Reducing Carbon Emissions

Carbon Emissions : Global Impacts

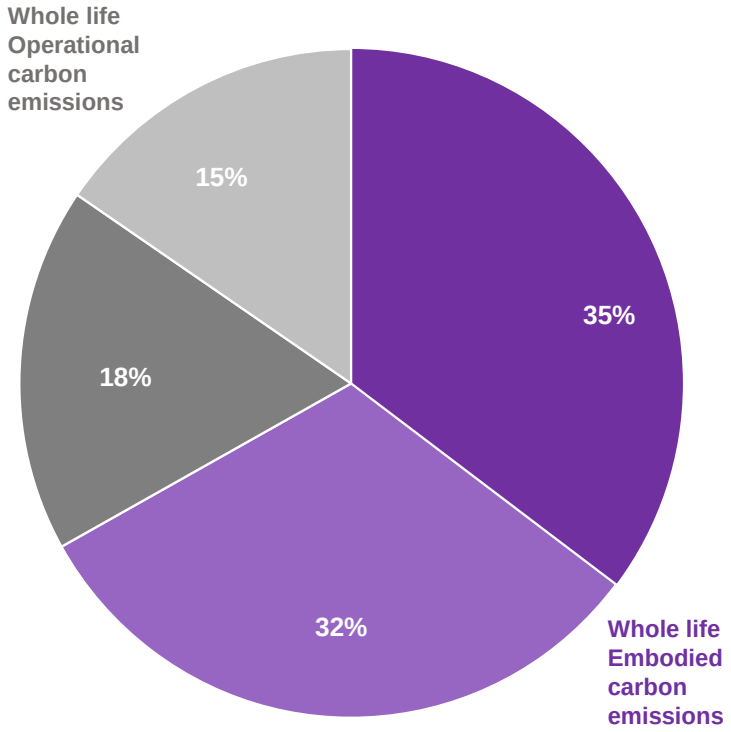
Global Warming

Resource Depletion

CO_2

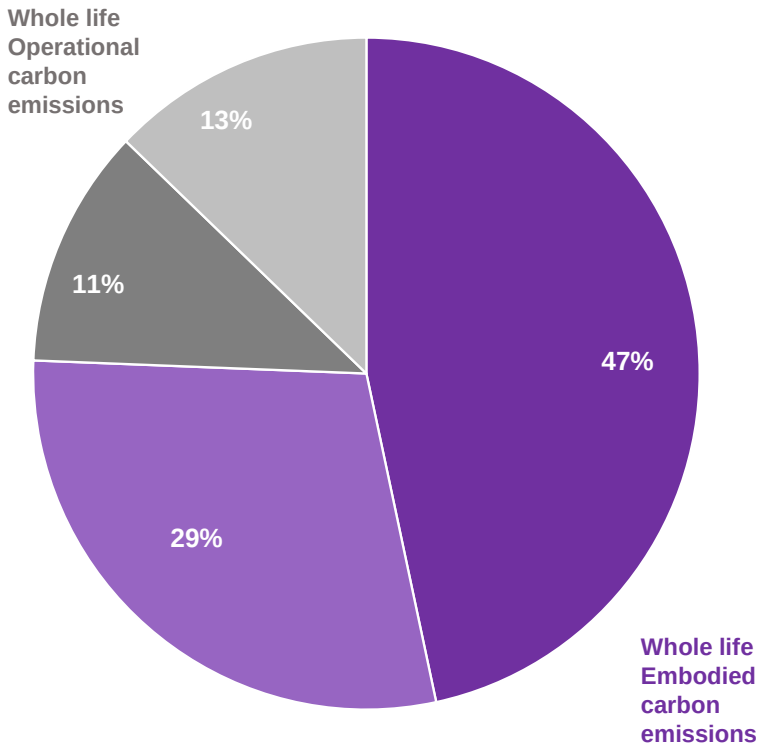
Carbon Emissions : Embodied Impacts

Office



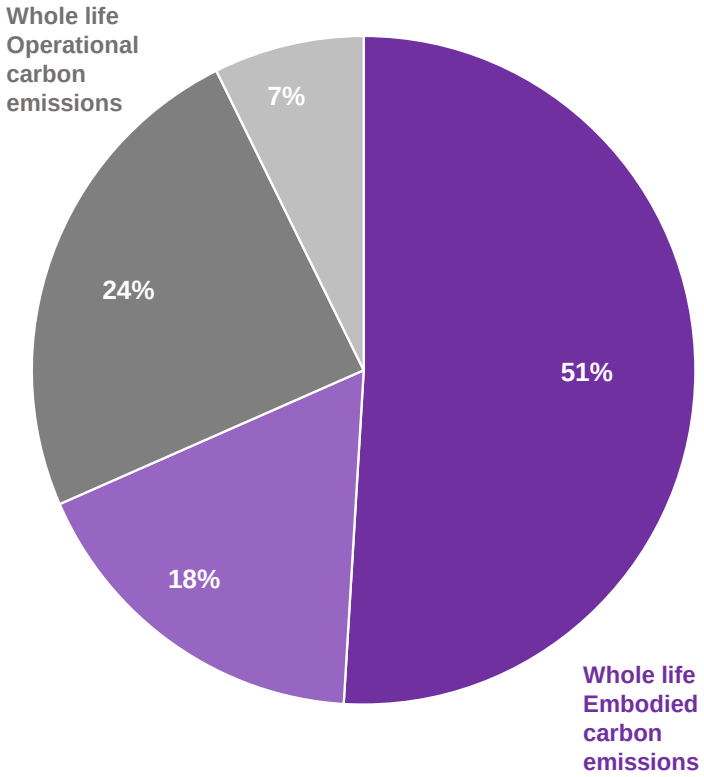
Speculative office building with Cat A fit out; central London

Warehouse



Typical warehouse shed with office space (15% by area); London perimeter, UK

Residential



Residential block, with basic internal fit out; Oxford, UK

Carbon emissions to Practical Completion

Carbon Emissions In use

Operational emissions Regulated

Operational emissions Unregulated

The whole life figures illustrated have been calculated in line with the modular structure of EN 15978 and account for all components making up the finished building covering a cradle to grave scope (modules [A–C]) over a 60-year life cycle. Embodied and operational emissions were estimated at the design stage. Grid decarbonisation has been applied to emissions due to electricity consumption over the life of the building, embodied and operational. Decarbonisation scenario used: slow progression from the National Grid *Future Energy Scenarios* 2015.

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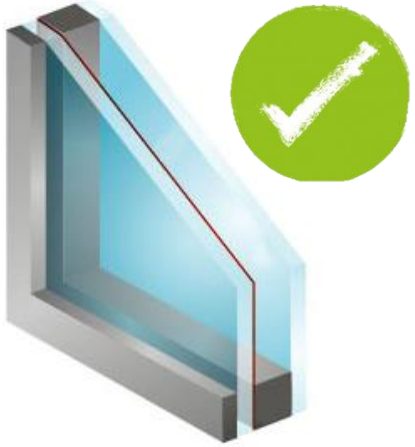
Carbon Emissions : Cost / Benefit

