Findings from industry leaders on how we can accelerate low carbon building

Combient Pure RAMBØLL stordenso NCC

NCC Finland, Stora Enso, Ramboll and Combient Pure joined their forces to help property developers and investors make data-based low carbon construction material choices and take down the industry's emissions.

Combient Pure

An accelerator for value chain wide co-operation and business value creation from low carbon and circular solutions

NCC

A leading Nordic construction and property development company

storaenso

One of the largest sustainable forest owners and providers of wood products

RAMBØLL

An international engineering, architecture and consultancy company

Low Carbon Building collaboration– why did we join forces and what did we achieve?

Timber cities 'could cut 100bn tons of CO2 emissions by 2100'

Environmentalists say replacing natural forests with wood plantations to realise shift in construction practices is 'bonkers'

Science

'Timber Cities' Might Help Decarbonize the World

New research suggests that using wood for construction could avoid 100 gigatons of CO2 emissions through 2100, but building skylines of timber requires careful forest planning.

Efficiency & Environment, Top Stories

Wooden cities 'could save more than 100bn tonnes of CO2 by 2100'

Houses out of timber could become "unique long-term" carbon sinks, researchers say

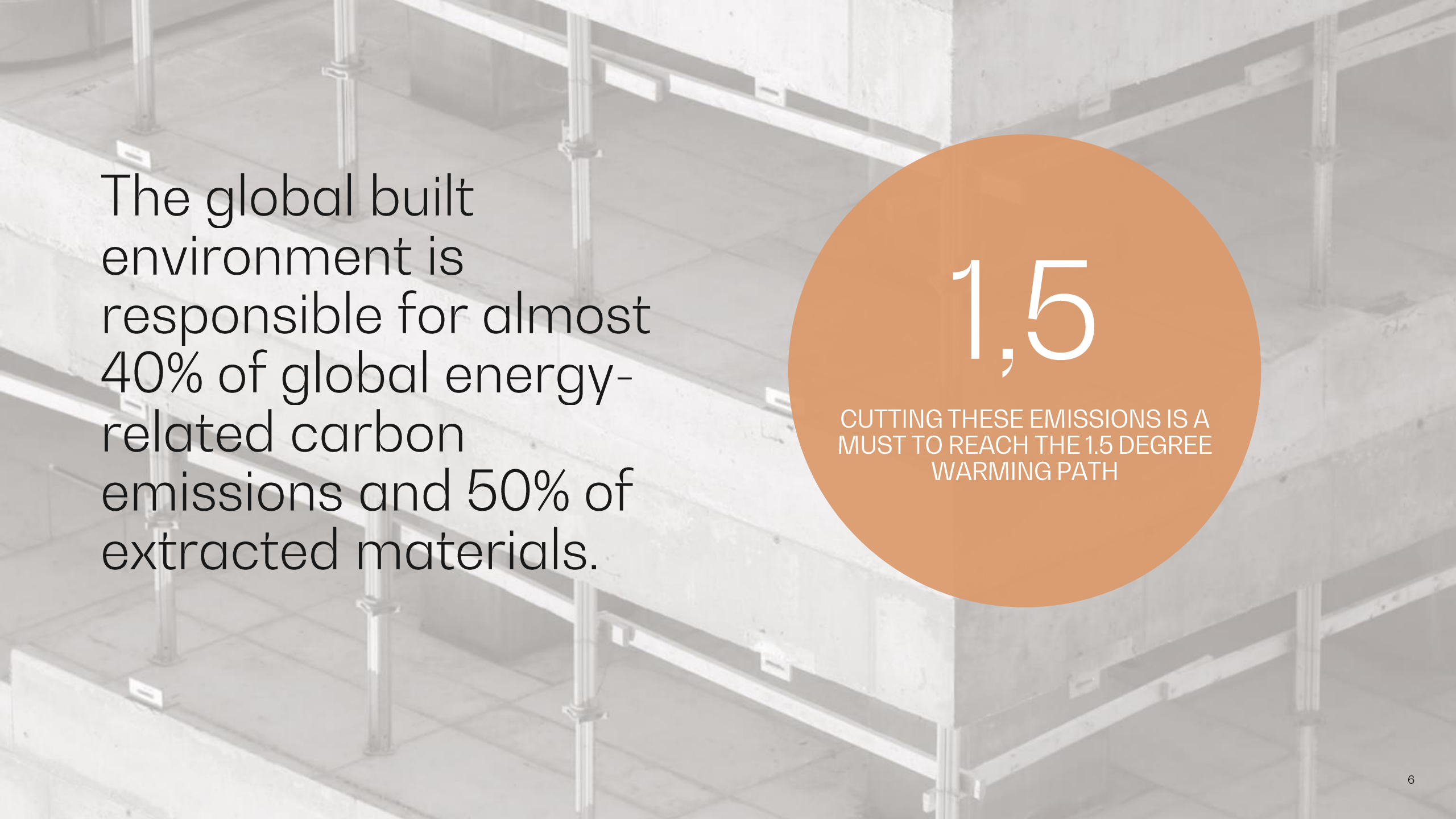
Tiede | Puurakentaminen

Tutkimus: Puukaupunkien rakentaminen maailmanlaajuisesti vähentäisi tuntuvasti hiilipäästöjä – Suomessa tilanne on mutkikkaampi

Kansainvälinen tutkimus puoltaa puurakentamisen lisäämistä maailmanlaajuisesti.

