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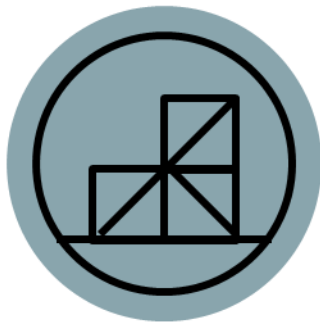
**Engineering a
Better Society**

Westminster Sustainable City Charter
Responsible procurement: reuse

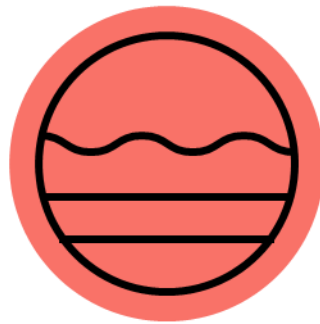
20/09/2023

Our services

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**Structural
Engineering**



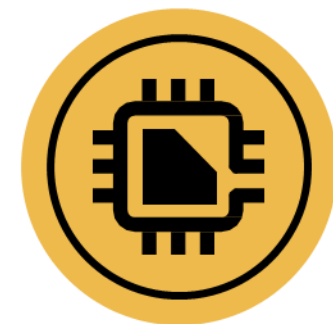
**Civil
Engineering**



**Sustainability
Services**



**Transport
Services**



**Digital
Services**

Education **E**

Technology **T**

Health **H**

Infrastructure **I**

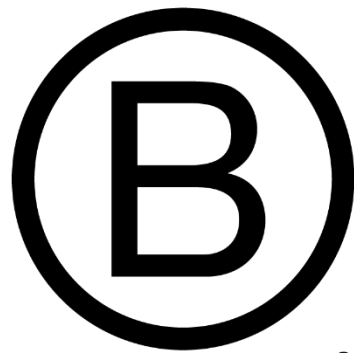
Culture **C**

Sustainability **S**

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engineering
a better **society**

Certified



Corporation

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The
**Building
Society**

Our Values

These are the values we all
take into our day-to-day work

Be Brilliant

- To go above and beyond
- To show outstanding ability no matter the task
- To offer unrivalled service
- To achieve your full potential

Flip It

- To disrupt routine
- To consider other perspectives
- To cultivate curiosity
- To realise unexpected benefits

Step Forward

- To inspire everyone for a better future
- To embrace diversity and inclusion
- To safeguard the wellbeing of yourself and others
- To choose well, leaving a positive footprint on our shared world

Industry work

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[Circular Economy Guidebook](#)

Our Head of Sustainability, Penny Gowler, co-authored this definitive guide to the Circular Economy published by the IStructE.



[Full Circle to Reuse Guide](#)

In partnership with Grosvenor, we have published this 12-step guide to reuse.



[Commercial Timber Guidebook](#)

We are leading development of a guide to establish wider adoption of structural timber in commercial buildings with Built by Nature, designers, fire specialists, insurers and leading developers.



[The Structural Carbon Tool](#)

Elliott Wood developed this tool with IStructE and donated it to the industry for free. It has been downloaded over 7,000 times.

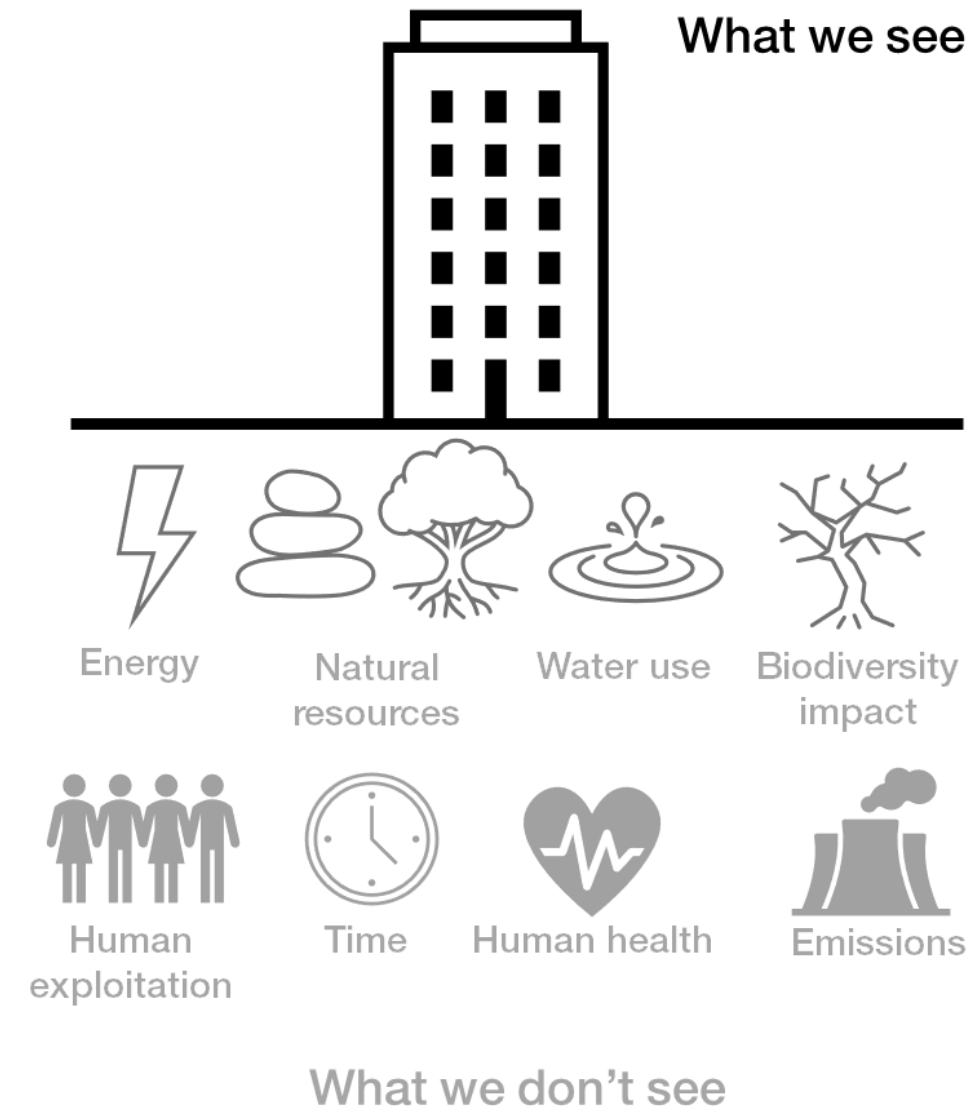
Why is this important?