Carbon Efficiency
Double vs Triple glazing
60 years life cycle



or

Benefit of 3rd sheet **= 11,661 $kgCO_2e$**

Cost of 3rd sheet **= 13,193 $kgCO_2e$**

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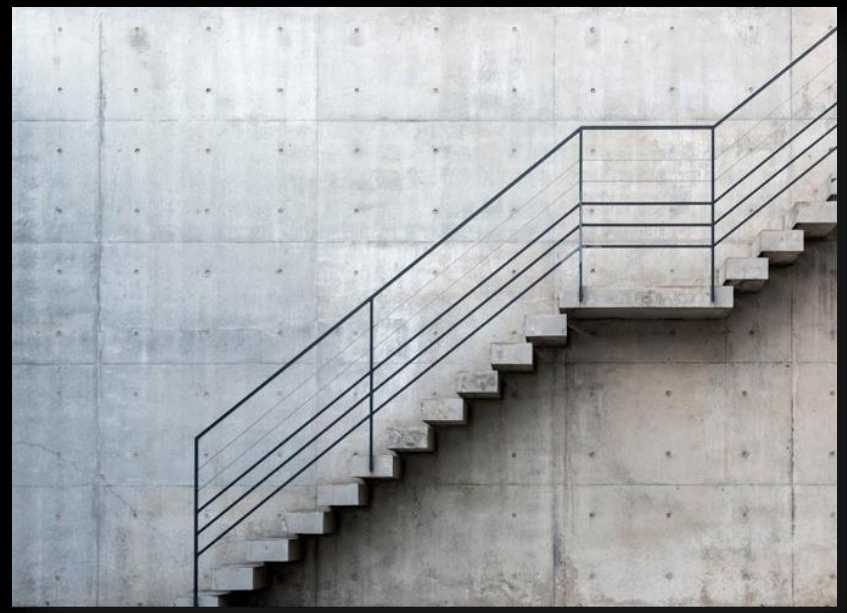
What of?



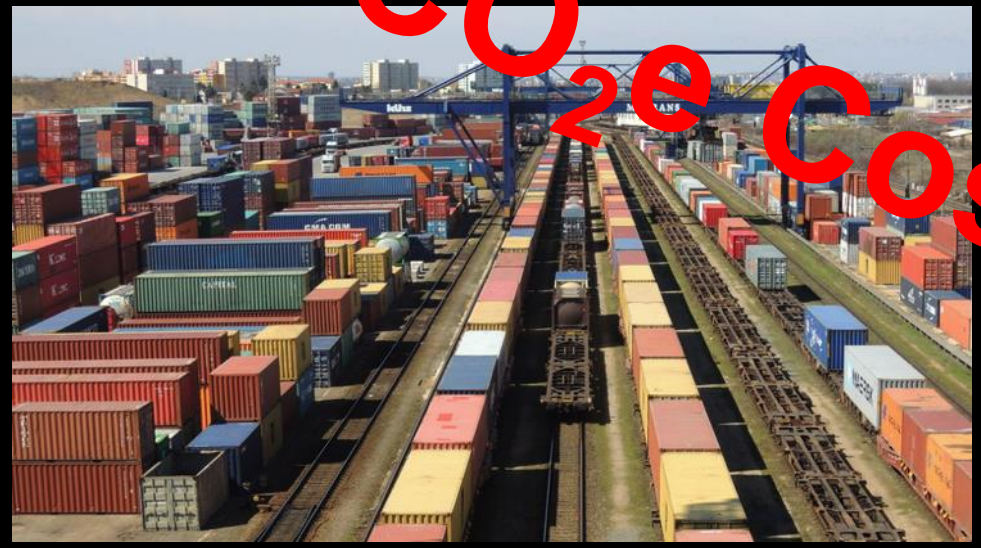
Where from?

Sourcing Process?

CO_2e Cost!

Transport

CO_2e Cost!



