

- A1 Raw materials supply
- A2 Transport raw materials
- A3 Manufacturing
- A4 Transport
- A5 Site works



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Net Zero Construction

The sector has developed strategies to improve building performance and significantly reduce emissions during the operational phase of a building's lifecycle. We must also focus our efforts on reducing emissions during the construction process. Often referred to as upfront carbon, these emissions are responsible for 11 percent of global greenhouse gas (GHG) emissions.¹

- B1 In use
- B2 Maintenance
- B3 Repair
- B4 Replacement
- B5 Refurbishment
- B6 Energy Use
- B7 Water use

Upfront carbon

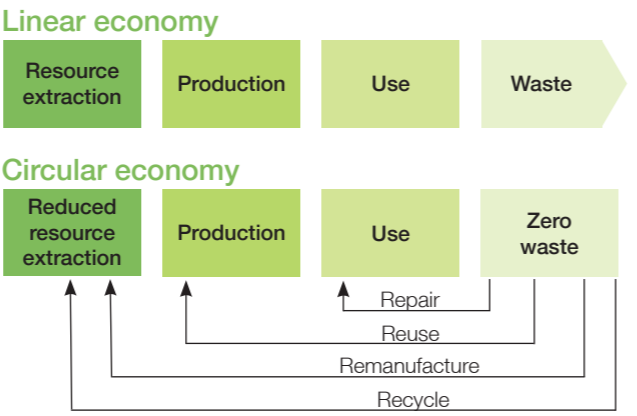
The embodied carbon and GHG emissions during the construction phase are often referred to as upfront carbon, our approach recognises the emissions during construction under modules A1 to A5 on our pathway to net zero.

Why is it important?

Emissions during construction are projected to be responsible for half of all global emissions between now and 2050.² Currently concrete, iron and steel alone produce approximately nine percent of annual global emissions.¹ Reducing the embodied carbon in buildings is critical to meeting our net zero goals. We must focus on circularity when designing buildings; building with carbon neutral or negative materials, reusing materials and designing with disassembly and reuse in mind.

Moving towards a circular economy

The UK construction industry accounts for approximately 60 percent of UK material use and a third of all waste.³ A circular economy places the emphasis on reuse, restoration and regeneration, replacing the traditional linear model. This illustration comparing linear and circular economies has been adapted from the [London Energy Transformation Initiative \(LETI\) Embodied Carbon Primer](#).⁴



- C1 Deconstruction
- C2 Transport
- C3 Waste processing
- C4 Disposal
- D Reuse

Steps to reducing embodied emissions



1 Working collaboratively

Create ownership, accountability and shared responsibility by discussing net zero ambitions and opportunities, developing an intelligent brief with measurable targets in collaboration with the client and wider design team.



2 Designing for the future

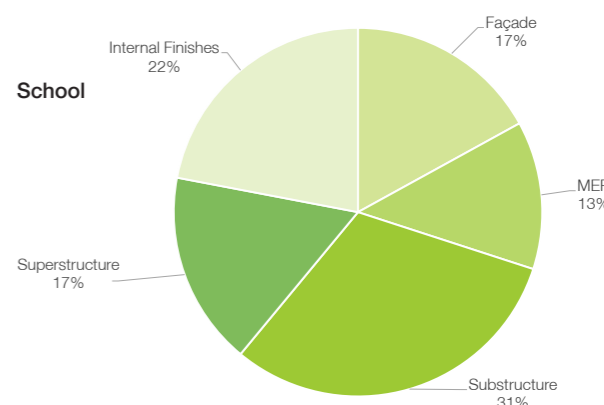
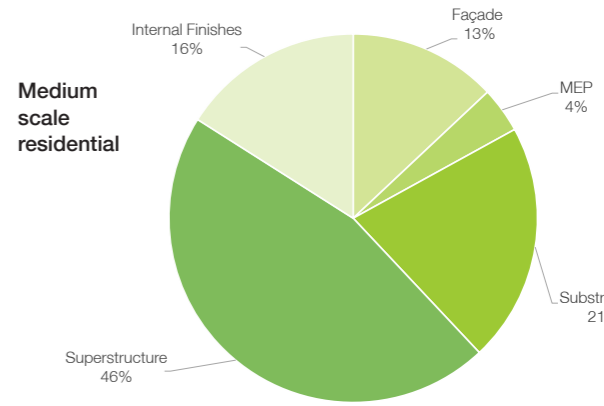
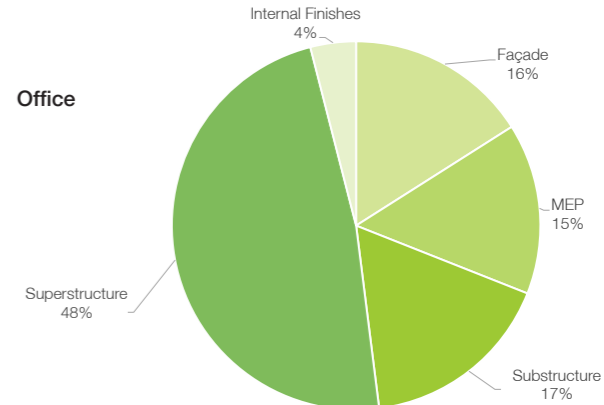
Focus on reducing the embodied carbon in the structure and envelope first. Ensure the design is flexible and represents the most efficient solution in line with the brief and the intended lifespan of the building. Design to standard sizes, modules and maximum structural efficiency. Explore innovative, sustainable products and solutions that may offer carbon savings and wider programme efficiencies. Above all, design for adaptability, disassembly and reuse.



3 A renewed focus on materials

View all existing structures as a material bank, highlighting the significant carbon benefits for retaining, reusing and retrofitting any existing structure to the client from the outset. Use digital modelling to undertake regular embodied carbon assessments on emerging proposals and lifecycle assessments of proposed design options. Materials should be selected based on their performance, embodied carbon content, longevity and ability to reuse or recycle. Use renewable materials from local suppliers who offer Environmental Product Declarations (EPD).

Recent case studies from the LETI⁴ reiterate the importance of focussing carbon reduction strategies around the 'big wins'. The charts below highlight the typical embodied carbon present in key building elements across three different building types, highlighting where to focus carbon reduction strategies.



References

1 Architecture 2030. (2017) New Buildings: Embodied Carbon. Retrieved from <https://architecture2030.org/new-buildings-embodied/9/>

2 World Green Building Council. (2019) Bringing embodied carbon upfront: Coordinated action for the building and construction sector to tackle embodied carbon. Retrieved from https://www.worldgbc.org/sites/default/files/WorldGBC_Bringing_Embodied_Carbon_Upfront.pdf

3 UK Green Building Council. (2018) Practical how-to guide: Build Circular Economy Thinking Into Your Projects. Retrieved from <https://www.ukgbc.org/sites/default/files/How%20to%20build%20circular%20economy%20thinking%20into%20your%20projects.pdf>

4 London Energy Transformation Initiative. (2020) LETI Embodied Carbon Primer: Supplementary guidance to the Climate Emergency Design Guide. Retrieved from <https://www.leti.london/ecp>

Images

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