

The Entopia building

The architect's perspective: learnings from material choice, reuse and circular economy



Wendy Bishop

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Location



Central
Conservation
Area

Emmanuel
College

1 Regent
Street

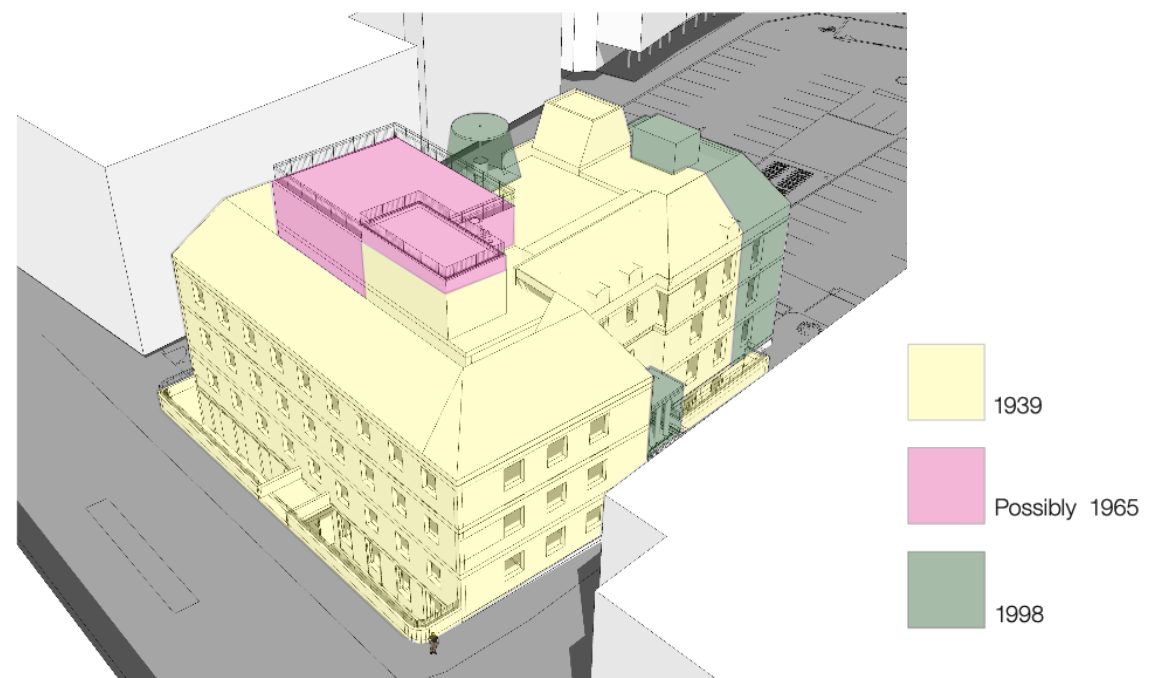
University
Arms Hotel

Parker's Piece

Downing College

Existing building

- existing building in central Cambridge conservation area, owned by the University
- a former 1930s telephone exchange
- refurbished in 1998 as an office
- mostly solid brick walls, with single glazed sash windows with some secondary glazing





