CENTRE FOR RESEARCH INTO
ENERGY DEMAND SOLUTIONS

Reducing climate impacts from construction: experiences from the UK

Dr Jannik Giesekam & Prof. John Barrett

University of Leeds

19/11/2019

Overview

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UK context

CREDS

UK construction industry

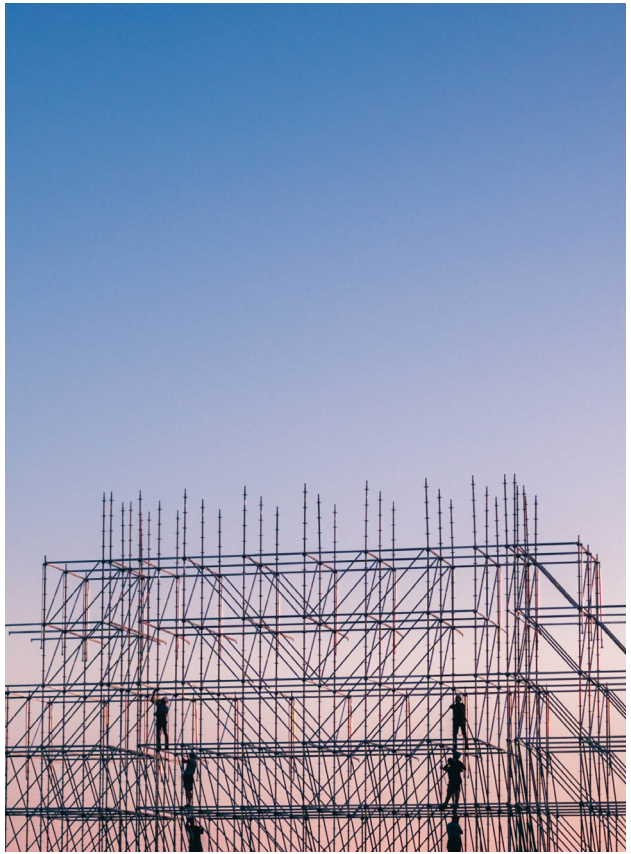
Decarbonisation pathways

Guidance & standards

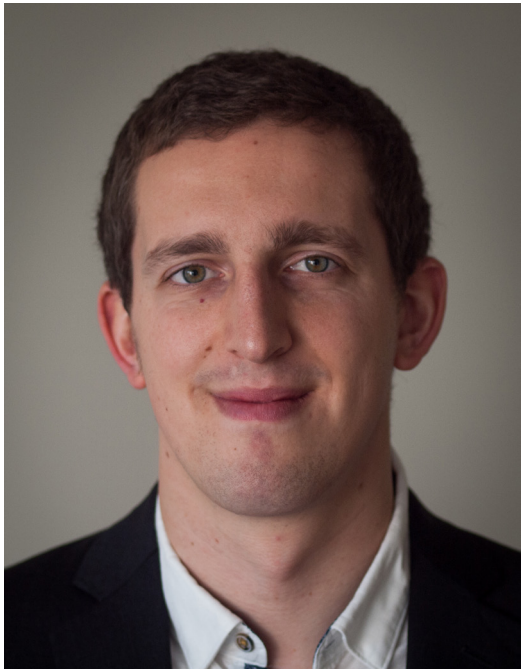
Best practice examples

Policy options

Summary



Who we are



Dr Jannik Giesekam

Prof John Barrett

CREDS

CREDS team

Publications from CIE-MAP

All available at **ciemap.ac.uk**

CIE-MAP

Centre for Industrial Energy, Materials and Products

Reducing carbon in construction: a whole life approach

The UK construction sector is failing to meet its carbon reduction targets and needs to explore additional mitigation options. The carbon emissions from heating and lighting our buildings (*operational emissions*) have been falling but these are not the only emissions arising from the built environment. Sizeable carbon emissions are incurred in constructing, maintaining and demolishing an asset and producing the materials and components used throughout its life cycle (*embodied emissions*). Considering both the anticipated operational and embodied emissions of a built asset is considered a *whole life approach*. To date the construction industry has mainly focussed on reducing operational emissions, driven by changes in the building regulations and planning requirements. Extending the focus of project carbon assessments and targets from operational to whole life emissions presents designers, clients and contractors with a broader range of mitigation options. The faster proliferation of a whole life approach should be supported by national and local policies for which there are a number of international precedents. Targeted intervention from national and local government could drive innovation in design teams and supply chains, improve sector productivity, reduce the costs of UK buildings and infrastructure, create employment opportunities, boost export markets and deliver immediate reductions in carbon emissions.

Recommendations

1. The Government should establish a well resourced independent body to develop and accelerate the construction sector's decarbonisation agenda.
2. Local authorities should require assessment of whole life carbon emissions on significant schemes as part of the planning process.
3. All publicly funded building projects should include a whole life carbon assessment and whole life carbon targets where project benchmarks can be established.
4. The greenhouse gas emission reporting requirements for quoted companies should be extended to include scope 3 emissions associated with developing new facilities.
5. Product manufacturers should require Environmental Product Declarations to support environmental claims.

Challenges facing UK construction

The National Infrastructure Commission has highlighted three key challenges facing the construction sector: congestion, capacity and carbon[1]. By 2050 there are expected to be an extra 14 million people living in the UK and the construction sector must deliver the housing and infrastructure that will underpin their future prosperity. That requires dramatically increasing housebuilding, retrofitting one existing home every minute, and delivering an infrastructure pipeline worth in excess of £600bn. UK firms are also expected to capture an increasing share of the global market for sustainable construction and be at the forefront of delivering the Government's Clean Growth ambitions[2]. Meanwhile by 2025 the industry is expected to halve delivery time, cut costs by a third, halve the trade gap between exports and imports of construction products, and halve carbon emissions from the built environment[3]. All of this must be achieved by a highly fragmented sector with low financial margins and declining labour availability[4]. None of these targets will be met under business as usual conditions[4,5]. Therefore the construction sector must undergo a radical transformation over the next decade.

