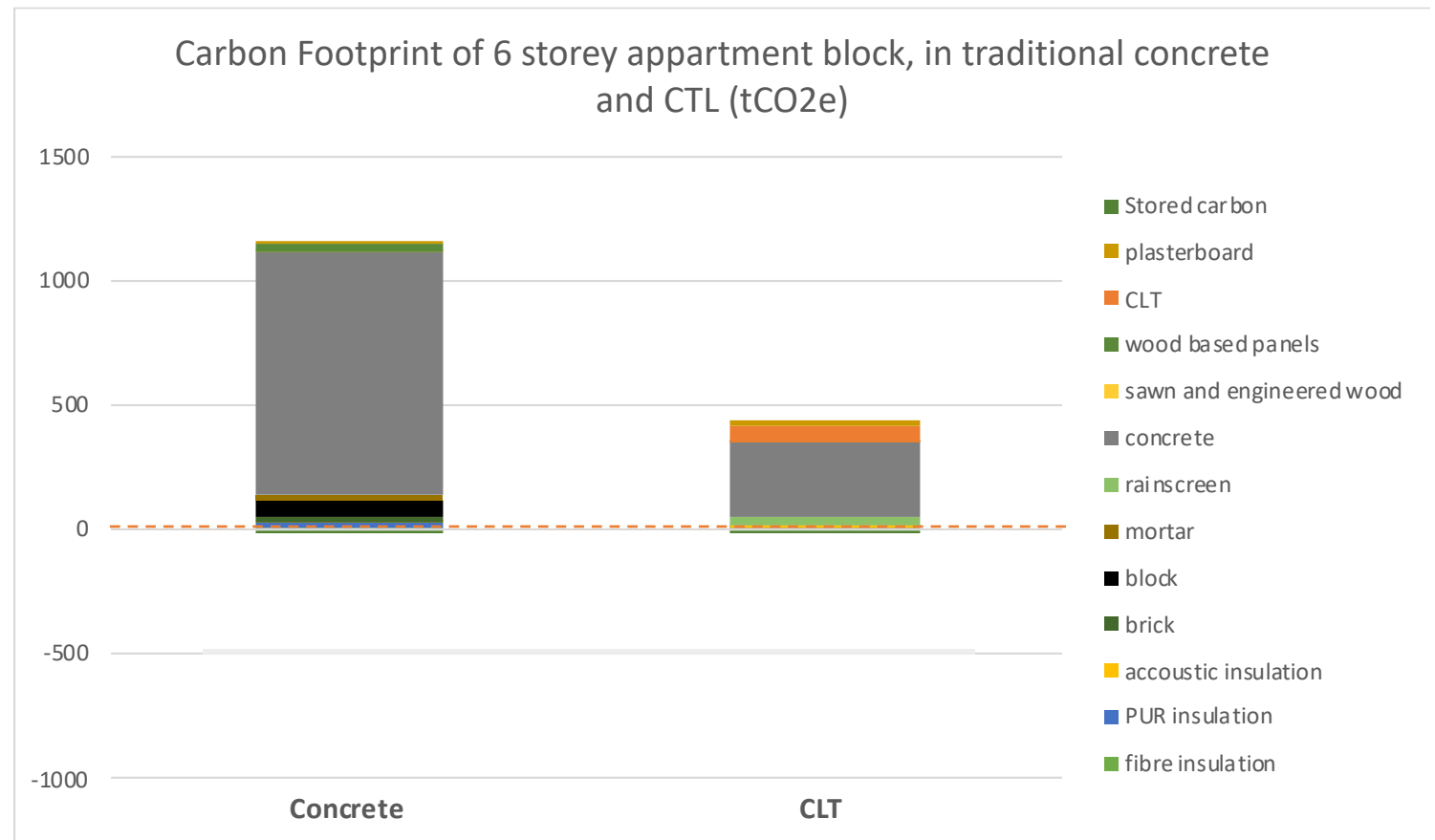
Carbon credits\*



Resource efficiency –  
(circular economy)

\*"trinomies study": European Commission, Directorate-General for Climate Action, Bolscher, H., Schelhaas, M., Garcia Chavez, L., et al., *Evaluation of the climate benefits of the use of harvested wood products in the construction sector and assessment of remuneration schemes : final report*, 2021, <https://data.europa.eu/doi/10.2834/421958>