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Process

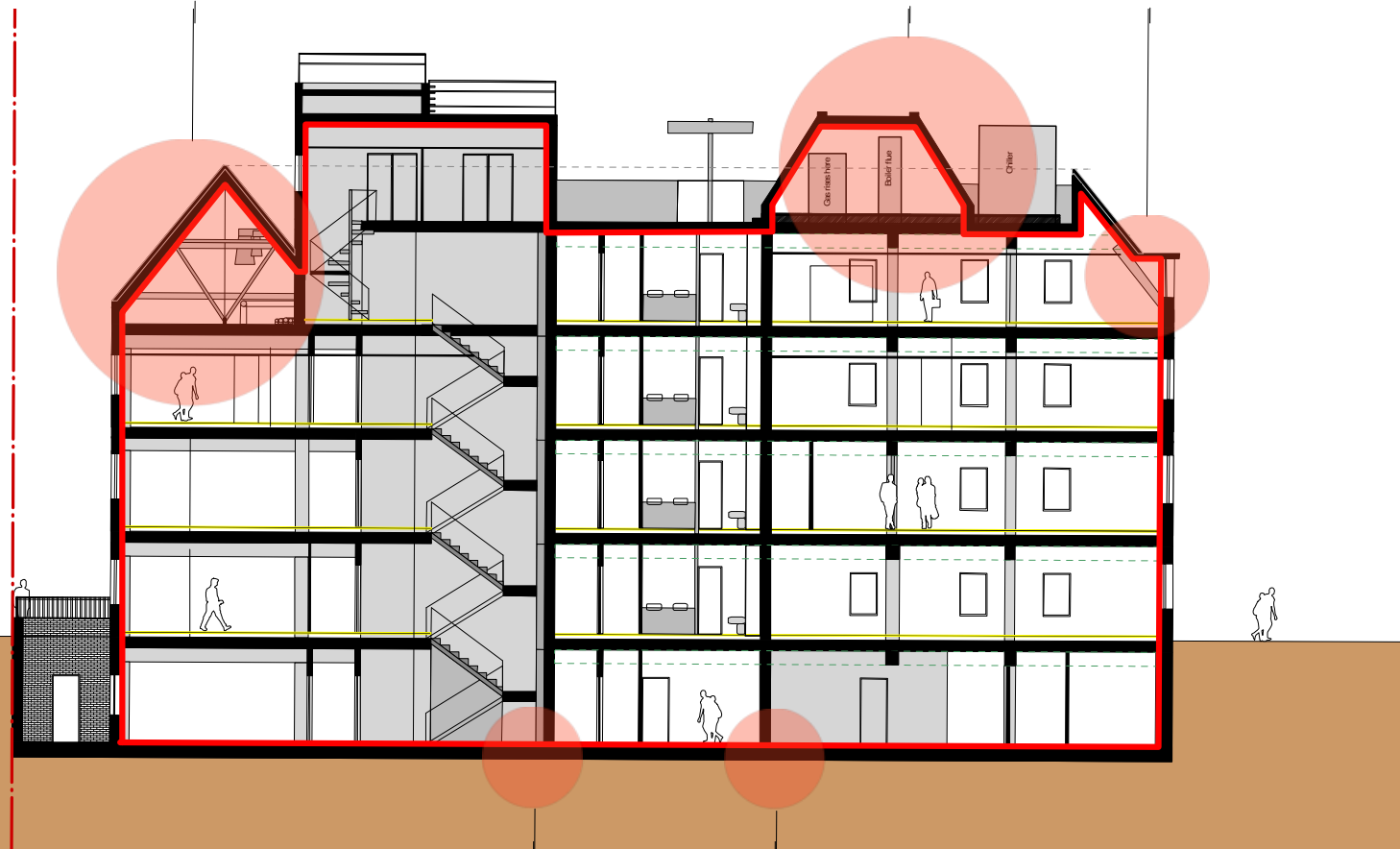


Initial strategy

Complex roof structure to retrofit

Complex plant and duct system installed and difficult to retrofit insulation

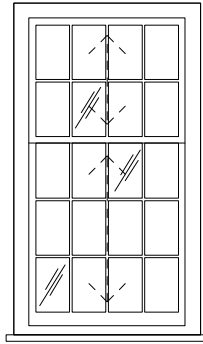
Dormer: very difficult to retrofit



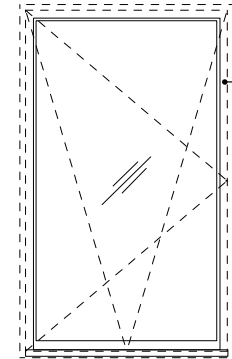
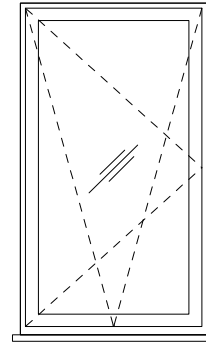
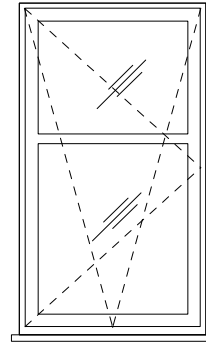
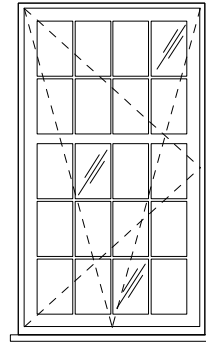
Thermal bridge

Thermal bridge

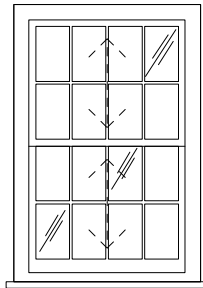
Windows



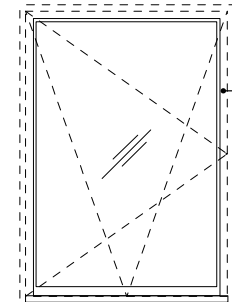
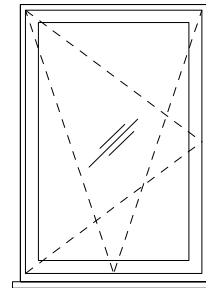
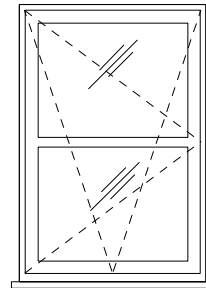
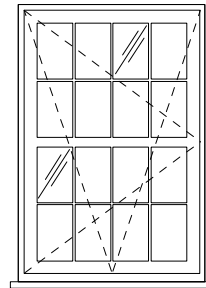
Typical first floor windows



line of overlapping window frame beyond



Typical ground floor windows



line of overlapping window frame beyond

Option 1
Double glazed sliding sash

Average glazed area: 57.0%

U-value*:
U(w) 1.5 W/(m²K)

Option 2
Triple glazed mock sash -
central horizontal glazing bar with
subdividing mullions & transoms

Average glazed area: 61.5%

U-value*:
U(w) 0.95 W/(m²K)