Article https://doi.org/10.1038/s41467-022-32244-w

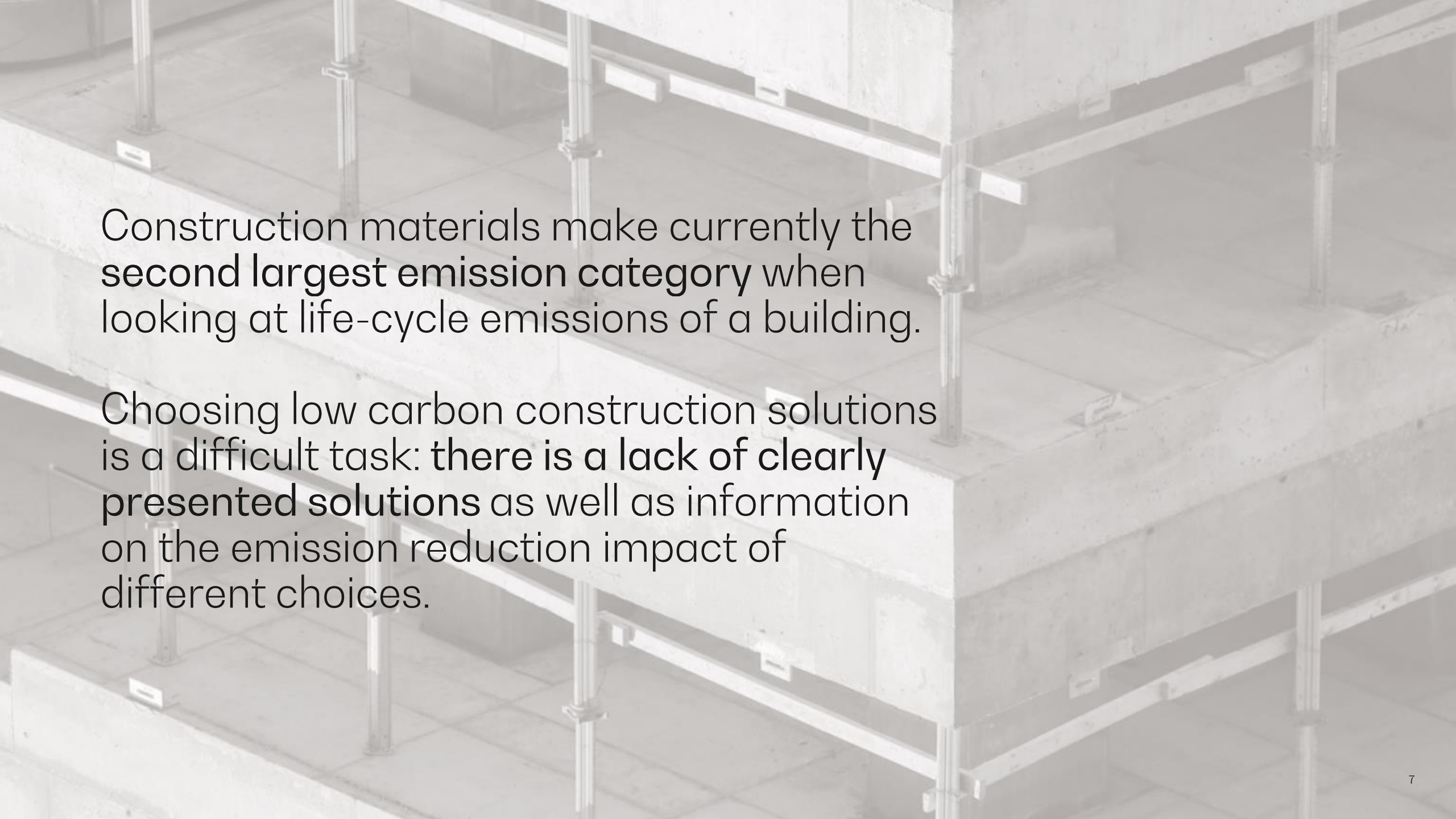
Land use change and carbon emissions of a transformation to timber cities



The global built environment is responsible for almost 40% of global energy-related carbon emissions and 50% of extracted materials.