Resource scarcity and environmental degradation

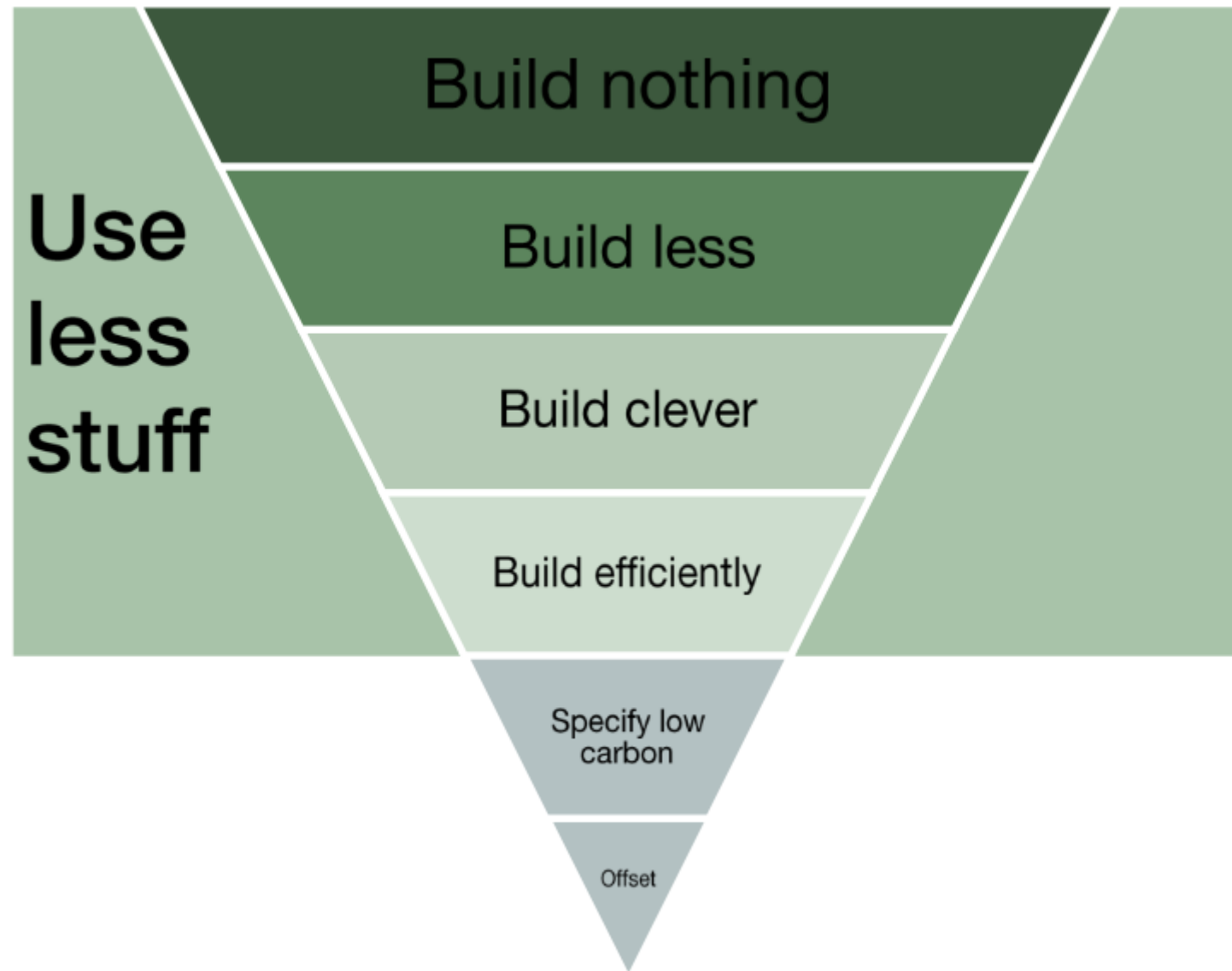


The problem

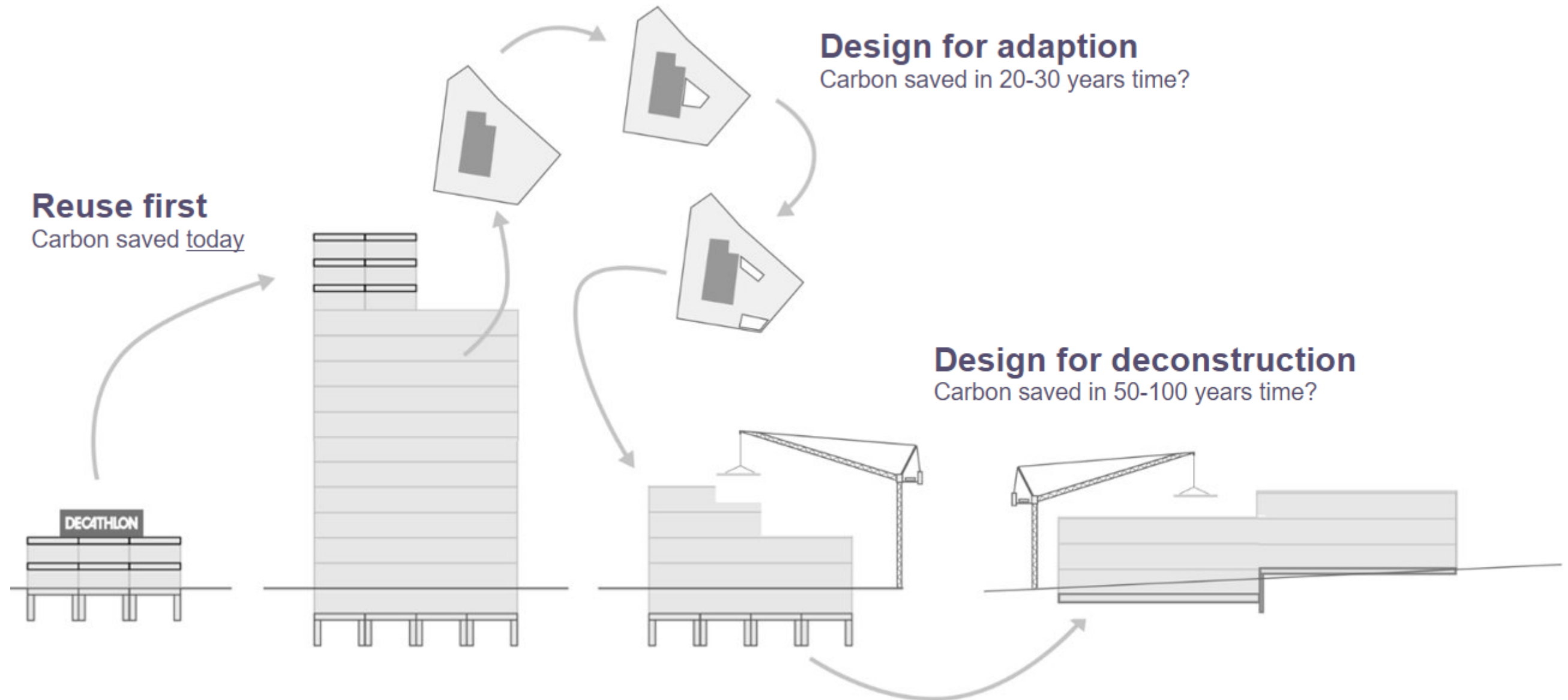
In 2020, for the first time in human history, human-made products outweighed the total mass of all life on earth.



