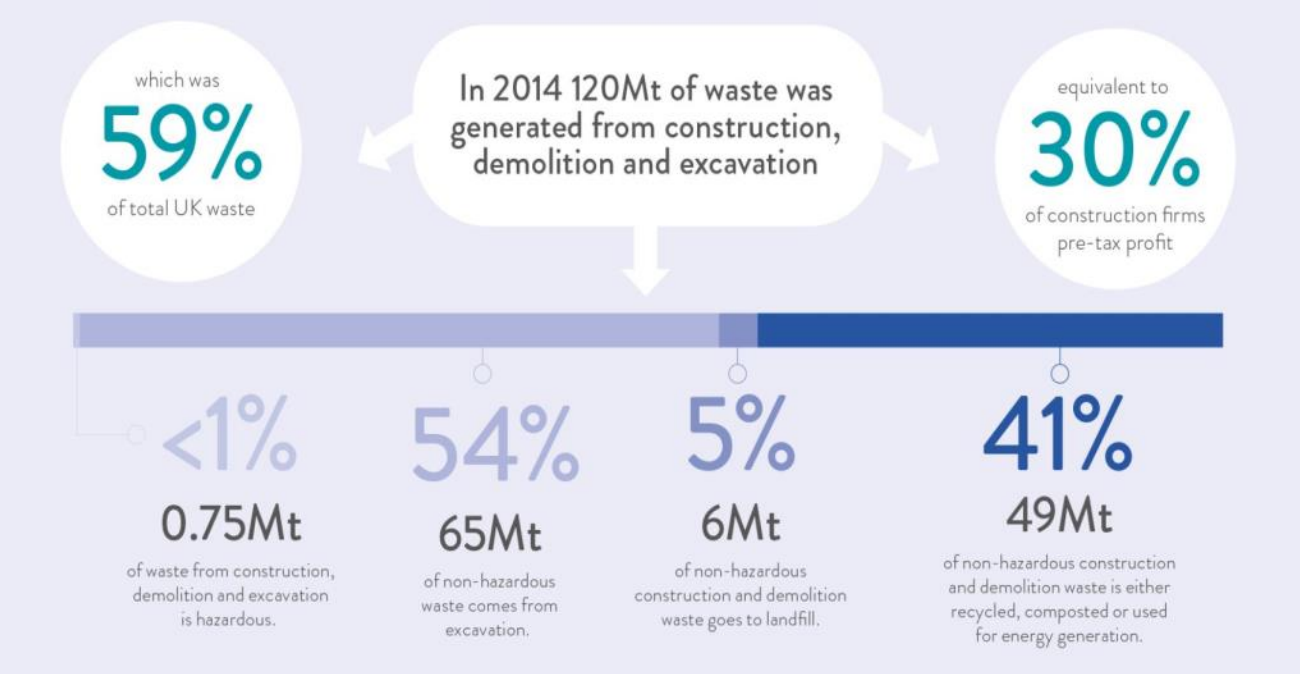
Innovation and the circular economy in a built environment context