# What is currently shown in a building assessments?

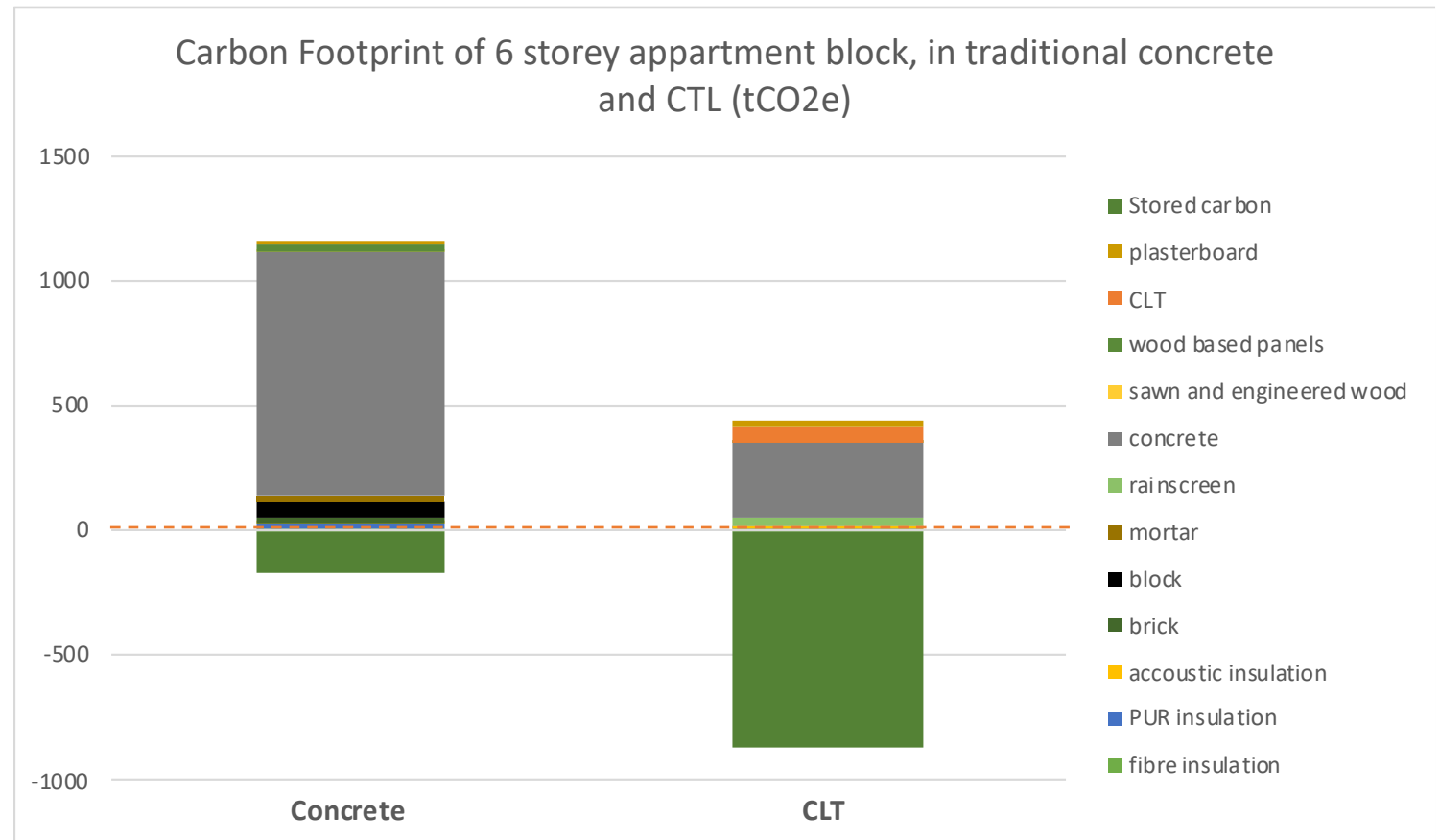


<https://www.theccc.org.uk/publication/wood-in-construction-in-the-uk-an-analysis-of-carbon-abatement-potential-biocomposites-centre/>