Option 3
Triple glazed mock sash-
central horizontal glazing bar only

Average glazed area: 66.2%

U-value*:
U(w) 0.93 W/(m²K)

Option 4
Triple glazed tilt and turn Passivhaus
window (open-in)

Average glazed area: 69.3%

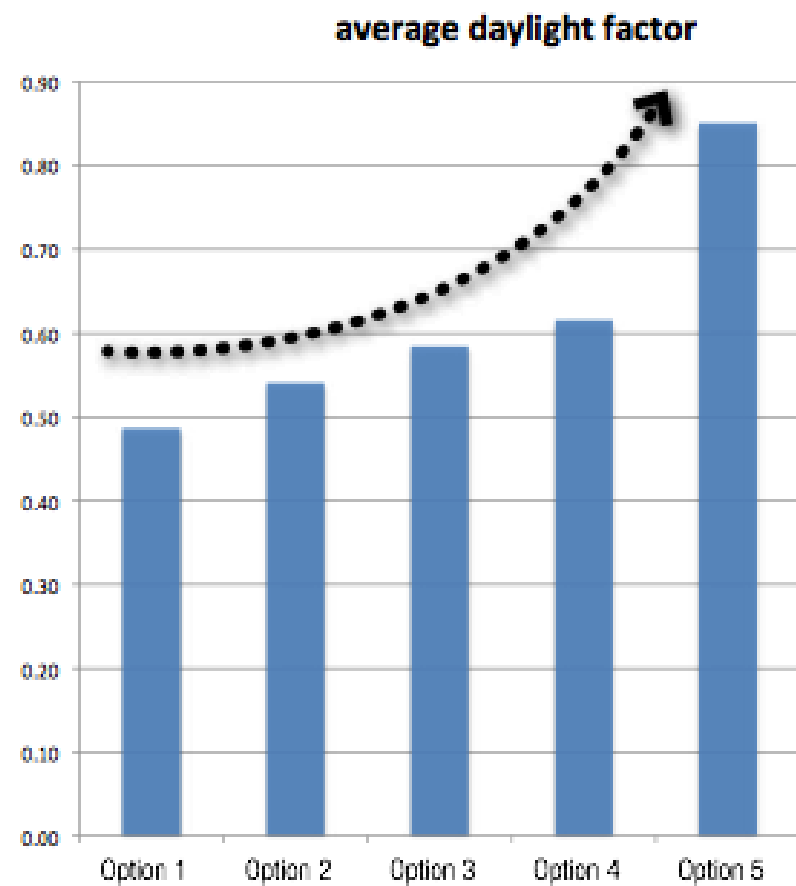
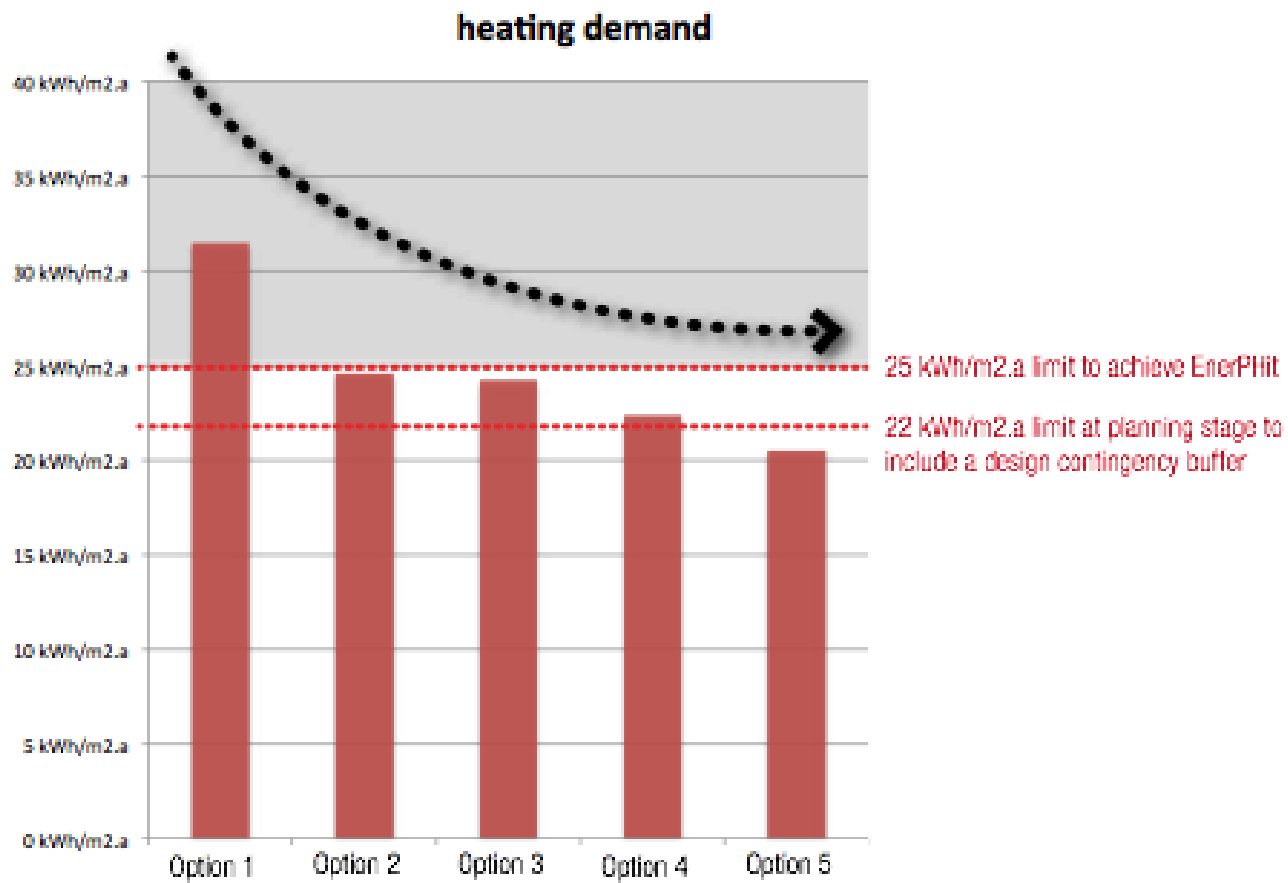
U-value*:
U(w) 0.76 W/(m²K)