Circular Economy & low carbon design approach

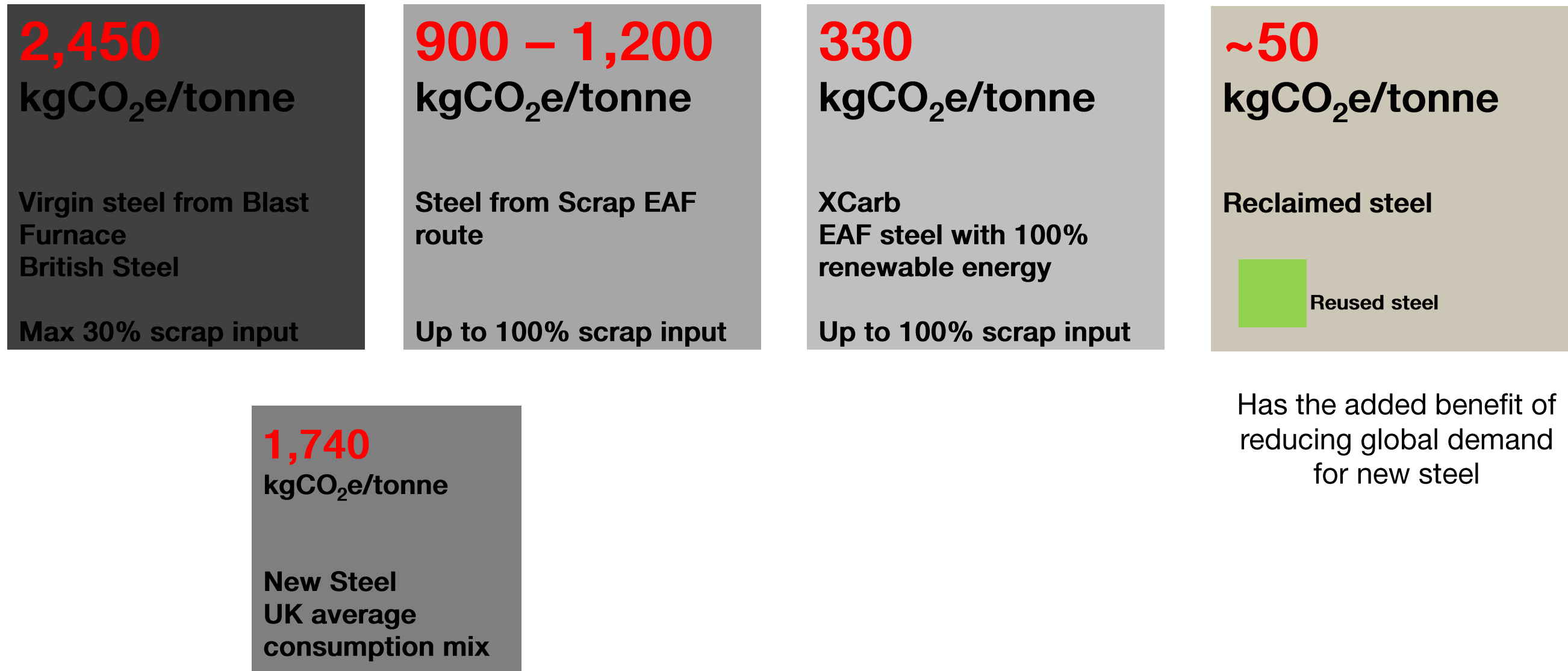


Circular Economy: what should we be doing when?

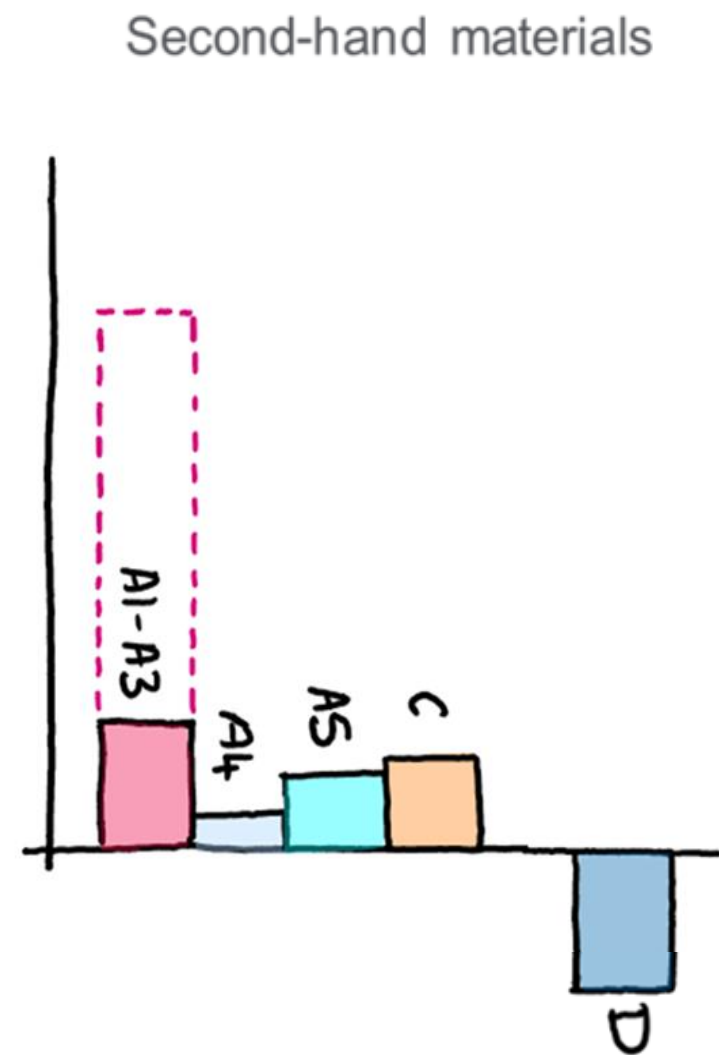
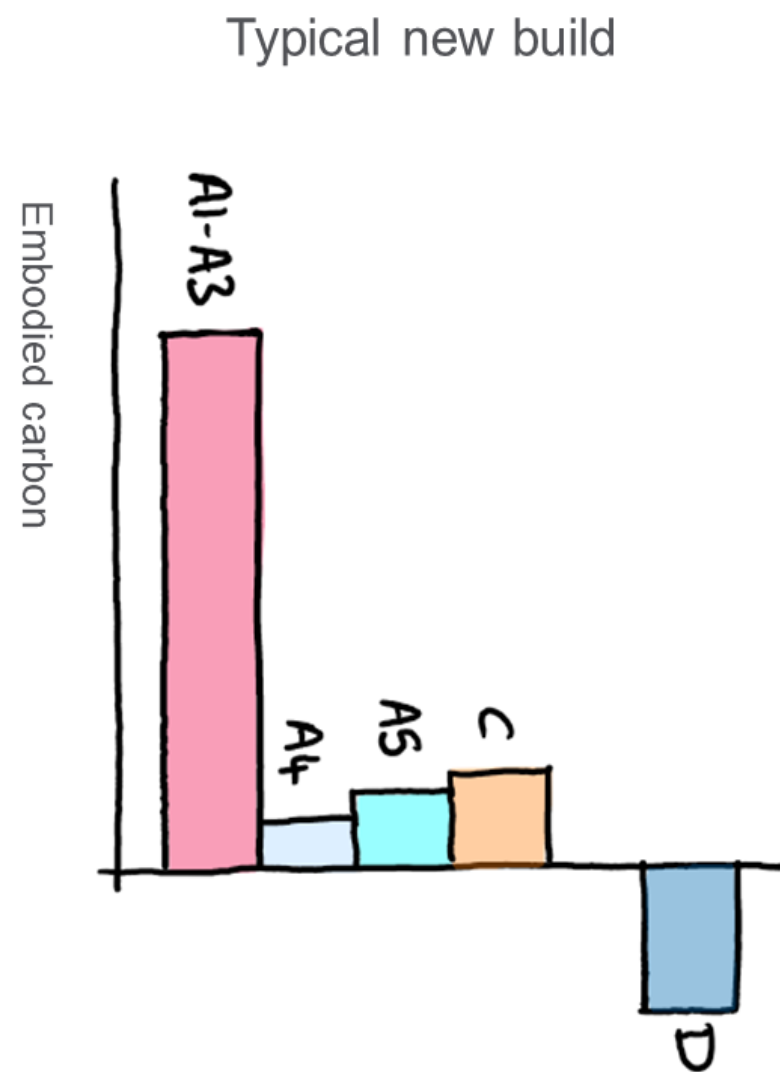