# What should we show?



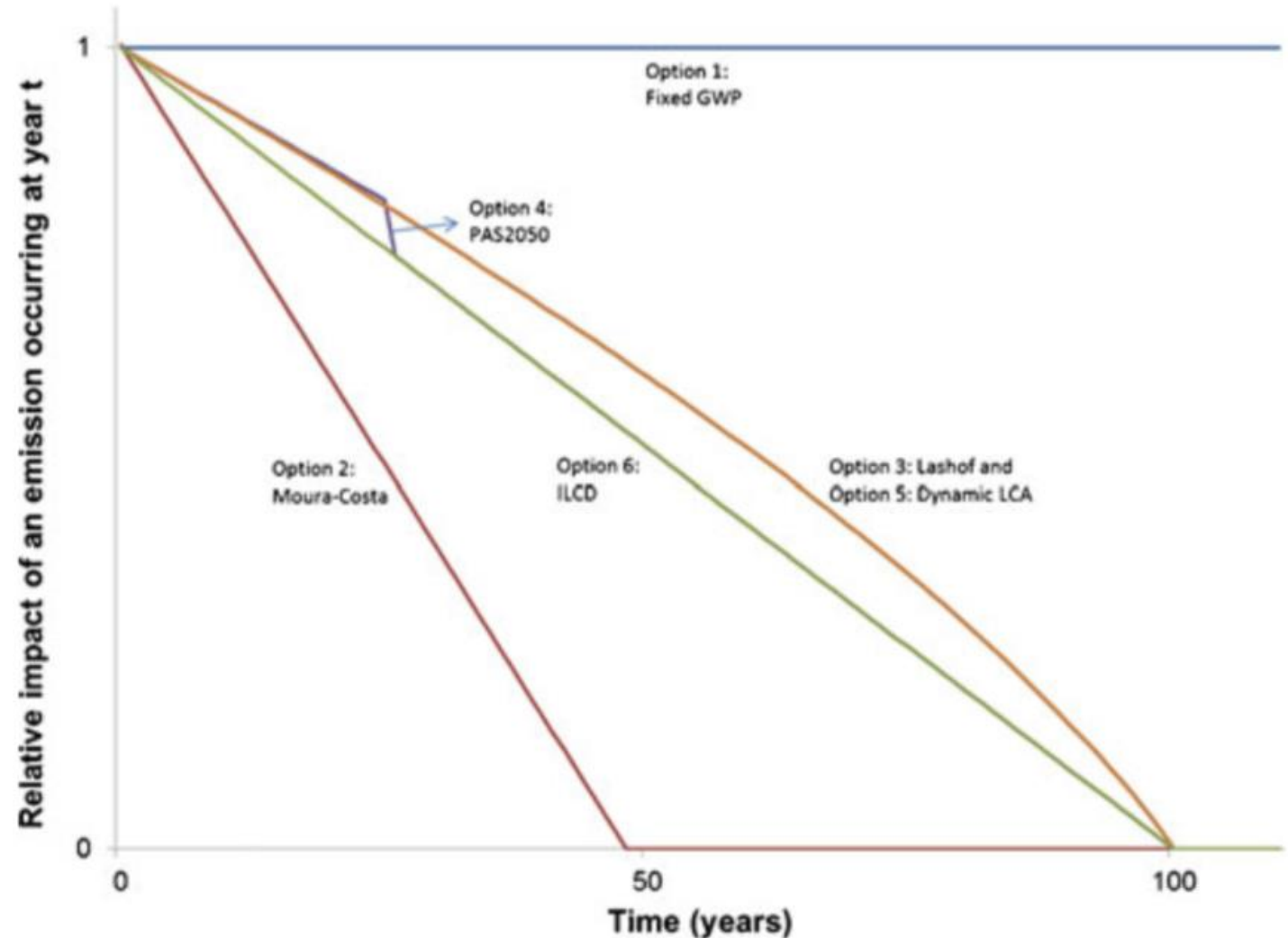
The graphs here display the total quantity of stored carbon as a carbon footprint (or Global Warming Potential) in CO<sub>2</sub> Equivalents, but not necessarily the benefit of maintaining it over time...