Construction

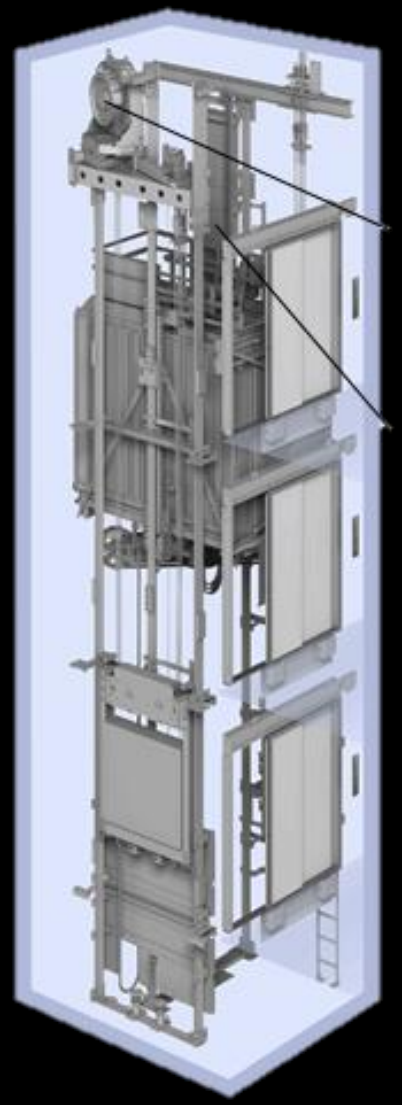
In Use

1975

2008

CO_2e Cost!

In Use



CO_2e Cost!

20-30 years life?

In Use

CO_2e Cost!

Demolition

Transport

CO_2e Cost!