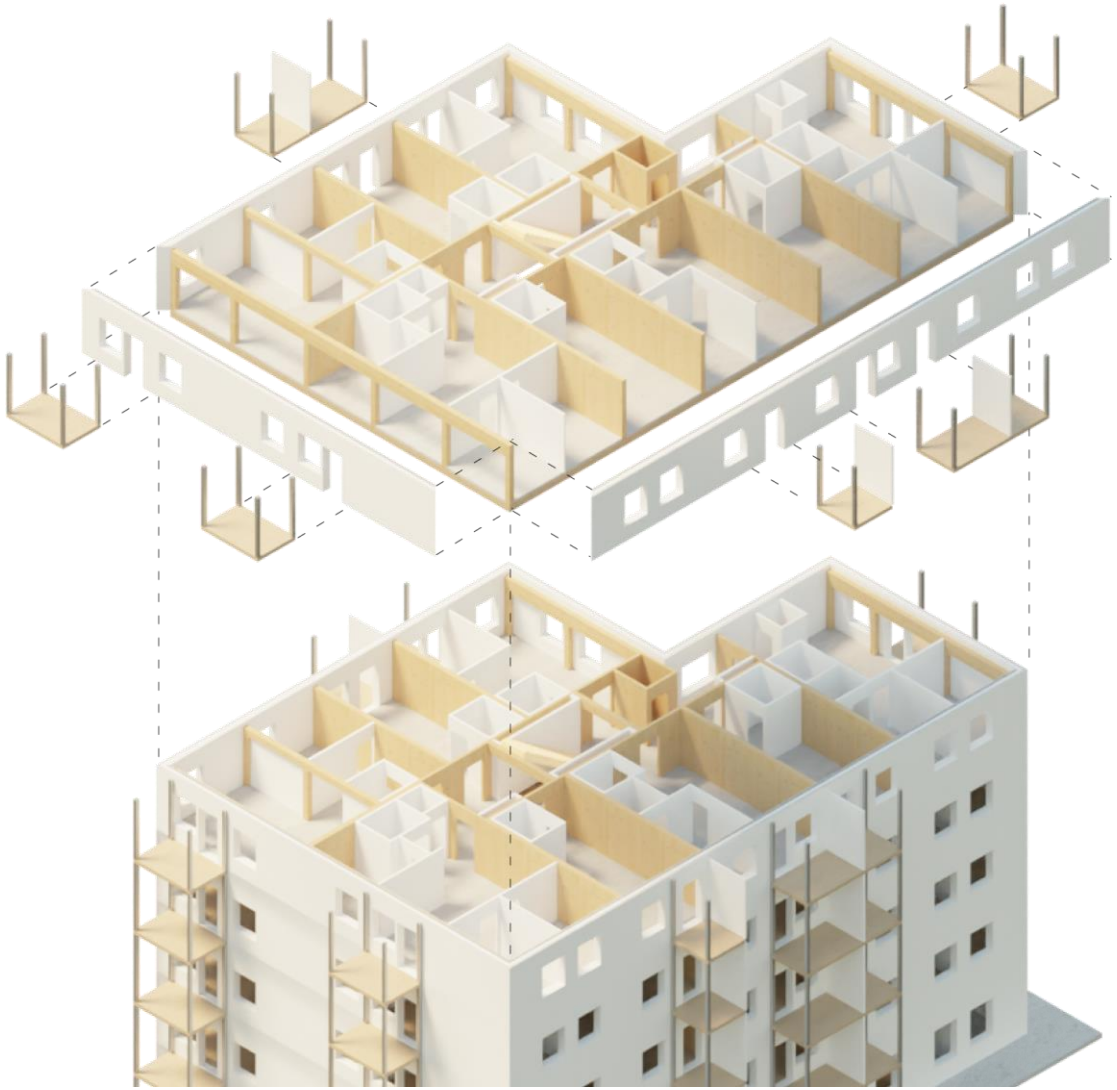
1,5

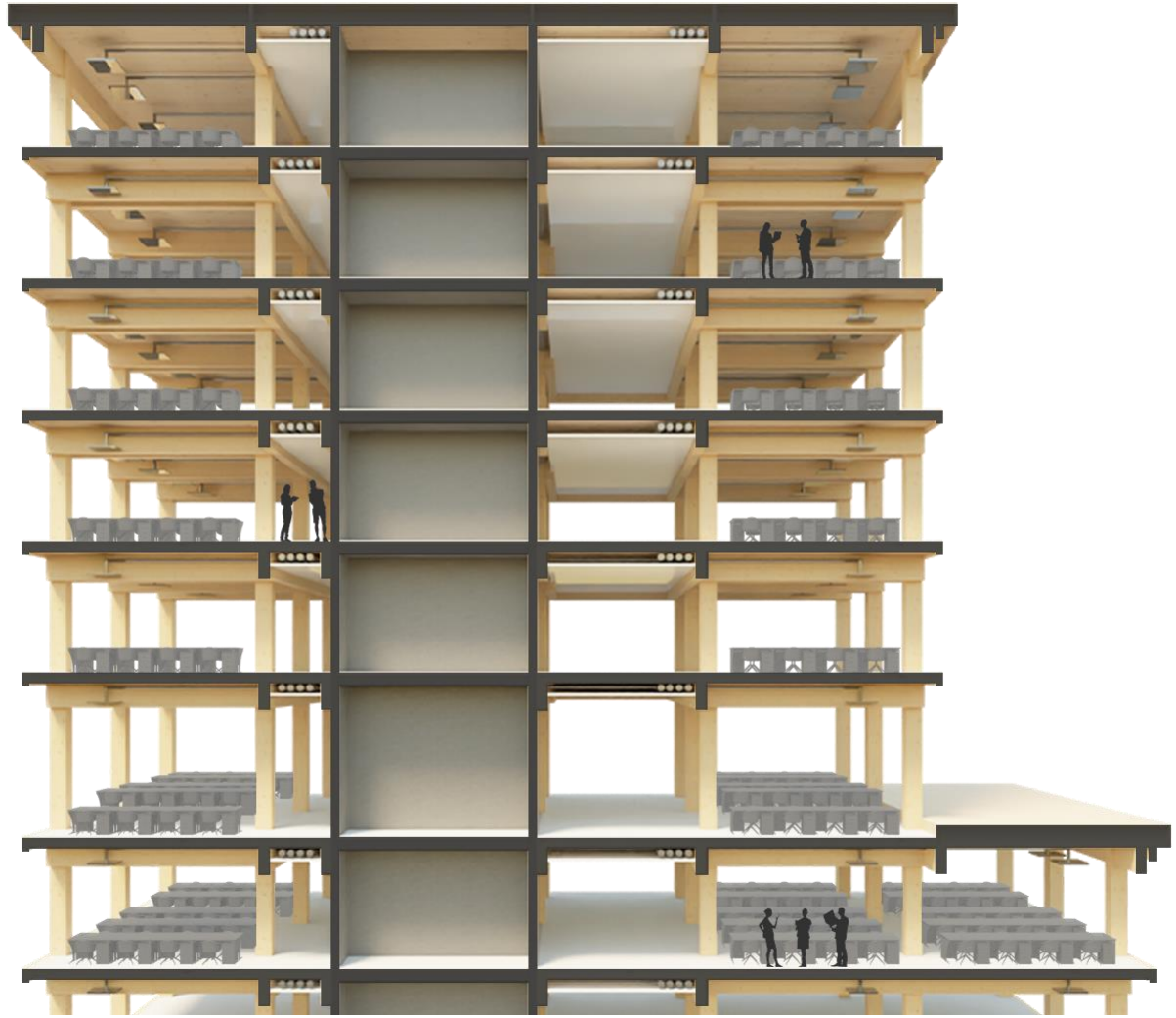
CUTTING THESE EMISSIONS IS A MUST TO REACH THE 1.5 DEGREE WARMING PATH

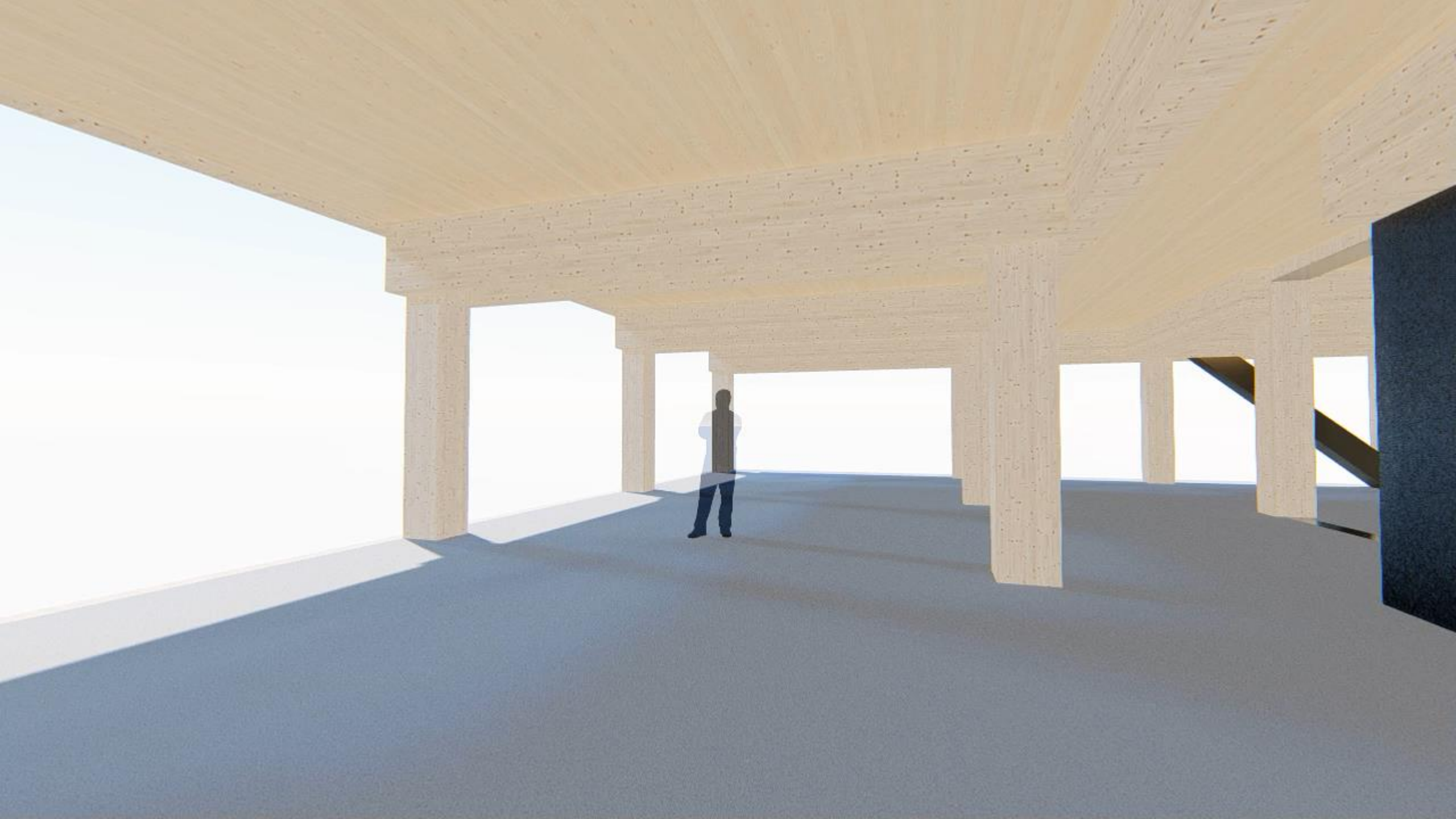


Construction materials make currently the **second largest emission category** when looking at life-cycle emissions of a building.

Choosing low carbon construction solutions is a difficult task: **there