Option 5
Triple glazed tilt and turn
Passivhaus window with frame
overlapping wall (open-in)

Average glazed area: 92.4%

U-value*:
U(w) 0.69 W/(m²K)

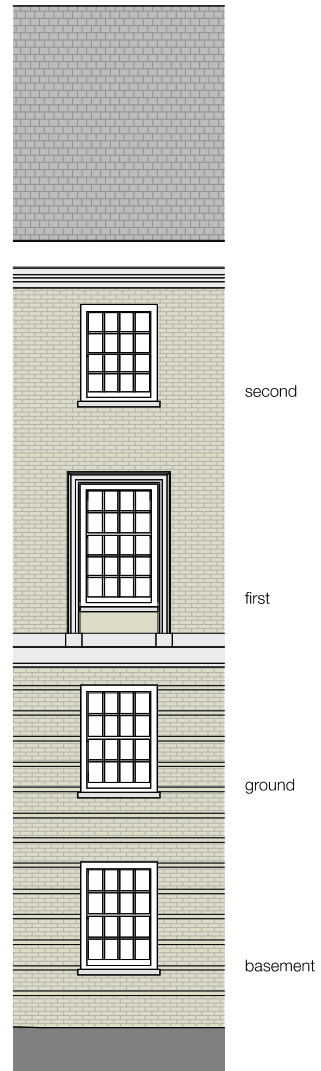
Windows



Windows



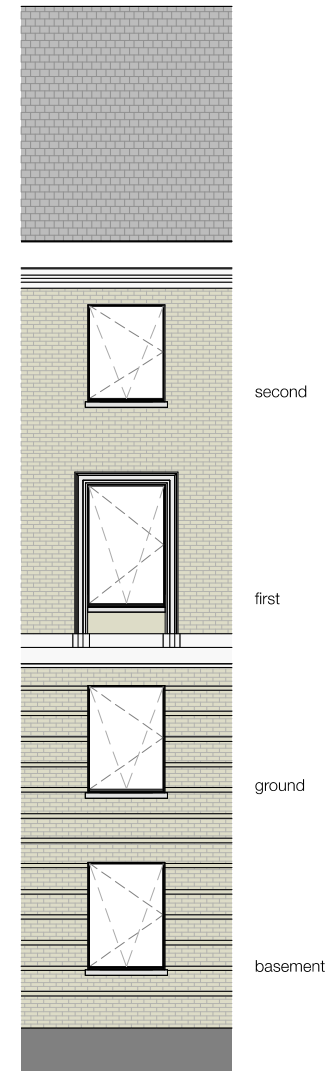
3D View - Existing Window Bay



Elevation - Existing Window Bay
1:100



3D View - Proposed Window Bay



Elevation - Proposed Window Bay
1:100

Windows



Developed strategy



Internal wall insulation wrapped around building



Triple-glazed windows



Task-based lighting with intelligent lighting controls



Exposed ductwork distributes fresh air, tempered through heat recovery and peak-lop cooling



Suspended ceilings removed to increase height (+daylight) - absorbent finish proposed



Airtightness detailing



FF+E strategy being developed - aiming to reuse existing furniture where possible



Plants promote access to nature (effect on IAQ is minimal)