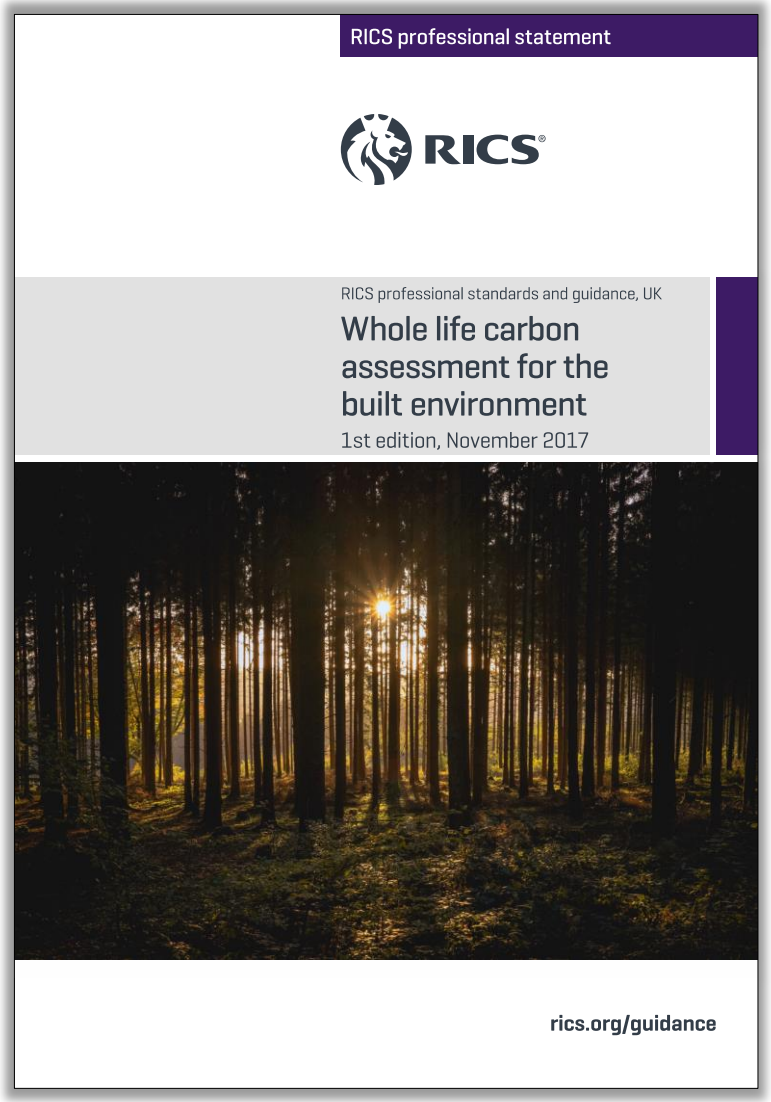
Landfill vs Recycling

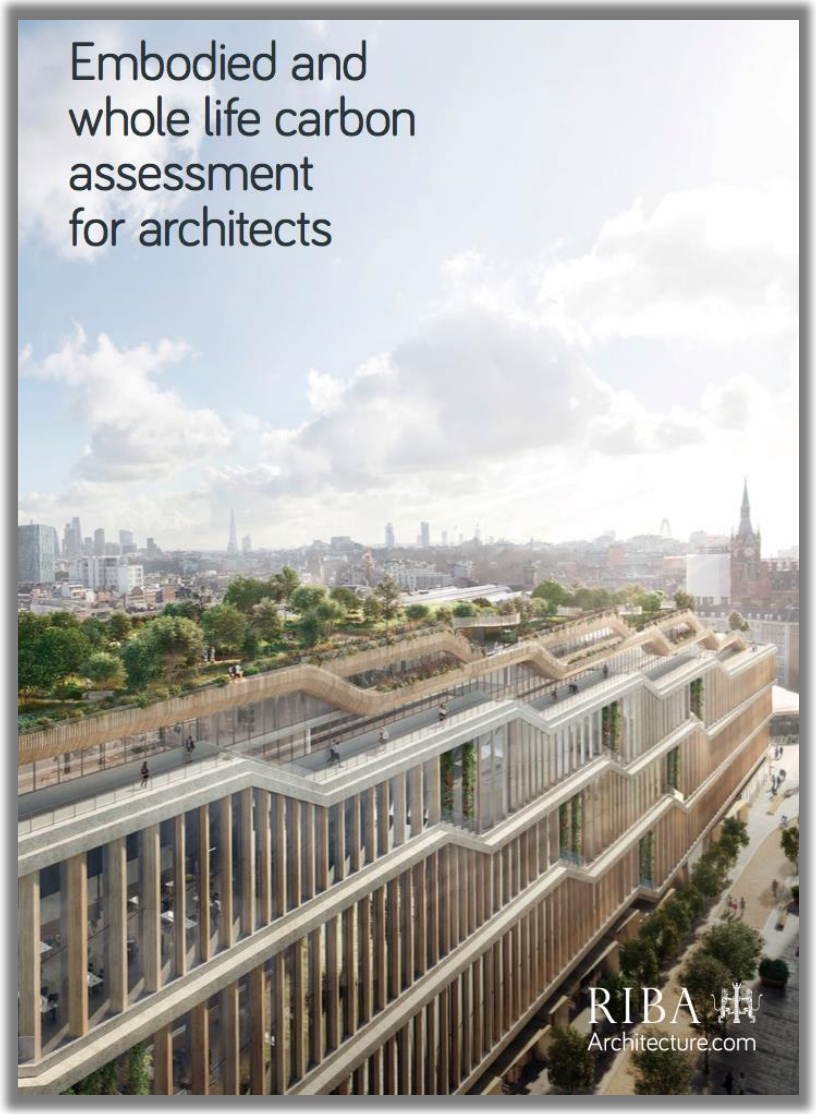
Mitigation – Reuse, Recycling, Circularity

Energy in Use

CO_2e Cost!