is a lack of clearly presented solutions** as well as information on the emission reduction impact of different choices.







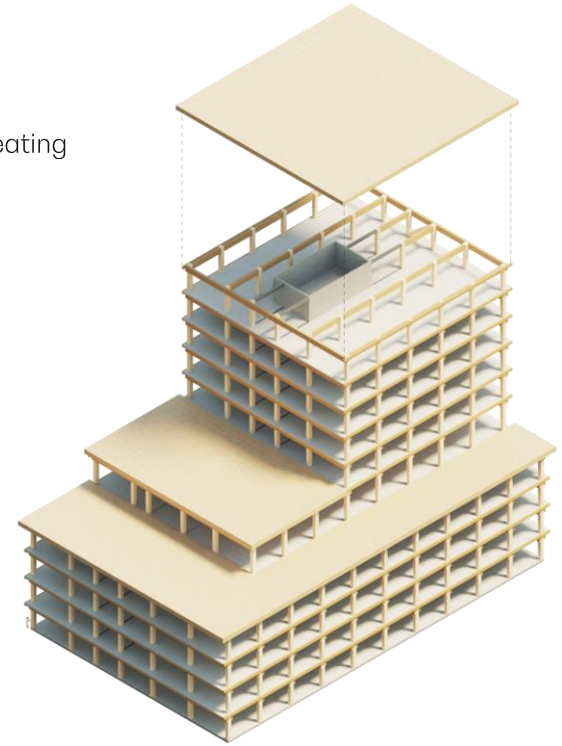

Are digitally developed designs leading to real-life emission reductions?
NCC
storaenso
RAMBOLL
Combient Pure
29.9.2022

Going into the project, expectation was 15-20 % reduction in total carbon footprint based on previous studies.