Reuse of steelwork

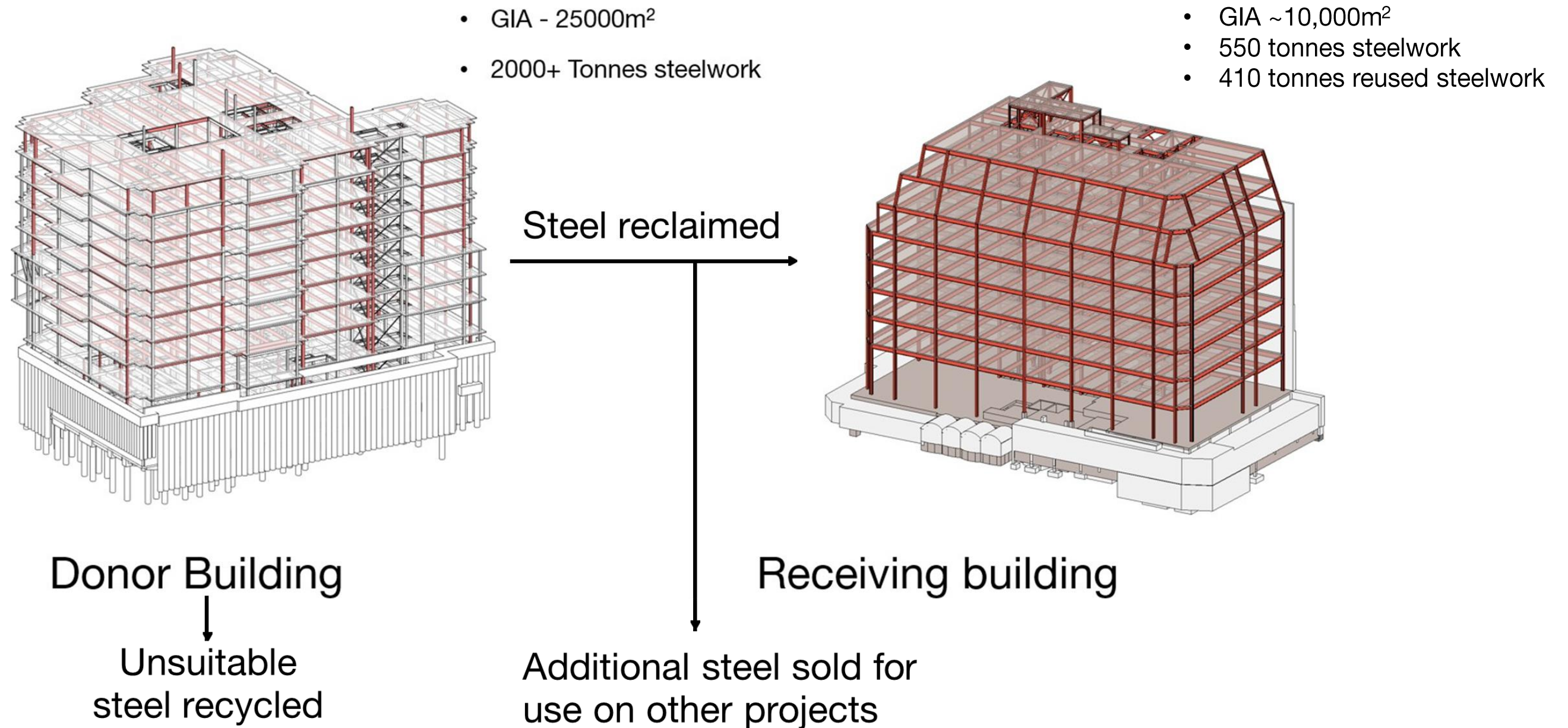
Reuse of steel: carbon



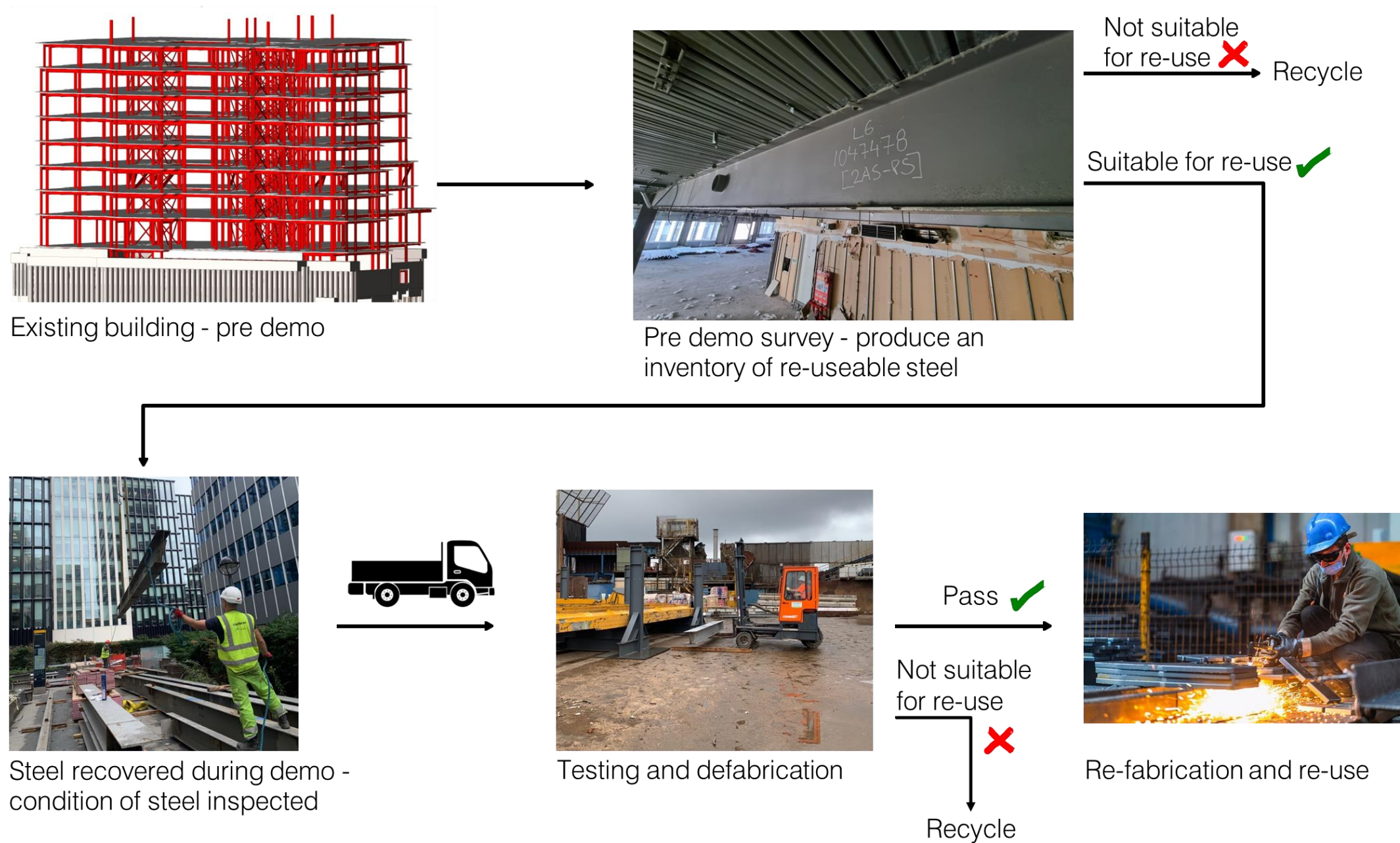
Reuse and carbon



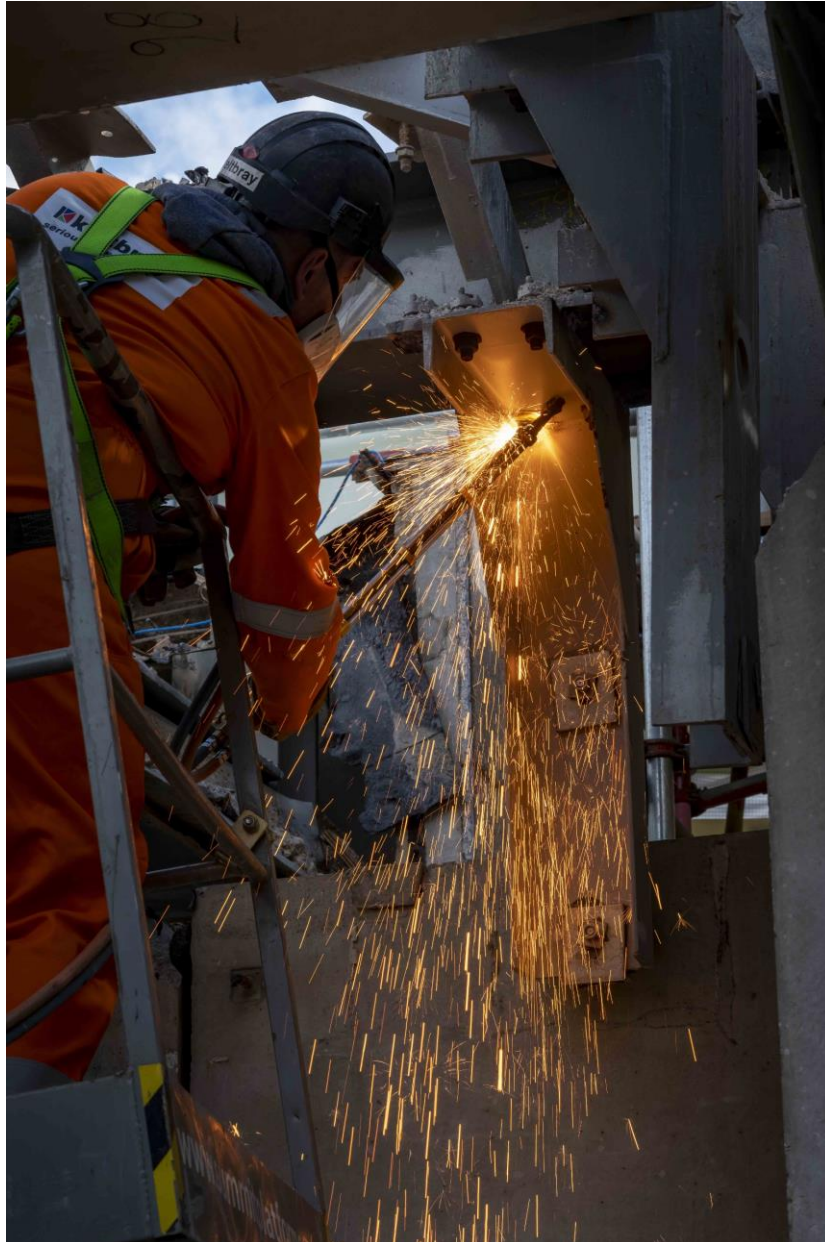
Reuse of steel



Reuse of steel: process



Reuse of steel: during deconstruction



Reuse of steel: steel removal



Strictly Confidential

© Elliott Wood



Reuse of steel

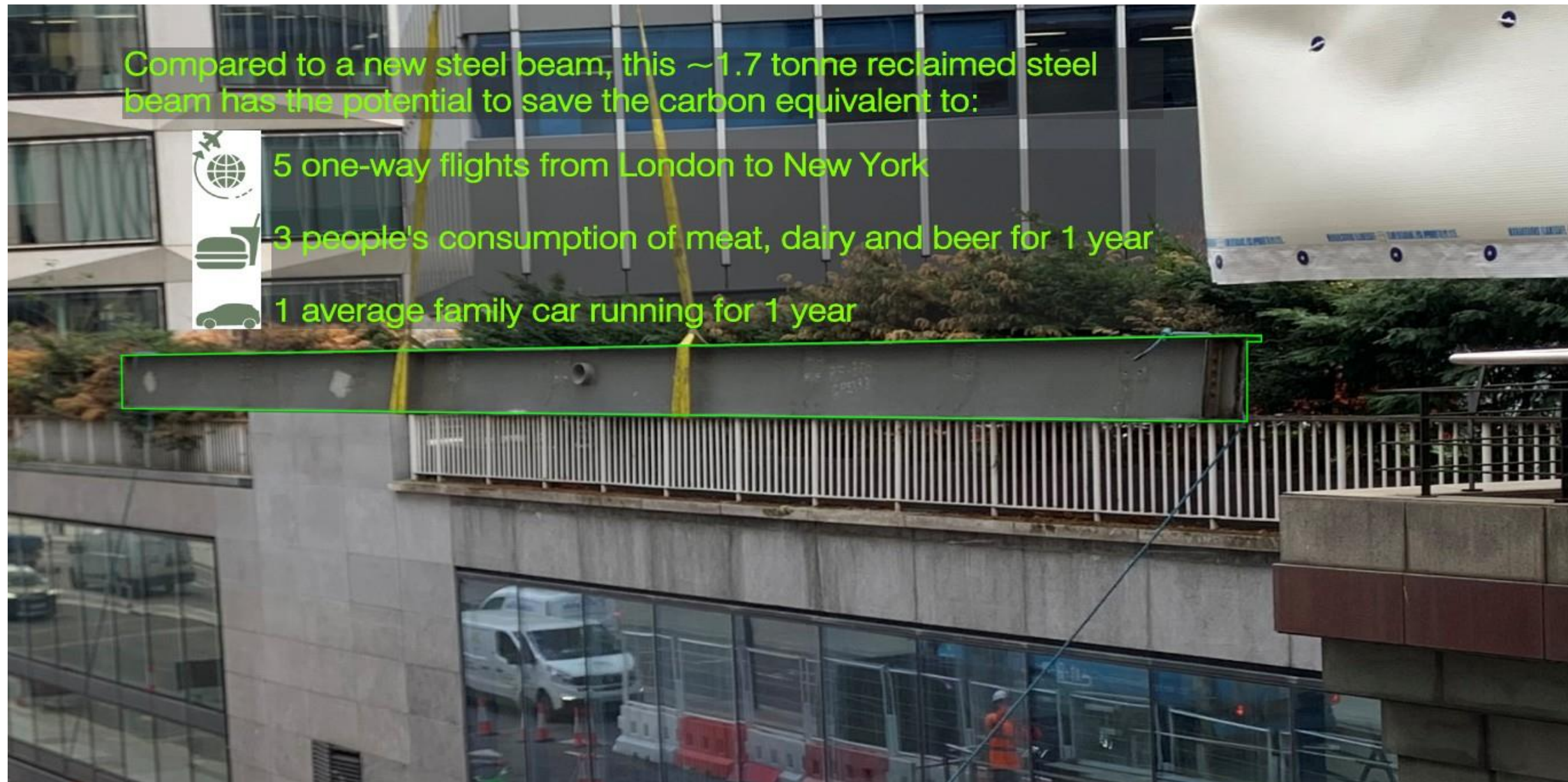