Embodied Carbon: The Standards





Sumner Street

Landsec

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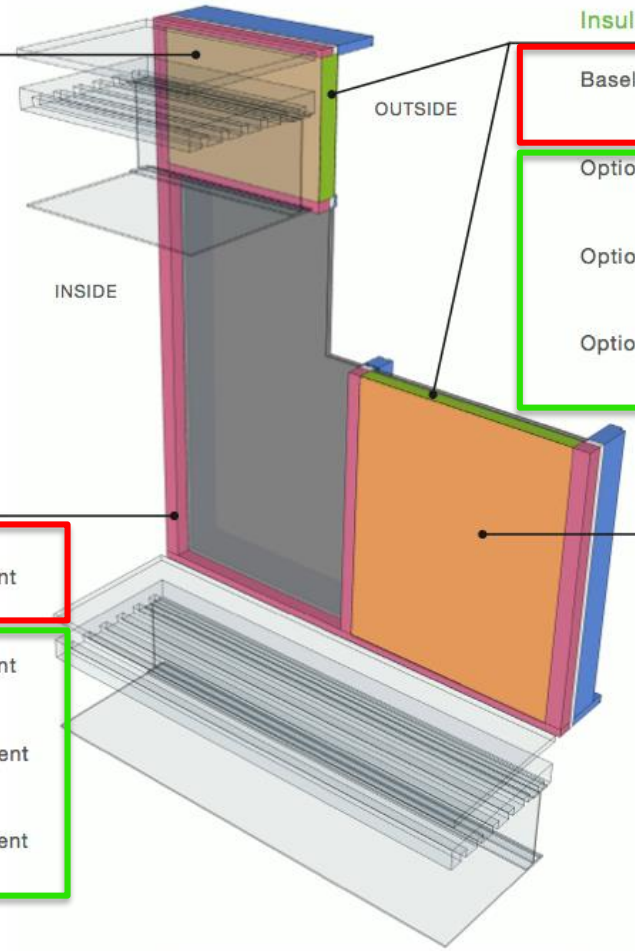
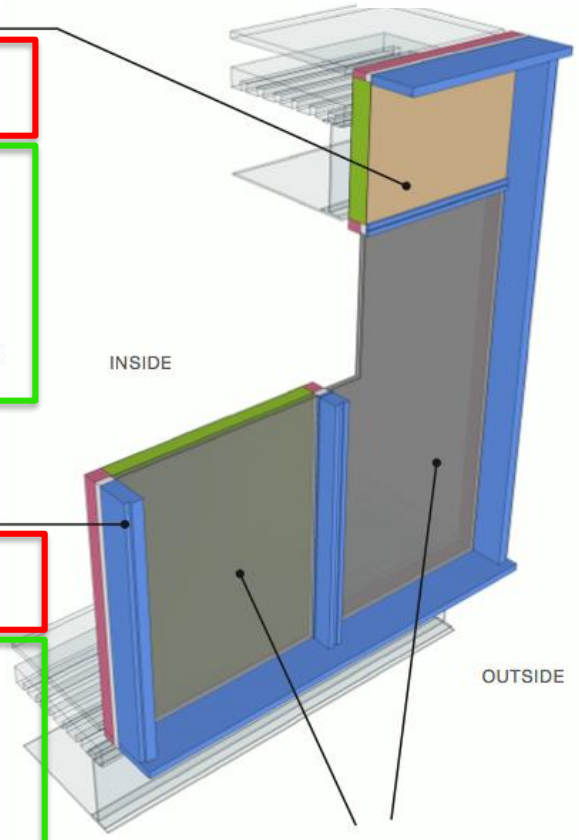
Sumner Street

Landsec





Spandrel (internal)

Baseline & Options	Steel Sheet Galvanised

Insulation [#]

Baseline	PIR 120mm tck
Option 1	Polyurethane 120mm tck
Option 2	Phenolic Foam 120mm tck
Option 3	Mineral Wool 120mm tck

Spandrel (external)

Baseline	Rolled Aluminium 0% Recycled Content Finish: Anodised
Option 1	Rolled Aluminium 33% Recycled Content Finish: Anodised
Option 2	Rolled Aluminium 33% Recycled Content Finish: Anodised
Option 3	Rolled Aluminium 100% Recycled Content Finish: PPC

Frame (internal)

Baseline	Extruded Aluminium 33% Recycled Content Finish: PPC
Option 1	Extruded Aluminium 70% Recycled Content Finish: PPC
Option 2	Extruded Aluminium 100% Recycled Content Finish: PPC
Option 3	Extruded Aluminium 100% Recycled Content Finish: PPC

Panel (internal)

Baseline	Rolled Aluminium 33% Recycled Content Finish: PPC
Option 1	Rolled Aluminium 70% Recycled Content Finish: PPC
Option 2	Extruded Aluminium 100% Recycled Content Finish: PPC
Option 3	VMZinc Composite

Frame (external)

Baseline	Extruded Aluminium 33% Recycled Content Finish: Anodised
Option 1	Extruded Aluminium 50% Recycled Content Finish: Anodised
Option 2	Extruded Aluminium 50% Recycled Content Finish: Anodised
Option 3	Extruded Aluminium 100% Recycled Content Finish: PPC

Double Glazed Unit
see Schüco "Design Concept"

Figure 2.3 - Illustrative diagram showing façade unit type A elements and related Embodied Carbon Reduction Option Strategy.