<https://www.theccc.org.uk/publication/wood-in-construction-in-the-uk-an-analysis-of-carbon-abatement-potential-biocomposites-centre/>

# What methods can we use to show benefit of stored carbon?

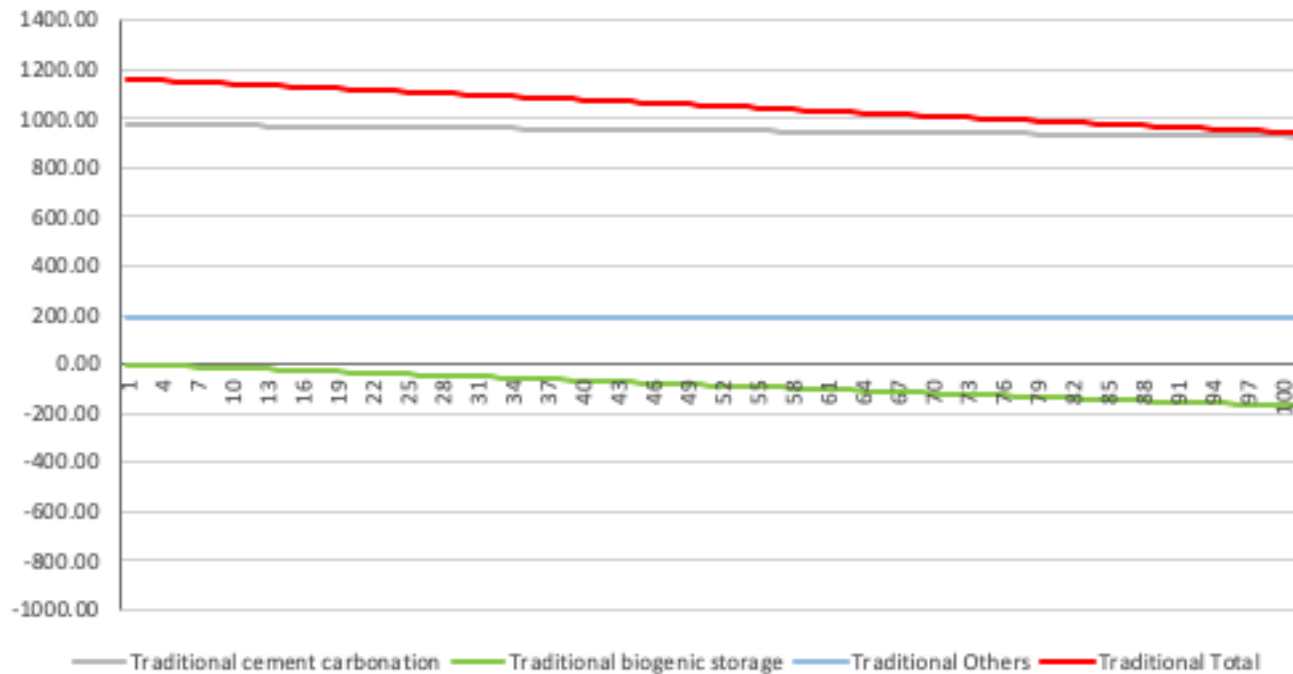
- Shows how **different methods** account for the benefit of storing carbon when it comes any final emission **dependent on when it occurs**
- - i.e. Instead of -1 +1 as shown in EPDs, it would be -1 +(the amount shown here, dependent on the year of emission)



Brandão M, et al, 2013, Key issues and options in accounting for carbon sequestration and temporary storage in life cycle assessment and carbon footprinting, J Life Cycle Assess (2013) 18:230–24