Drivers for Change - C&D Waste



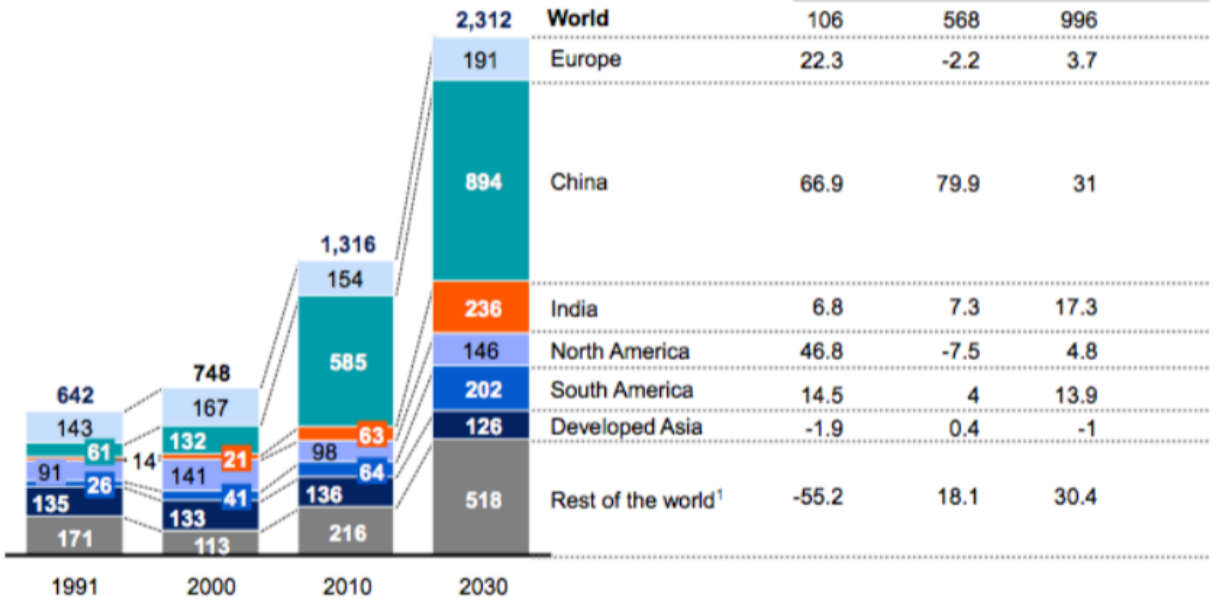
Source: UKGBC 2017

Our industry consumes about 50% of global steel production and, each year, 3 billion tonnes of raw materials are used to manufacture building products worldwide, with less than a third of construction and demolition waste being recovered and reused. The UK construction industry accounts for approx 60% of UK materials use.

Drivers for Change – Materials Price & Availability

Global steel demand is expected to increase by more than 75 percent from 2010 to 2030, driven by emerging markets

Finished steel demand
Million tons



Demand growth and regional contribution to growth
% of incremental demand

		1991–2000	2000–10	2010–30
2,312	**World**	106	568	996
191	Europe	22.3	-2.2	3.7
894	China	66.9	79.9	31
236	India	6.8	7.3	17.3
146	North America	46.8	-7.5	4.8
202	South America	14.5	4	13.9
126	Developed Asia	-1.9	0.4	-1
518	Rest of the world[1]	-55.2	18.1	30.4

1 Includes the Commonwealth of Independent States, Middle East and North Africa, sub-Saharan Africa, and Oceania.
NOTE: Numbers may not sum due to rounding.
SOURCE: McKinsey analysis; McKinsey Global Institute analysis

Volatility of prices and resource scarcity is not scaremongering, it's a reality that will only become more acute if we don't act quickly.

Drivers for Change – Guidance & Legislation

Alongside some businesses driving change through making their processes, products and services (more) circular, institutions and governments are also implementing guidelines and setting targets for materials reuse and resource efficiency, acknowledging that systemic changes need to come from the top down as well as bottom up.

EU's Circular Economy Package Industrial Strategy

Clean Growth Strategy,

25 Year Environment Plan

Waste and Resources Strategy.

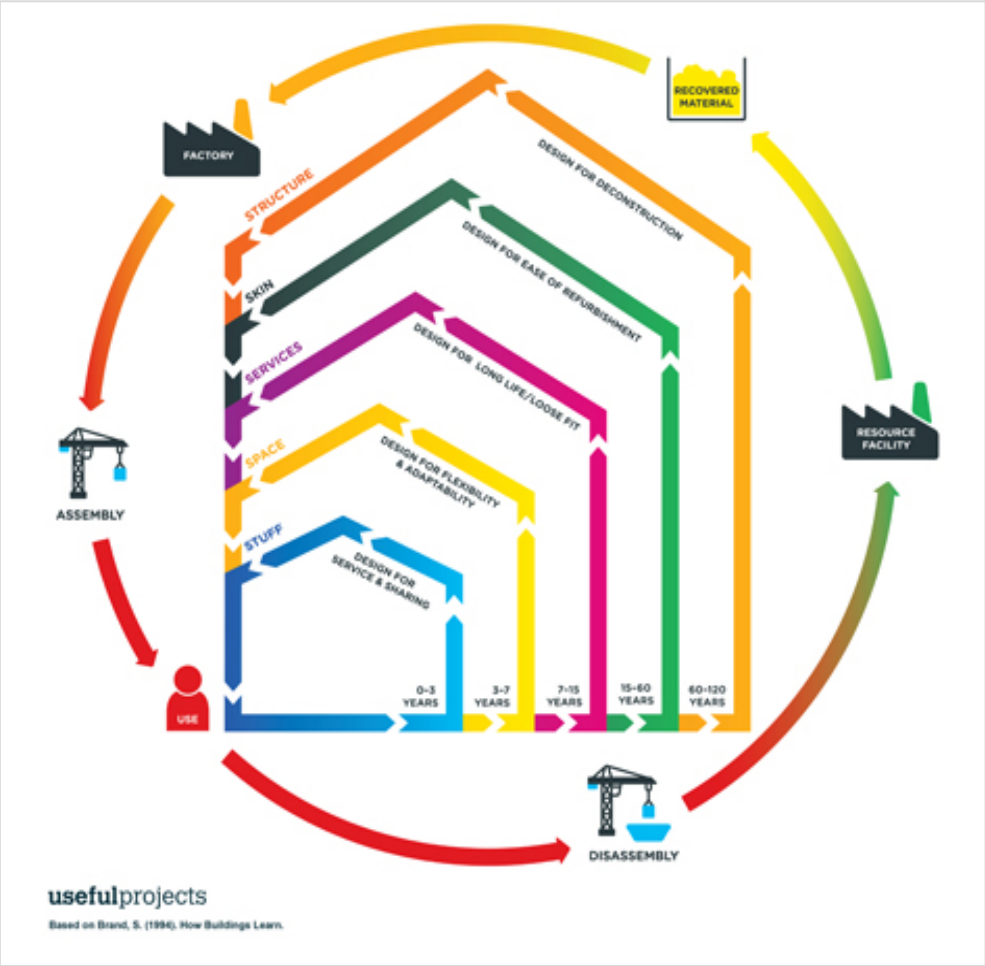
New draft London Plan: policy SI7.