[#] NOTE - Insulation: M&E consultant to confirm about façade module U-value regarding Part L. See also Section 2.4 for further information.

Sumner Street

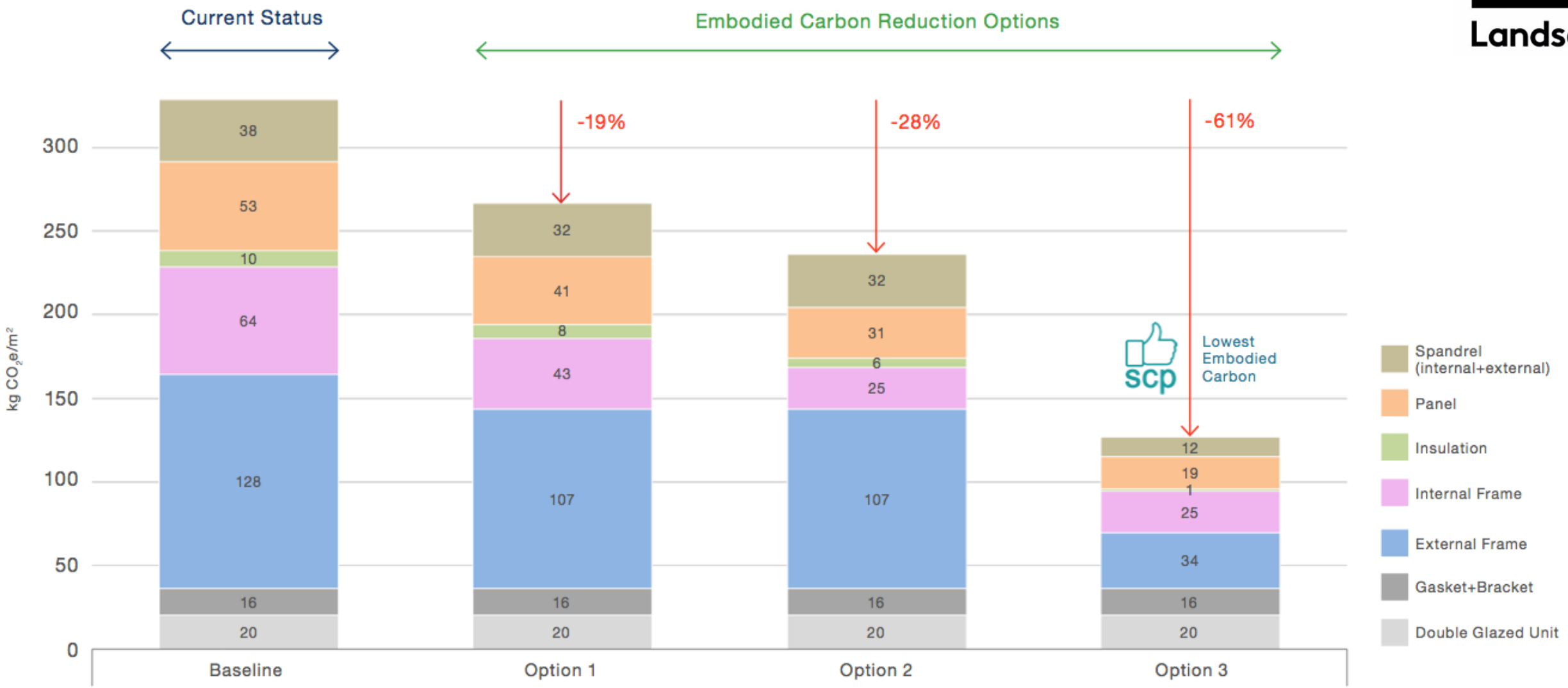


Figure 2.1 - Façade unit Type A Embodied Carbon Reduction Option Study (BS EN 15978 Stage A1-A3).