Compared designs

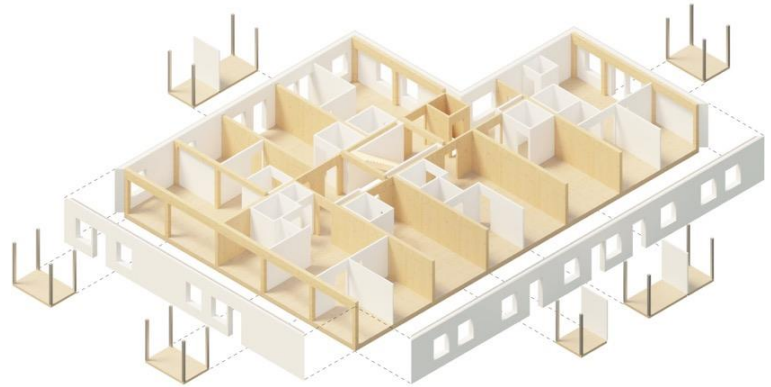
OFFICE BUILDING:

Compared alternatives	1. **Concrete** (Steel-concrete column-pilar frame, hollow core slabs) 2. **Wood** (Massive wood slabs, columns and beams. First floor and core similar concrete)
Gross area	16 600 brm^2
Number of floors	11
Form of heating	Geothermal and district heating
Energy class	A
Energy consumption	Electricity: 768 MWh District heating: 493 MWh District cooling: 102 MWh



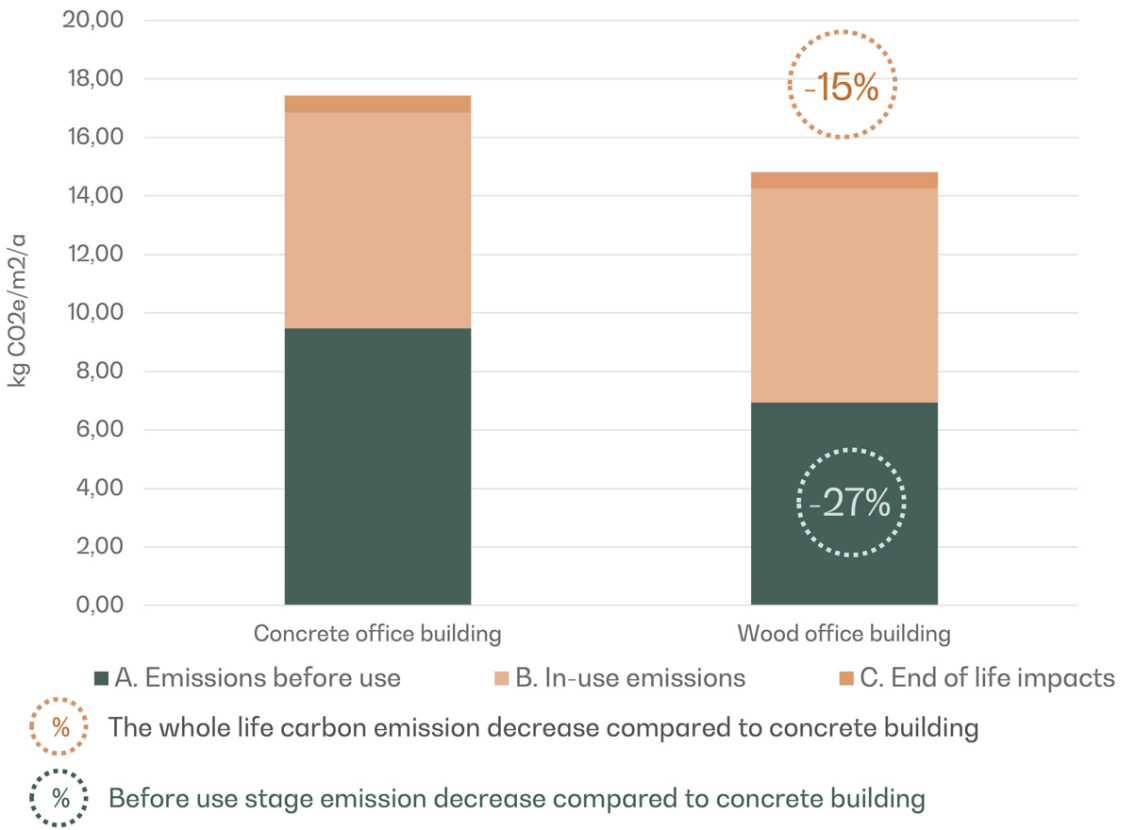
RESIDENTIAL BUILDING:

Compared alternatives	1. **Concrete** (hollow core slabs and load bearing walls) 2. **Wood, conversion** (Wooden load-bearing walls, columns and beams, CLT floor slabs. First floor and core concrete) 3. **Wooden, optimized** (Wooden load-bearing walls, columns and beams, CLT floor slabs. First floor and core concrete)
Gross floor area	2 500 m^2
Number of floors	6 (+ 1 basement floor)
Form of heating	Geothermal heating
Energy class	A
Energy consumption	Electricity 187 MWh