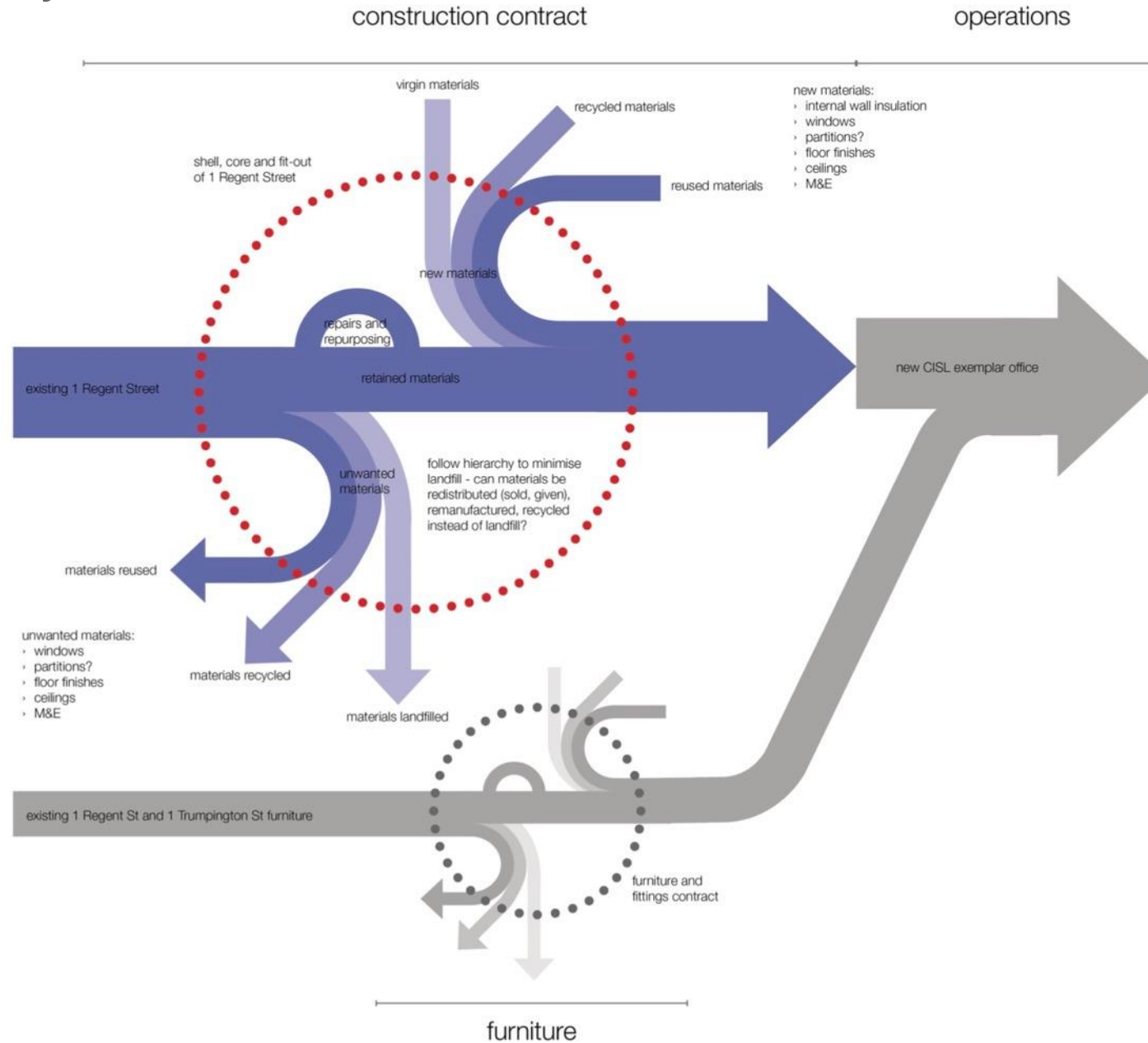


Low impact floor finishes proposed for functional reasons, and feature areas



Existing raised access floor retained, and exposed in lower traffic areas to reduce embodied carbon