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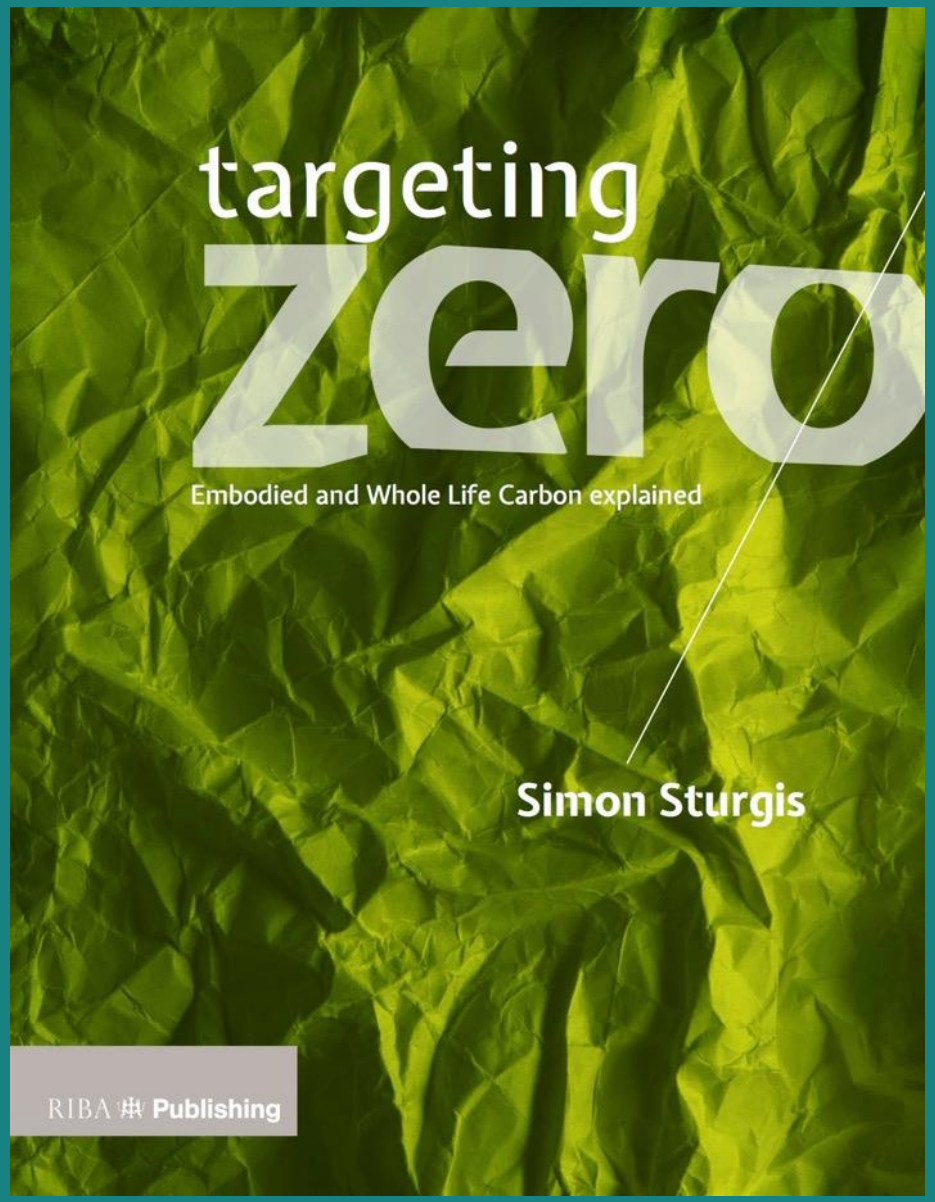
RIBA Guidance: **Take Up**

Thank You!

And…….



Embodied
and
Whole Life Carbon
explained

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