To date over 230 councils have declared a Climate Emergency and have associated Net Zero Carbon Targets.

Circular Economy Model

To have maximum impact the circular economy needs to be considered throughout design, specification, procurement, and construction. This facilitates multiple refurbishment and redevelopment cycles and therefore optimum value of resource's throughout the building's life as well as at end of life when deconstructed.

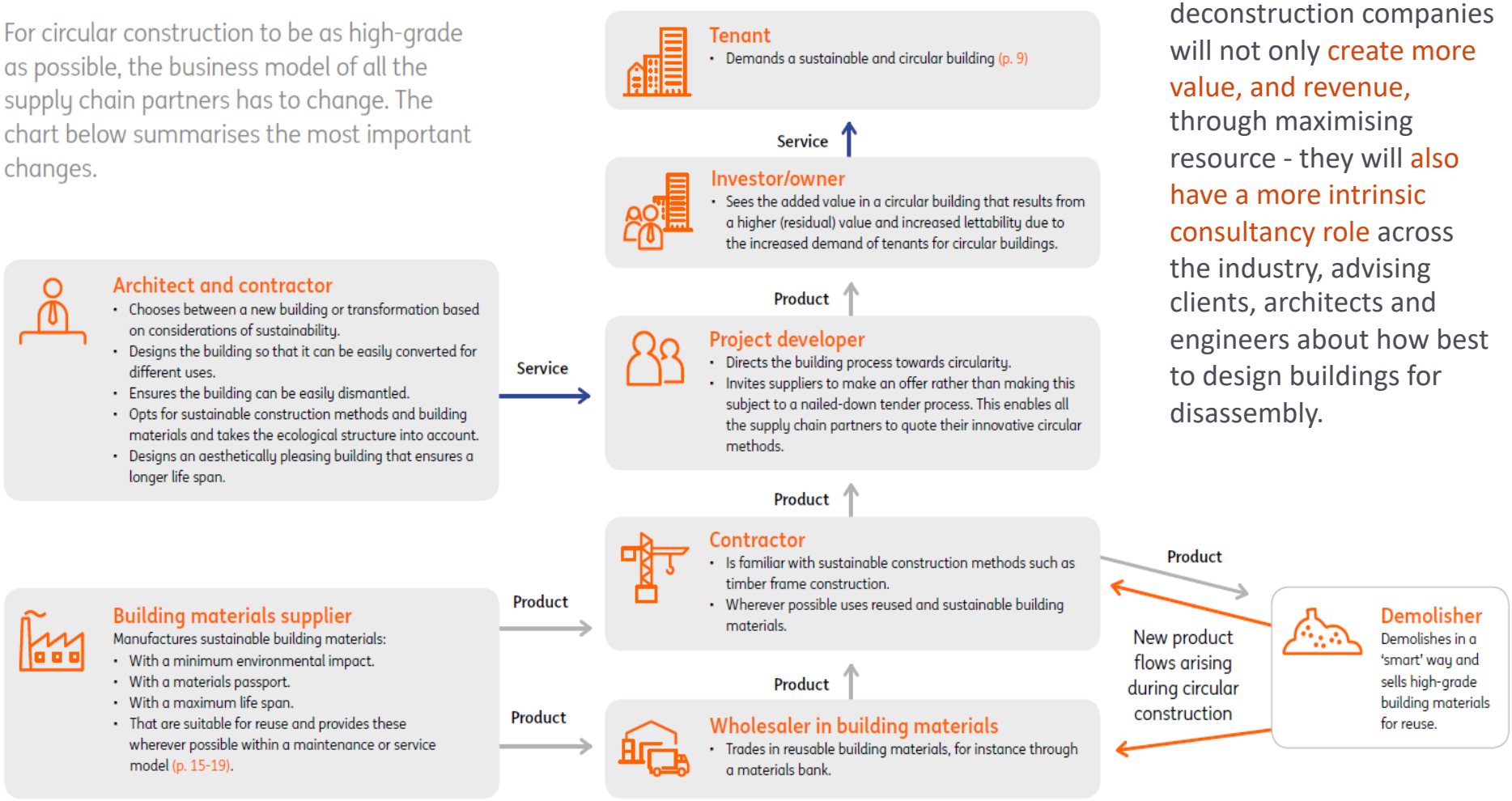
Circular Economy Model



This model demonstrates a how a more considered, layered approach, to building design can make it more flexible, adaptable and extend life, which aligns with circular economy principles.

Circular Economy Model

For circular construction to be as high-grade as possible, the business model of all the supply chain partners has to change. The chart below summarises the most important changes.