Pictures: Stora Enso

Results – Carbon footprint of the office



Results – Carbon footprint of the residential building

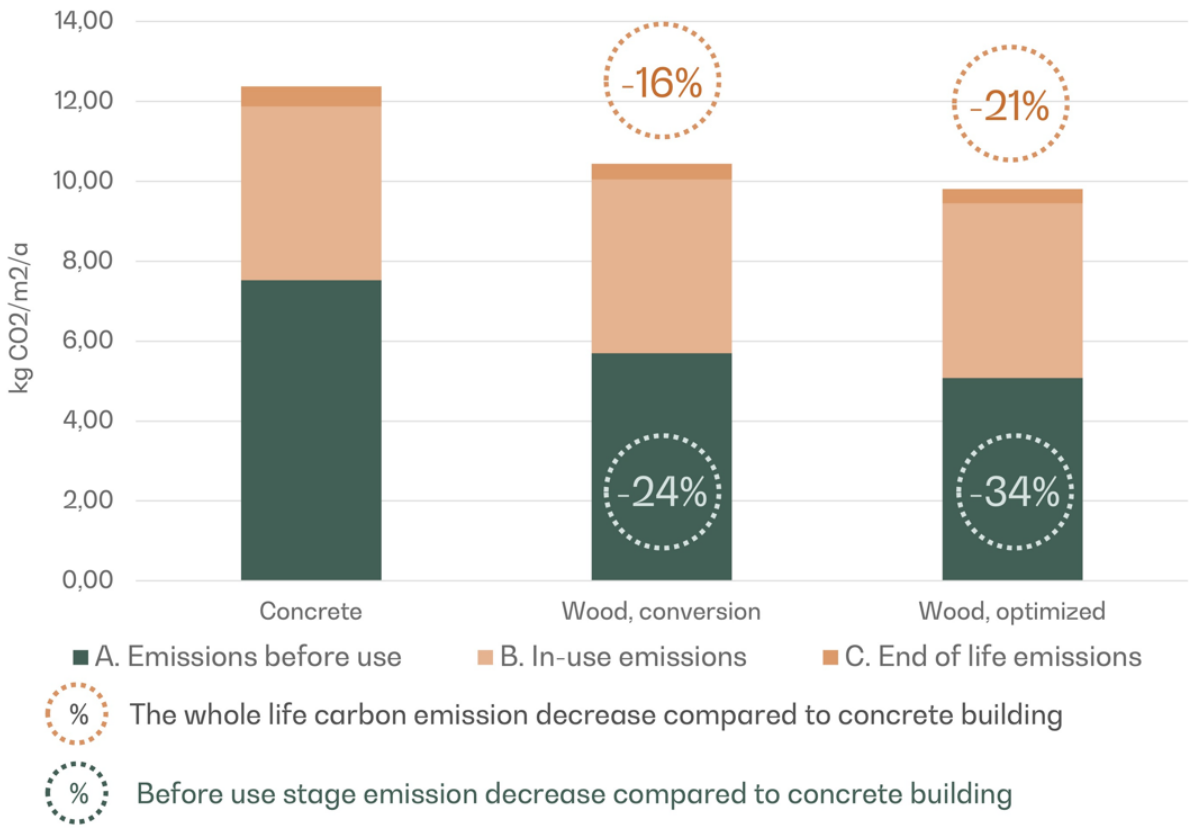


Chart: Combient Pure collaboration

Example from Office – Product stage comparison, concrete and wood

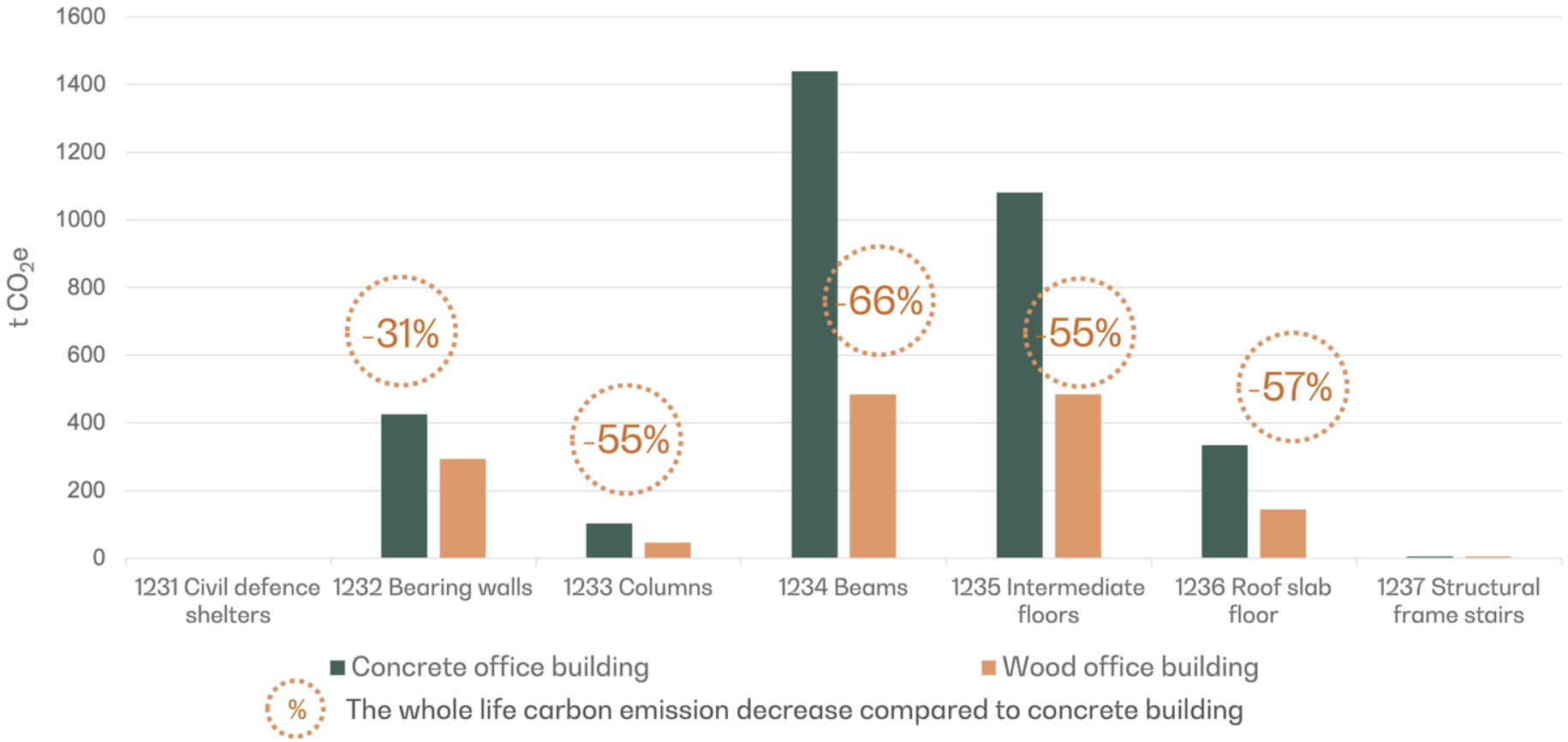


Chart: Combient Pure collaboration

Summary

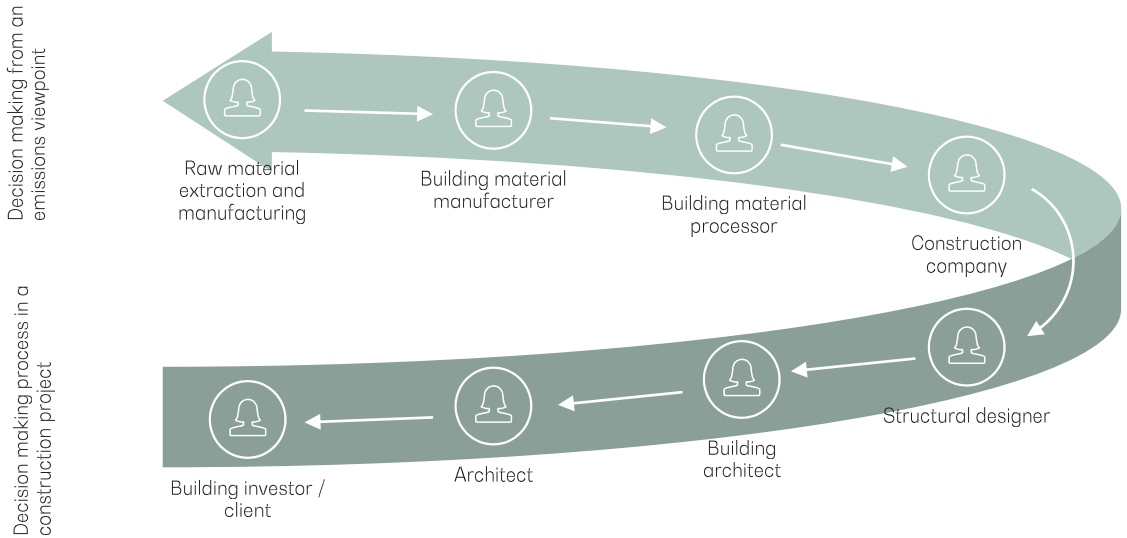
- Wood can be an excellent strategy in reducing embodied carbon