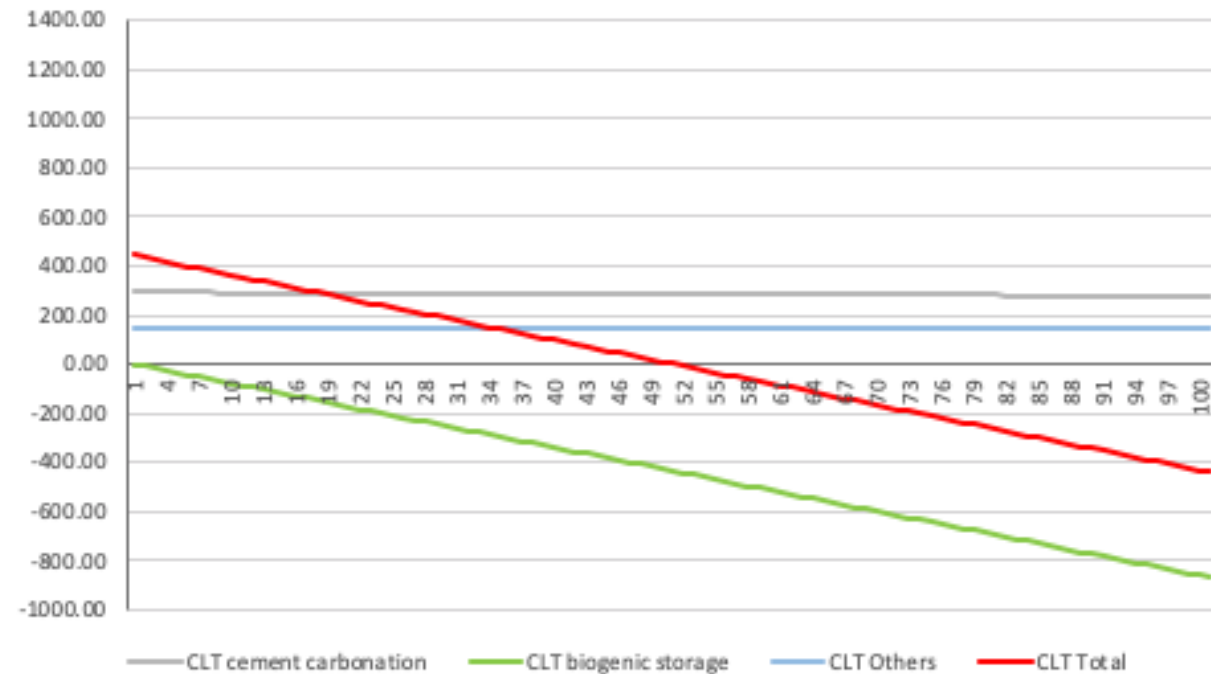
# Approximate benefit over time (Weighted Average)

Traditional (concrete) 6 Storey building with 22 Dwellings  
GWP tCO<sub>2</sub>e



Time in years →

Cross Laminated Timber 6 Storey building with 22 Dwellings  
GWP tCO<sub>2</sub>e