Demolition turned deconstruction companies will not only create more value, and revenue, through maximising resource - they will also have a more intrinsic consultancy role across the industry, advising clients, architects and engineers about how best to design buildings for disassembly.

Circular Economy | Start from the beginning

Reversible Building Design is the design of buildings which can be easily deconstructed or where parts can be removed and added easily without damaging the building´s integrity. BAMB Reversible Building Design tools inform designers and decision makers about the transformation capacity, reuse potential and the impacts of design solutions during the conceptual design phase and throughout the building's entire lifecycle.

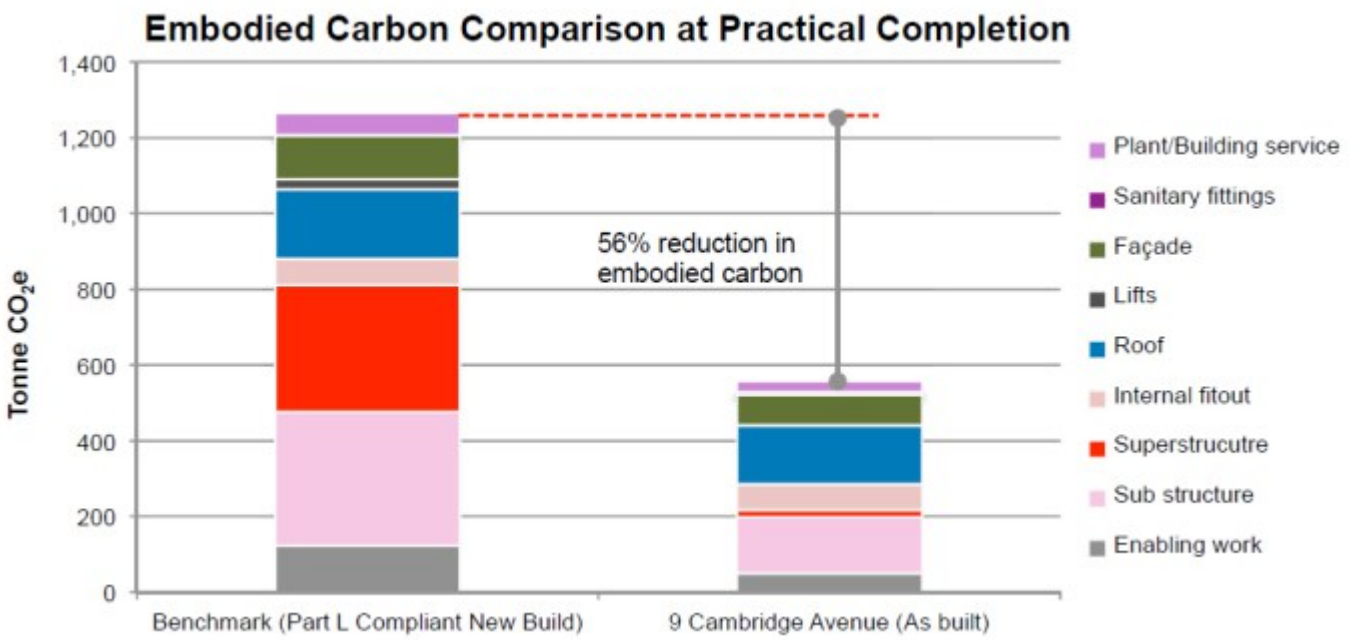
Materials Passports are electronic sets of data that describe those characteristics of building materials, products and product systems that enable value recovery from materials. Materials Passports focus on action, going beyond existing documentation on products to describe practically how residual value of materials can be recovered, instead of on measurement of impact, or listing composition.