Pre-deconstruction



Post-deconstruction

Carbon savings



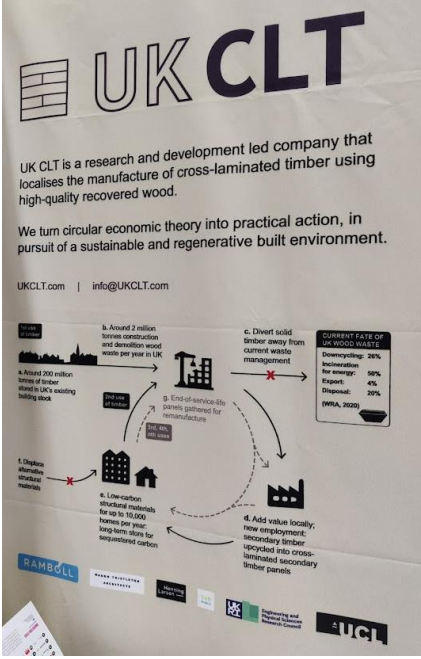
What about other materials?

Reuse of timber: case study



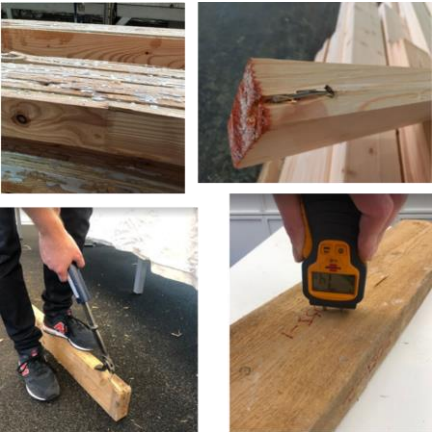
**Brighton Waste House – timber reused for structural frame.
House constructed from over 85% waste material.**

Reuse of timber: Upcycling



Secondary CLT

Secondary Glulam



Beam 1



Beam 2