  - 27-34 % reductions in carbon footprint in before use stage achieved
- Storing biogenic carbon in wood helps mitigate climate change
- We still have way to carbon neutrality and there are no shortcuts
  - Choosing the right design approach can bring us closer to carbon neutrality target, but requires work from different parts of the value chain

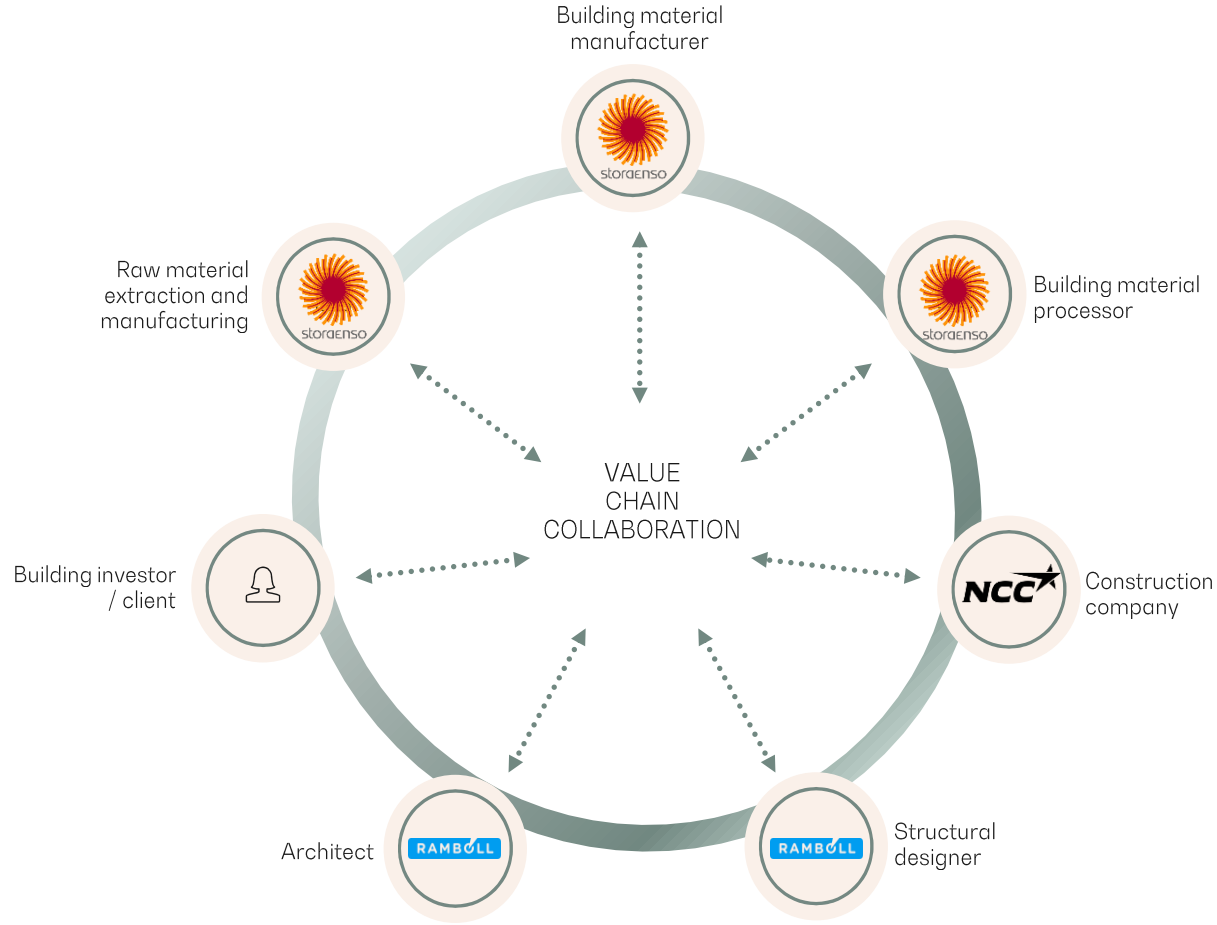
Our key takeaways on how you can promote low carbon building already tomorrow!