Time in years →

# What to report?

## Fixed Service life?

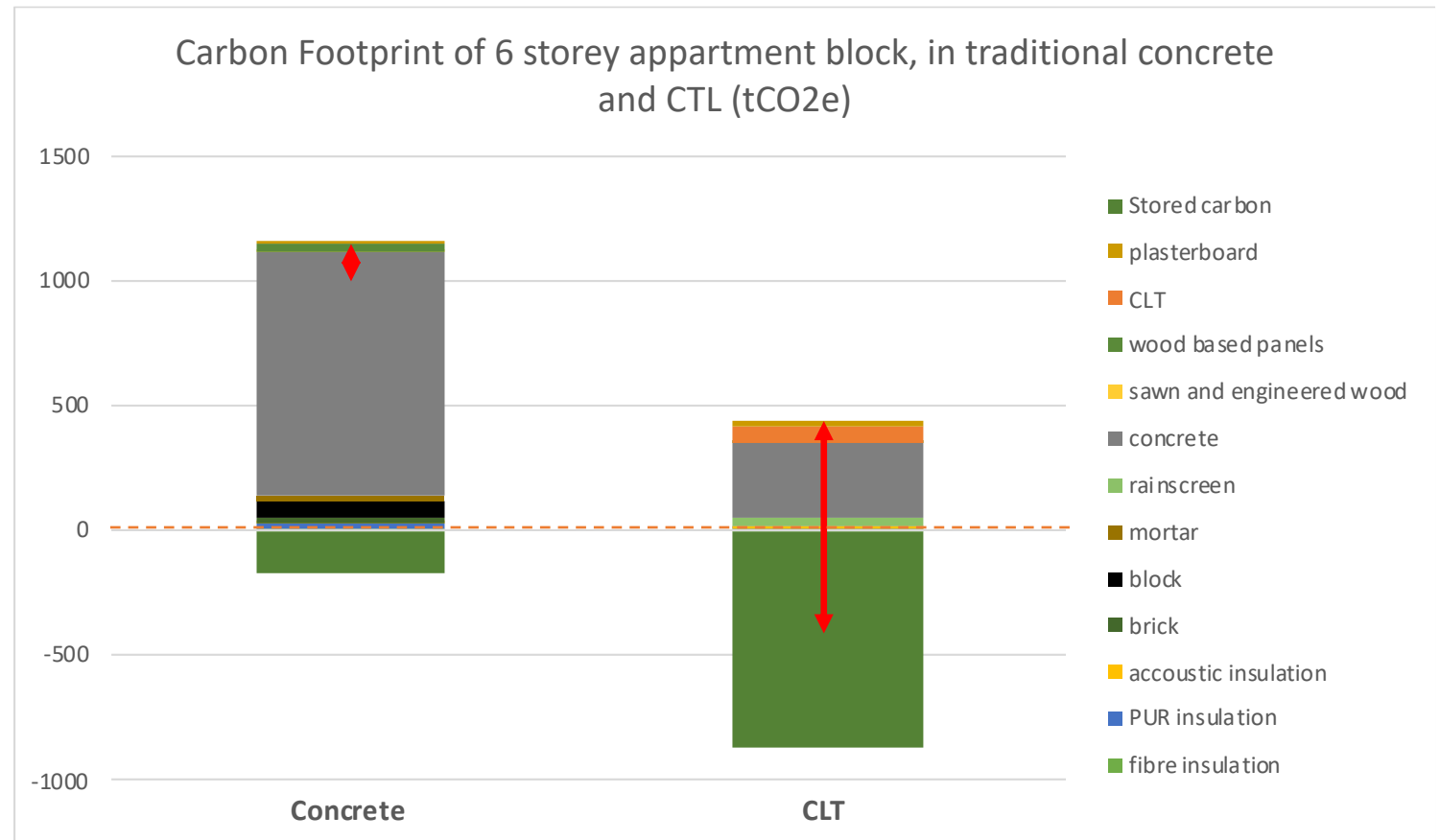
Net impact/benefit if maintained for 100 years:

Concrete 992 tCO<sub>2</sub>  
CLT -426 tCO<sub>2</sub>

Or **separate out storage benefit from impact?**

Or **a statement?** -“At 50 years the CLT building become climate change mitigation benefit\* (\*based on PAS2050 methodology using 100 year time frame)”

But - Showing a **spread of results** may be best for incentivising better use



# Where to display benefit on product footprint?



## Add to GWP result?

- + Shows clear benefit
- + Cannot be ignored
- but not the dependence on time
- Cannot be separated out

Currently being discussed for PEF [i.e. to include in PEF profile or as additional information/indicator, but also which method to apply e.g. dynamic LCA or weighted average].

RSL	Carbon storage benefit of biogenic carbon (GWP kgCO <sub>2</sub> e)
50 Years	-0.50
75 Years	-0.75
100 Years	-1.00

## Separate information?

- + Shows clear benefit
- + Data can be used for carbon certificates
- + Clear message to architects/consumer that benefit dependent on time
- Needs to be same method and mandatory to be consistent

Already suggested in PAS2050 and wood PCR but proposed table of results for Wood PCR revision as Mandatory additional information



# What is needed for building assessment?

The benefit could clearly be shown in BIM – designer would instantly see benefit of longer storage - or design for re-use

Could be included in Level(s) and most other national/voluntary assessments

BUT:

- Digitised data (like proposed digital passports) requires set structure for data
- This will require a set methodology for calculations of storage benefits
- Also need to have usable descriptions in common data dictionary
  - (e.g. building smart data dictionary)



# Conclusions

- The storage of carbon in biogenic materials is a benefit.

But:

- Currently little to incentive an increase in quantity or storage time
- Methods to calculate this benefit are available, but the results need to be available to consumers and designers in a consistent and meaningful way
  - i.e. displayed on EPDs and product information and incorporated into whole building assessments
- But this may require **scientific community need to agree on a meaningful method** – or one may be chosen for us
  - (e.g. will PEF chose Dynamic LCA for a set life spans and include results in single scores?)