Beam 3



Beam 4



Beam 5



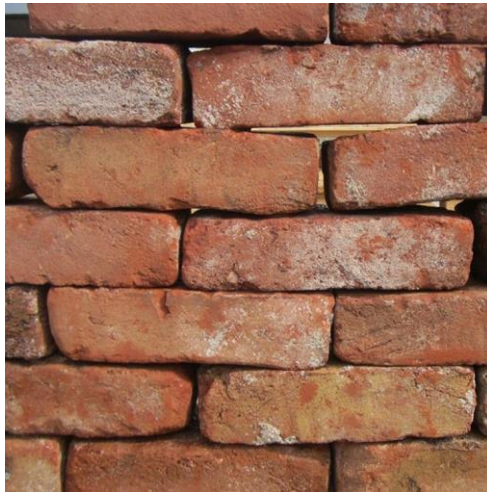
Beam 6

Figure 51: Failure modes from four point bending tests

Reuse of masonry

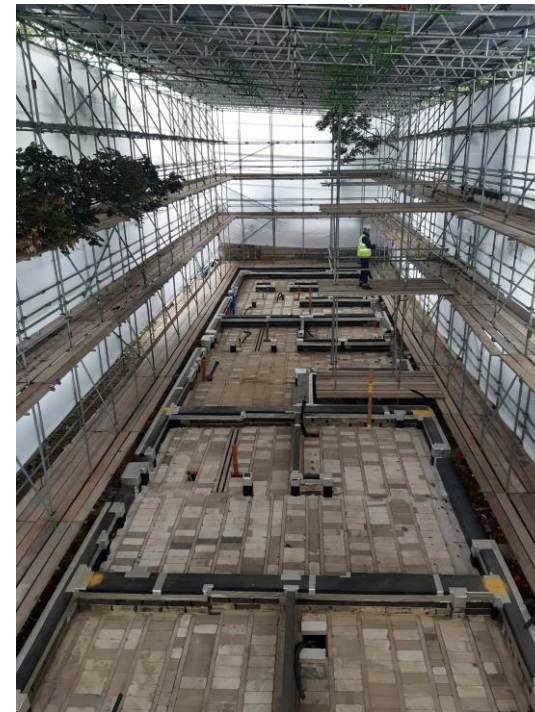
Hierarchy for second-hand market

Top tier (highest demand): Imperial red rubber and Imperial Yellow Stocks

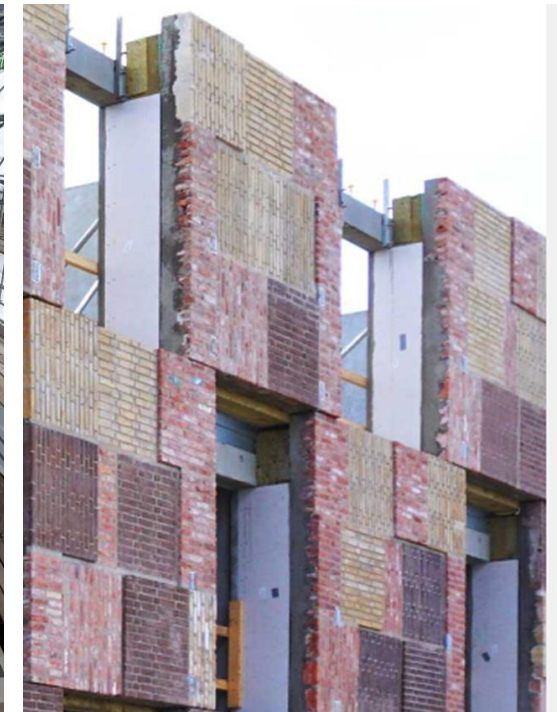


Bottom tier (lowest value): multi stocks (internal walls)