1. Value chain collaboration improves visibility and availability of low carbon solutions
2. Early-phase collaboration and digitalisation enables efficient design
3. Enhanced emission control in the building design phase
4. Fast-track to optimal solutions
5. Long term business value creation

1. Value chain collaboration improves visibility and availability of low carbon solutions

DECISION MAKING AND EMISSION INFORMATION FLOWS

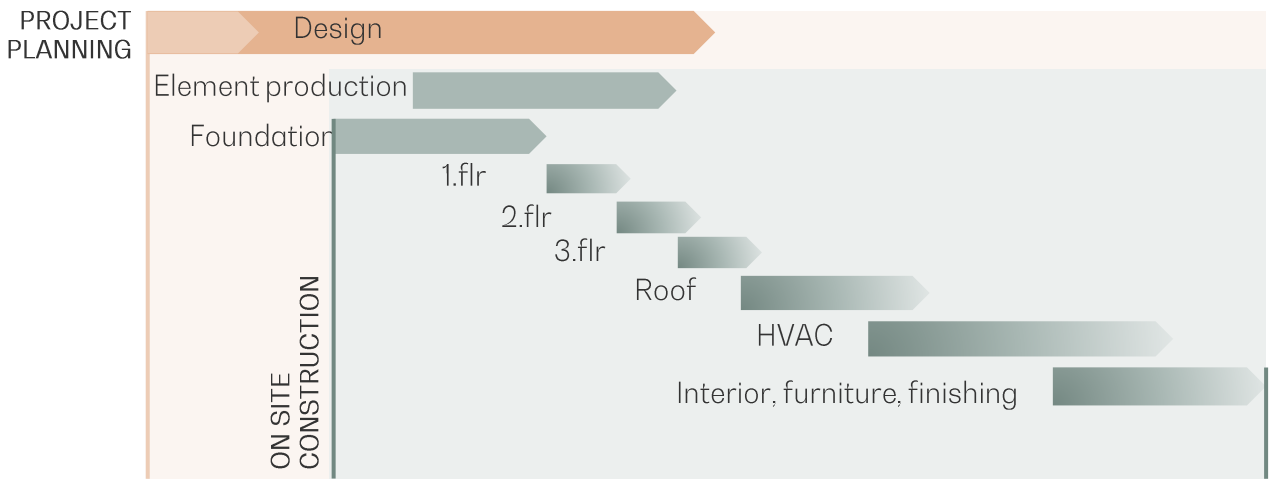




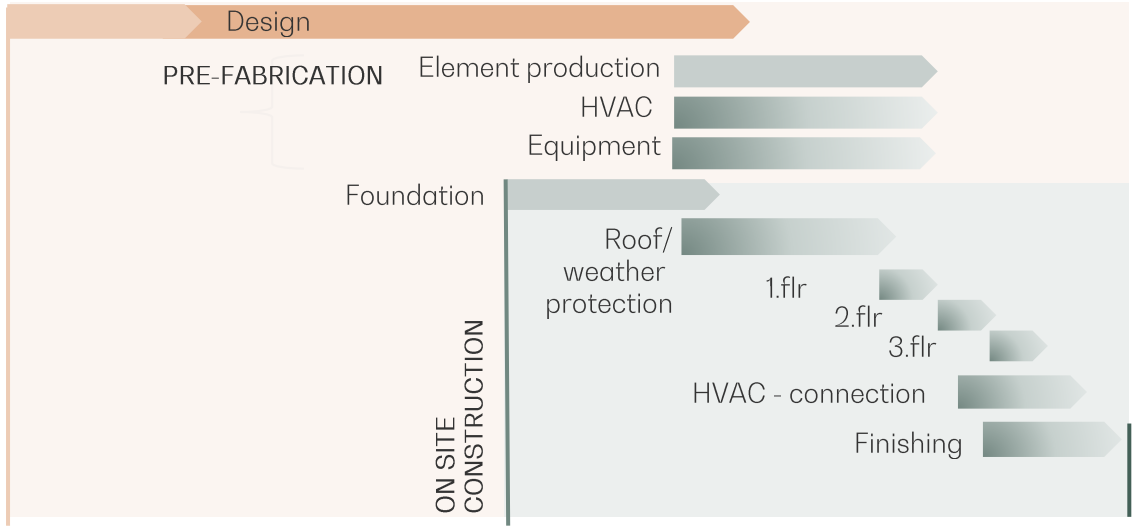
Applied from: Finnish construction industry's carbon neutrality roadmap to 2035

2. Early-phase collaboration and digitalisation enables efficient design

TRADITIONAL INDUSTRIAL CONSTRUCTION



INDUSTRIAL WOOD CONSTRUCTION (PRE-FAB)



3. Enhanced emission control in the building design phase...

- ...helps construction industry in tracking their emissions within the developing regulations
- ...accelerates the further development of digital tools and calculation methods
- ...is only possible with early collaboration and information sharing across the entire value chain

4. Digital tools and collaboration provides fast-track to optimal solutions...

- ..solving challenges and breaking prejudices towards the use of massive wood as a construction material
- ...analyse our internal processes and operations
- ...optimized use of timber in low-carbon solutions

5. Creating long-term business value...

- ...with value chain-wide collaboration, which is unique in the building industry.
- ...with collaborative methods can unlock new business potential.
- ...instead of single building project.

Let's continue the journey together!

www.lowcarbonbuilding.fi

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