Buildings As Materials Banks (BAMB) is creating ways to increase the value of building materials. Dynamically and flexibly designed buildings can be incorporated into a circular economy – where materials in buildings sustain their value. That will lead to waste reduction and the use of fewer virgin resources.

http://www.bamb2020.eu/

Circular Economy | Examples

SEGRO's 9 Cambridge Avenue - saving a redundant warehouse building due for an untimely demolition and relocating it to a new and more economically viable site.



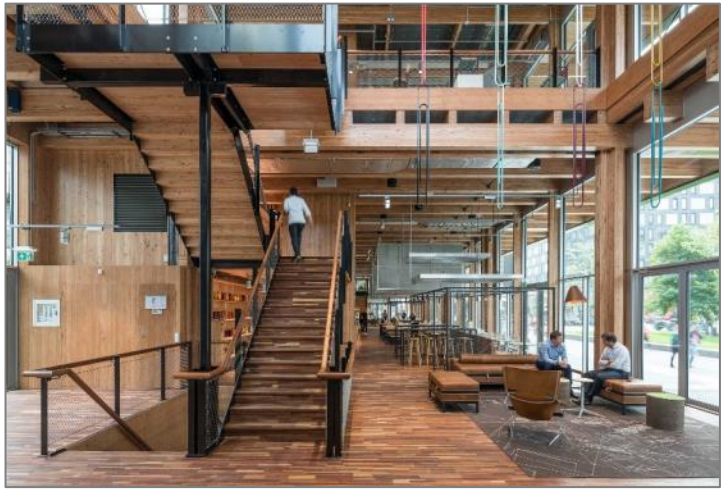
25% saving in costs and 56% lower embodied carbon at practical completion compared with a comparative new build

Circular Economy | Examples

The eco-overhaul of the UK Green Building Council's office, which boasts the lowest carbon footprint of any recorded refurbishment, is an example of so-called **urban mining** - the concept of re-using valuable materials rather than sending them off to landfill.

They significantly cut landfill waste by refurbishing their head office with 98% of the original fixtures reused or repurposed.

Circular Economy | Examples



Circl – ABN AMRO

Circular inputs include:

- walls in the basement were made from window frames from an old Philips building
- 1,600 m2 parquet floor made from residual wood from various renovation & demolition projects.
- plastered walls and felt on the stands contain old work clothing (Denimtex)
- insulating material in ceilings made from 16,000 old pairs of jeans (VRK Accoustics / Metisse)
- wall finishing made of residual wood (Studio RAP)
- floor has C2C certification (Tarkett iQ One)
- ventilation ducts have been finished with sustainable textiles (KE Fibertext)
- renewable energy comes from solar panels (Exasun) 29 and from an experimental Fasolar solar boiler (De Groot & Visser)
- exterior wall (De Groot & Visser) is remountable and covered with C2C-certified plant modules (Donkergroen)

Circular Economy | Examples


ING
PROLOGIS
MAYOR OF LONDON
JLL
CISCO
ROLLS ROYCE
BASF
We create chemistry
MARKS & SPENCER
ISG
THE CROWN ESTATE
pwc
ArcelorMittal
Novelis
CAT
LLOYDS BANK
JAGUAR
LAND ROVER
Interface
Schiphol
Amsterdam Airport
danogips
IKEA
BUSINESS IN THE COMMUNITY
ecovative
INTESA SANPAOLO
UK GBC
bam
accenture
High performance. Delivered.
Armstrong
ARCADIS
GYPSUM RECYCLING INTERNATIONAL
EcoDistricts
DESSO
A Tarkett Company
ABN·AMRO
RICOH
imagine. change.
Unilever
CUNDALL
Rabobank
LIVING BUILDING CHALLENGE
H&M
TATA STEEL
VEOLIA
AECOM
ARUP
sky
DELTA
DEVELOPMENT GROUP
Argos
Kingfisher
RENAULT
The Scottish Government
PHILIPS