Alternatives

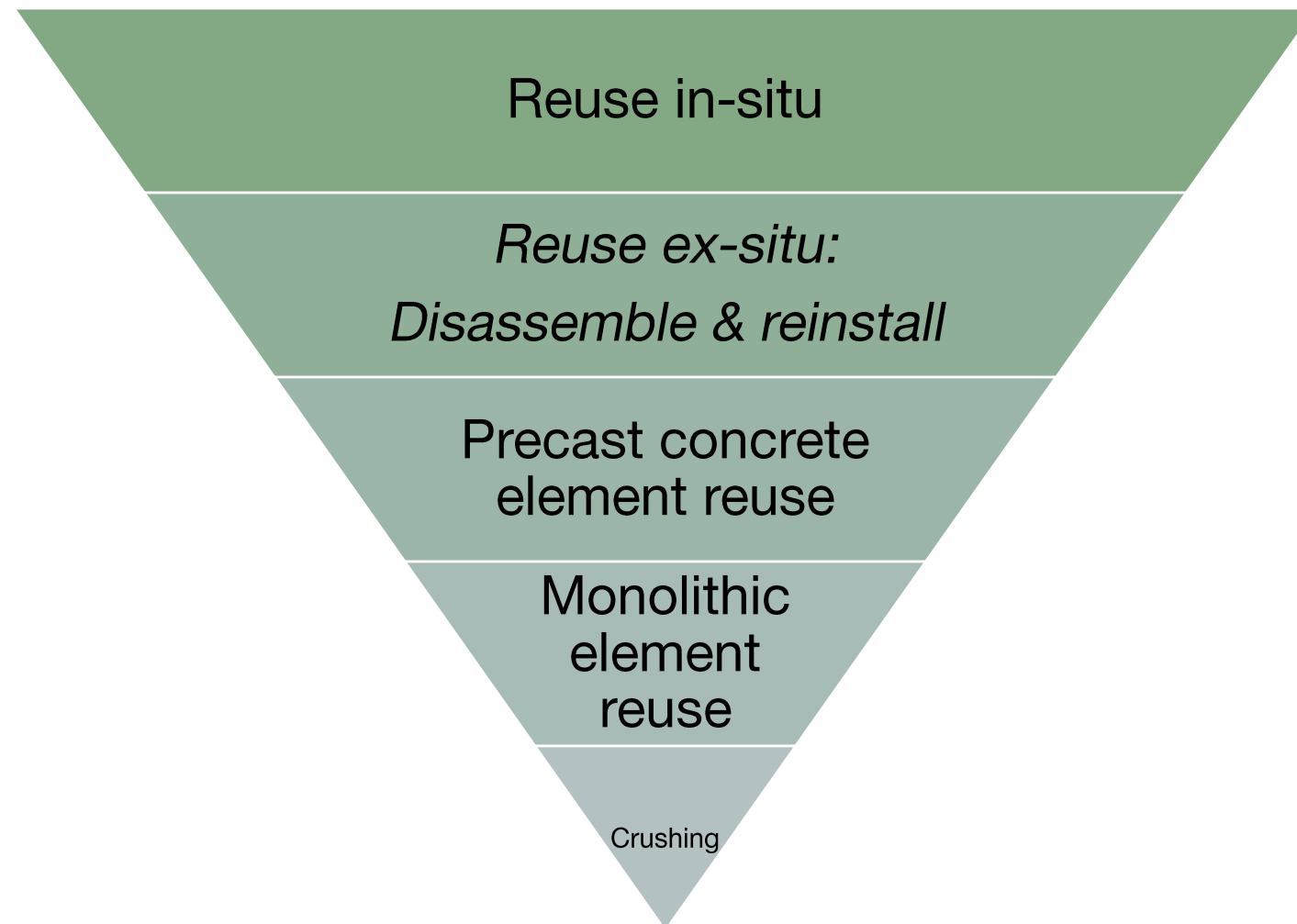


Re-use of blocks for beam & block floor



Re-use of masonry panels by Lendager group

Reuse of concrete



Stacked reclaimed precast concrete planks from a pilot project as part of the Aterhus project based in Sweden



EPFL researchers have built a footbridge prototype using reinforced-concrete blocks from walls of a building being renovated.

Non-structural material exchange

Organisations include:

- Rotor Deconstruction
- Community Wood Recycling
- Opalis
- Salvoweb
- Building Deconstruction Institute
- ReLondon / CirCUIT
- LB Enfield Excess Materials Exchange



Future possibilities...

Data and material passports

Material Passports

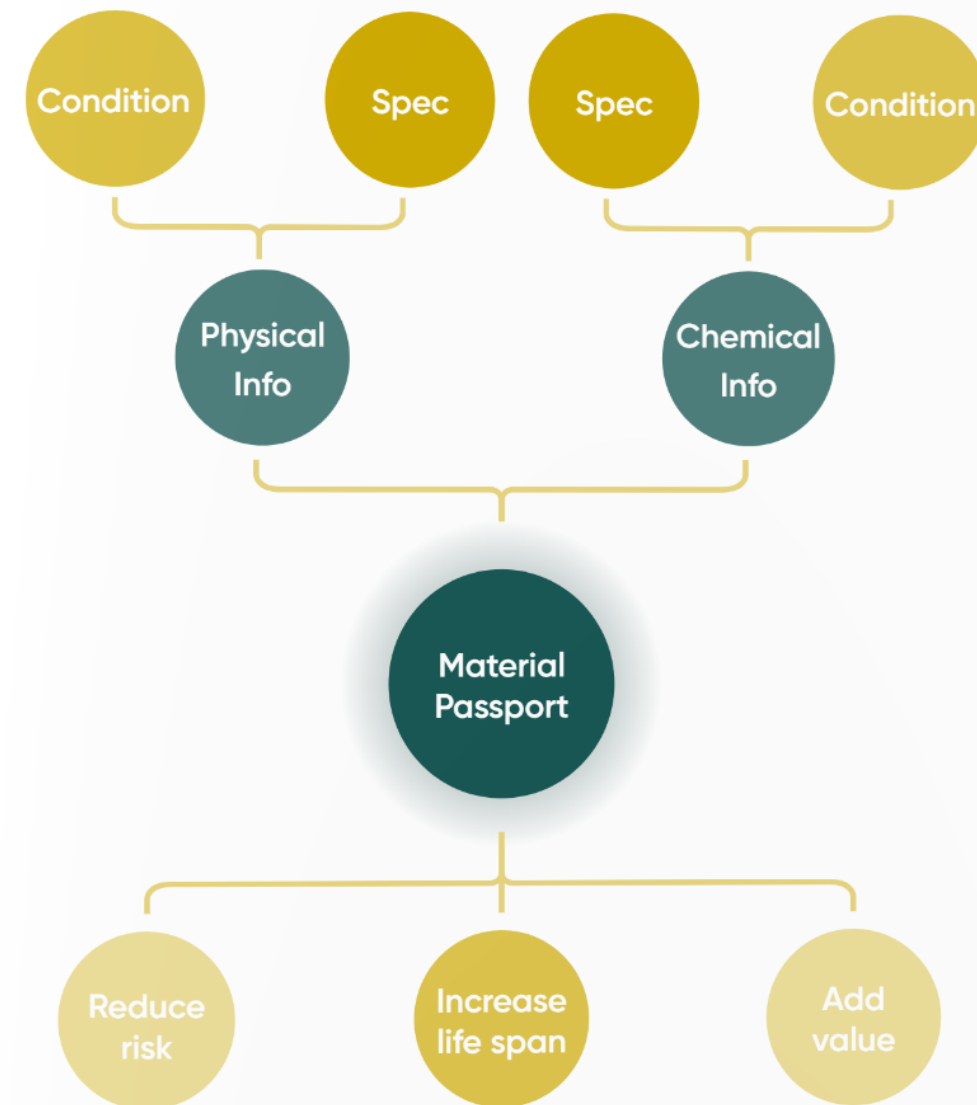
**Waste is a material
without an identity**