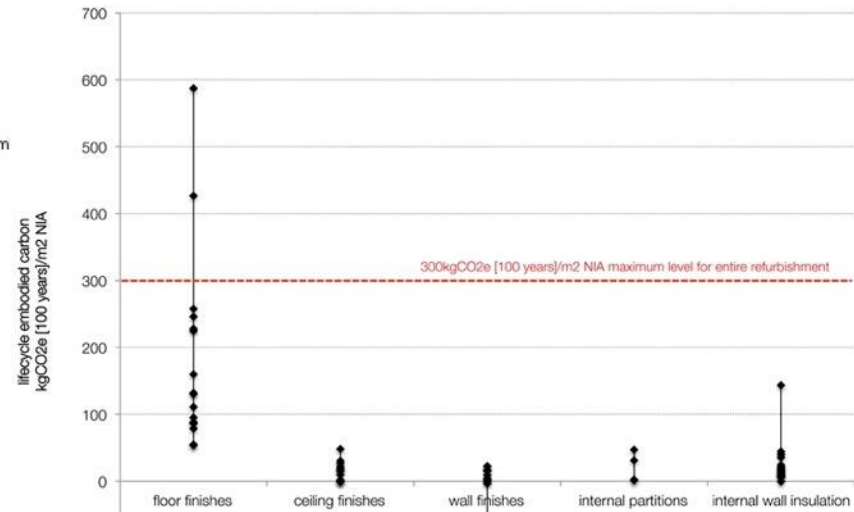
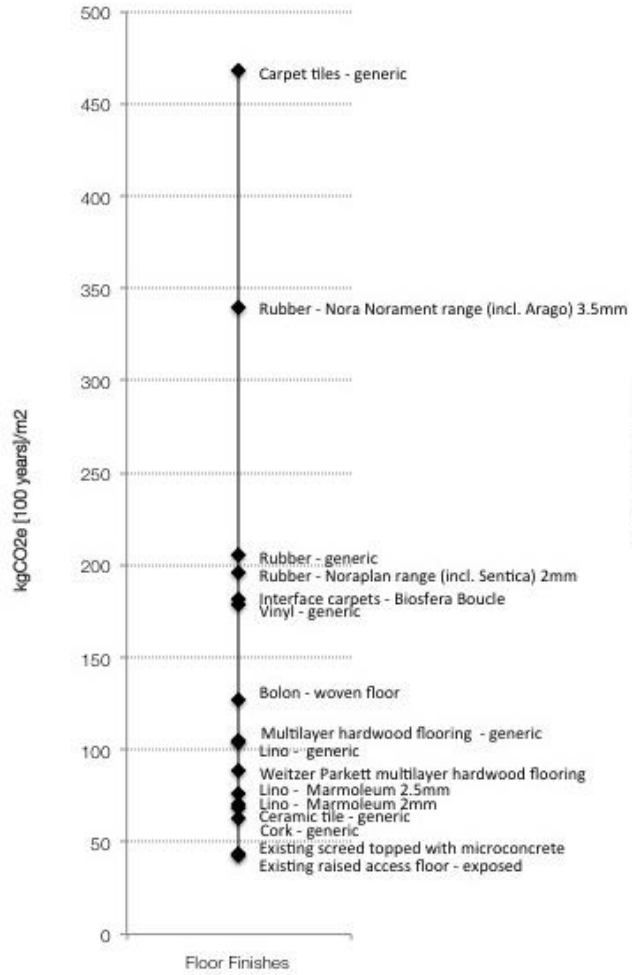
Circular economy





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Floor finishes





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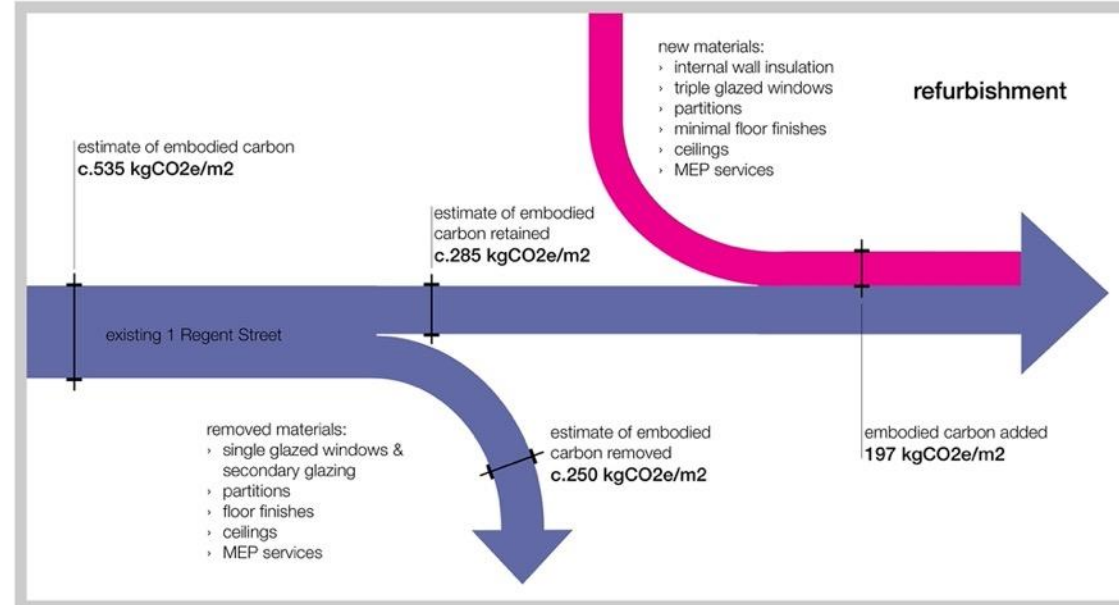
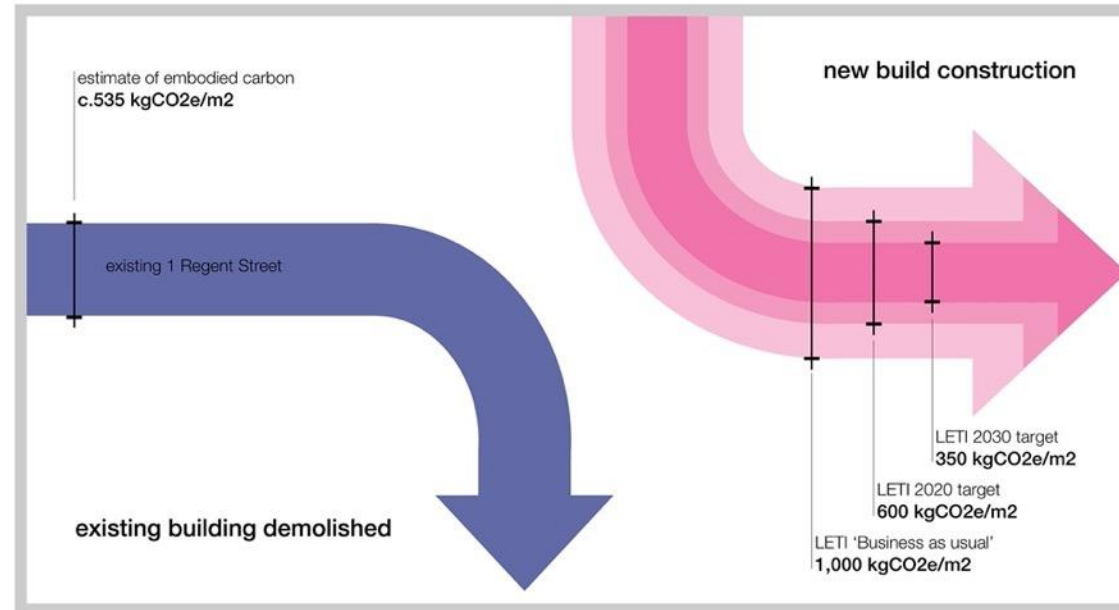