Thomas Rau

**A passport gives that
material an identity**

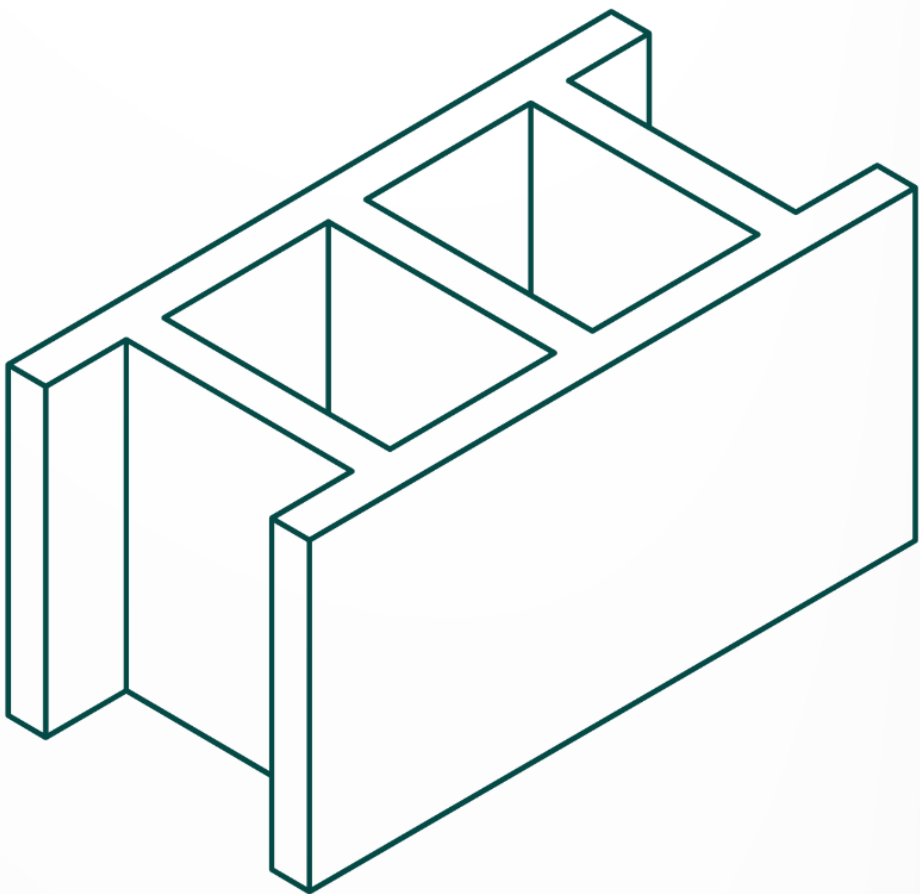
**Knowledge about a material
gives us confidence in it,
enabling successful reuse**

Source: Orms



Data and material passports

Material Passport



Unique Identifier:
BLK-X-00001

Name:
Hollow Block

Material:
Concrete

Dimensions (WxHxL):
215 x 215 x 440

Method of Fixing:
Cementitious mortar

Date of Manufacture:
04/2018

Place of Manufacture:
United Kingdom

Installed:
10/2020

Maintenance History:
N/A

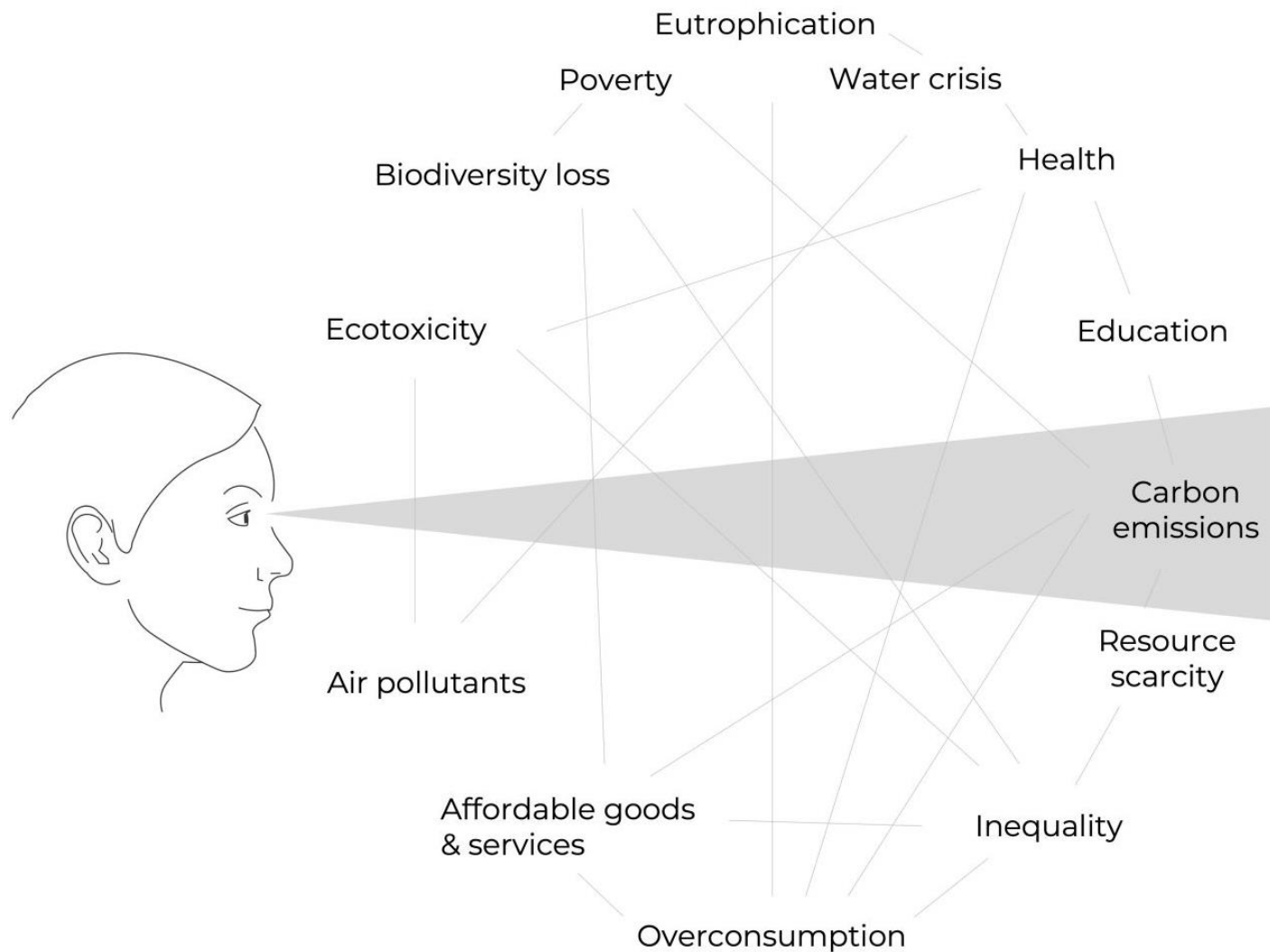
Performance grade:
Band A

Aesthetic grade:
Band 1

Source: Orms

Sustainability – not just carbon

Carbon Tunnel Vision



Sustainability transition

Thank you

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