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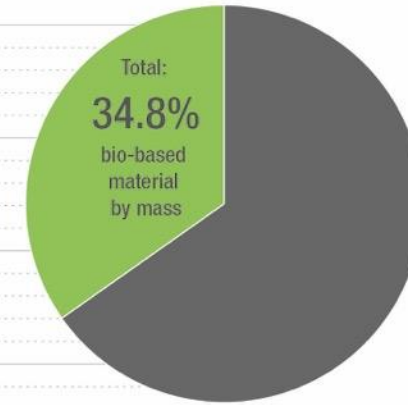
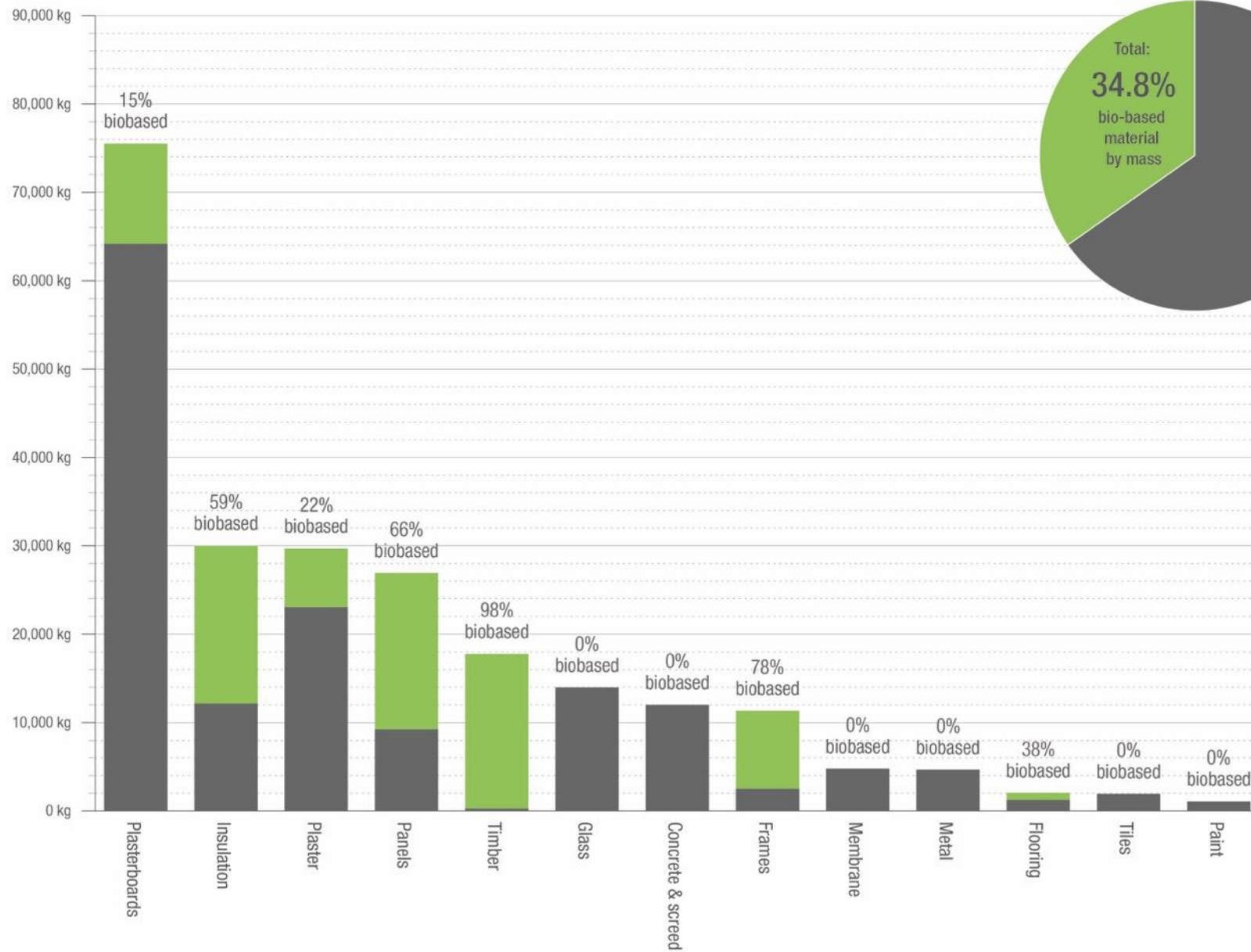
Circular economy



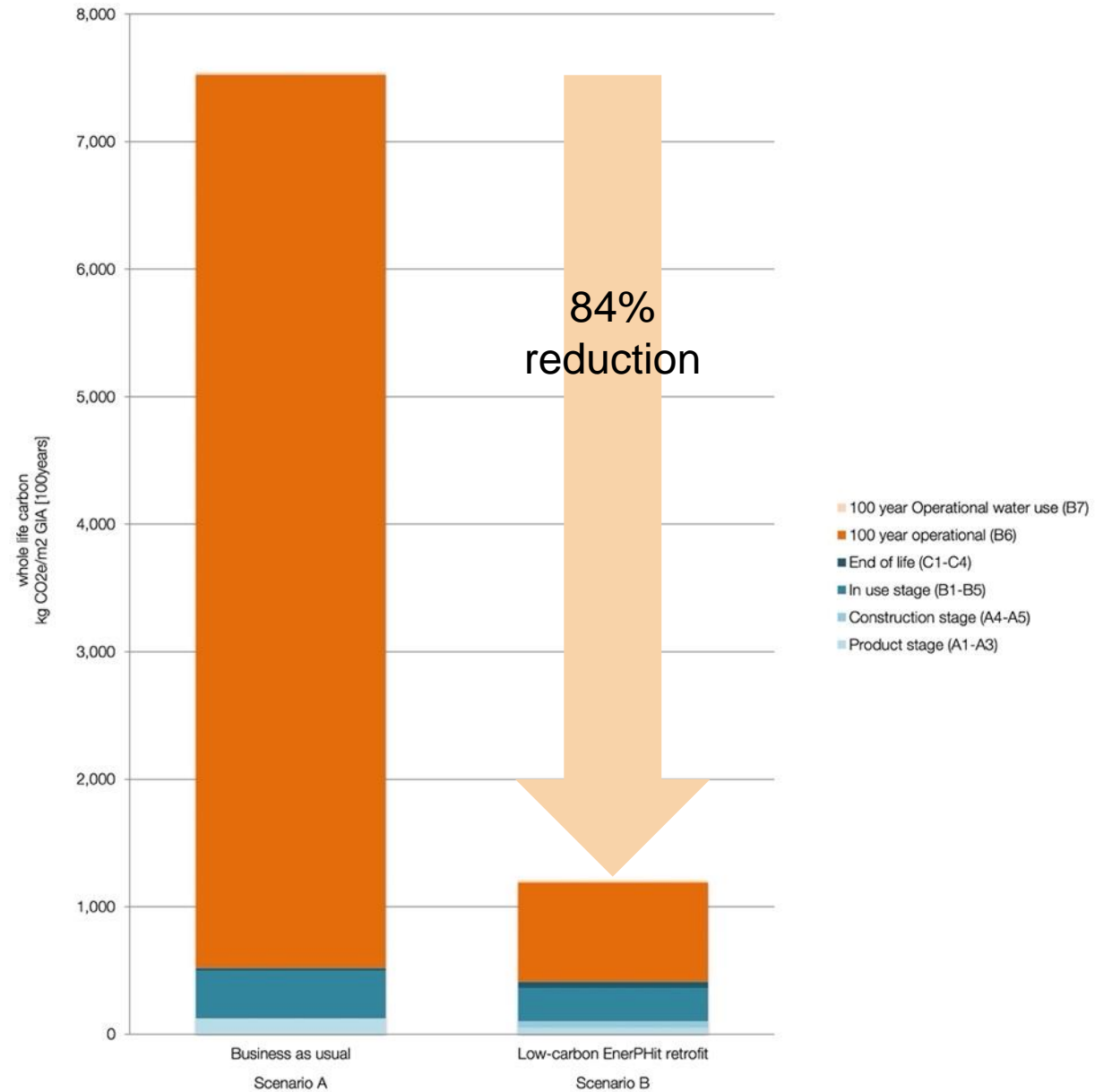
Note: Embodied carbon figures are for building life cycle Stages A1-A5. Figures for 1 Regent Street and LETI targets include substructure, superstructure, internal finishes and MEP. Figures for 1 Regent Street are from Stage 5 design.

Biobased materials

Bio-based material by mass, by material grouped by type



Whole life carbon



THIS IS NOT AN ORDINARY PROJECT. BUT IT NEEDS TO BE.

The time is now.

Together we can be extraordinary. Together we can build a better world.

#BuildingChange | #Entopia | @CSL_Cambridge