The Government has already set out some measures to transform infrastructure performance[1], and modernise the industry through the Construction Sector Deal as part of the Industrial Strategy[6]. This transformation must focus on reducing carbon whilst improving sector productivity through the adoption of more resource efficient designs, novel materials and delivery models. The successful transformation of this industry will be critical to achieving the Government's target of doubling resource productivity over the next 25 years[7] and meeting carbon targets.

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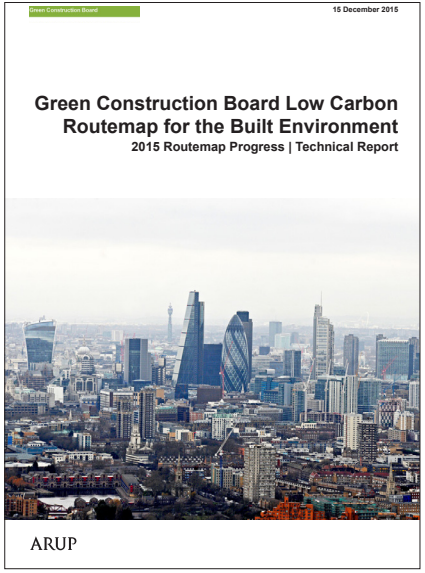
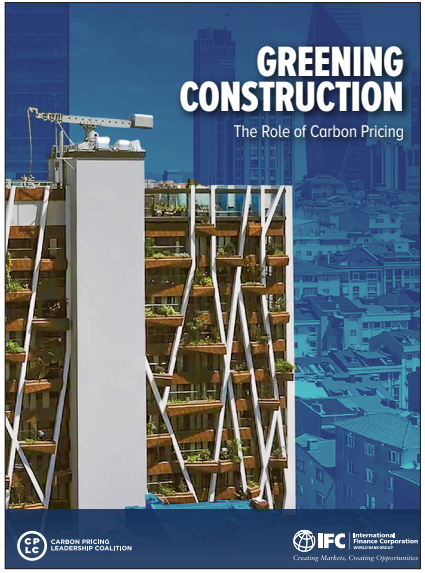
EPSRC Engineering and Physical Sciences Research Council

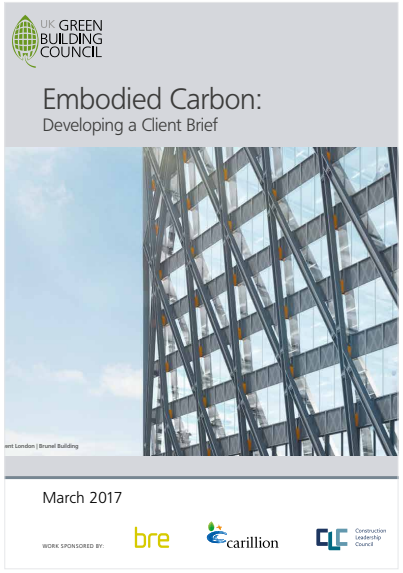
Giesekam et al. (2014, 2015, 2016, 2017, 2018a, 2018b); Roelich & Giesekam (2018)

Also involved in wide range of projects outside academia

Examples include







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GCB (2015); IFC (2019); UKGBC (2017); RICS (2017)

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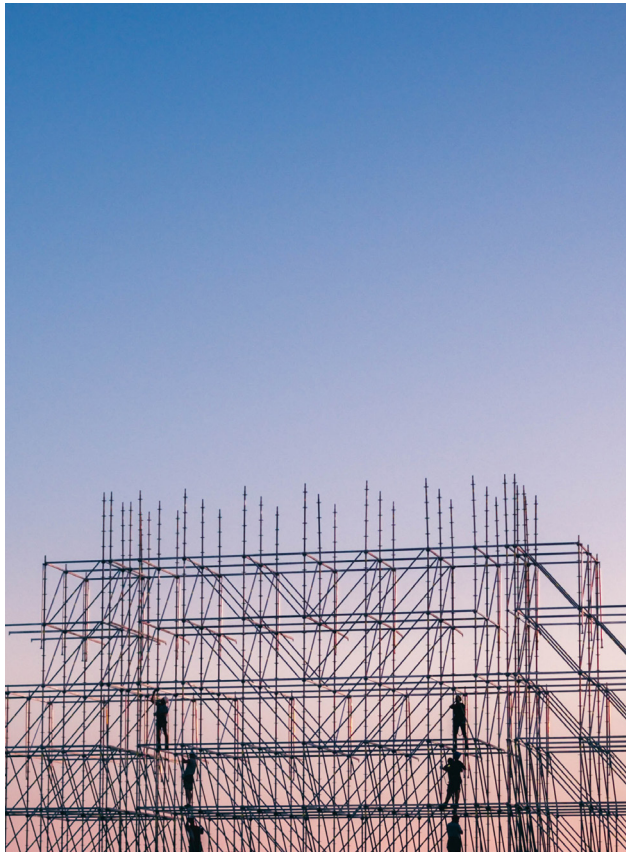


Climate emergency

In May 2019 the UK Government declared a climate emergency & subsequently set a **target of net zero greenhouse gas emissions by 2050**

Similar declarations from devolved administrations in Wales & Scotland

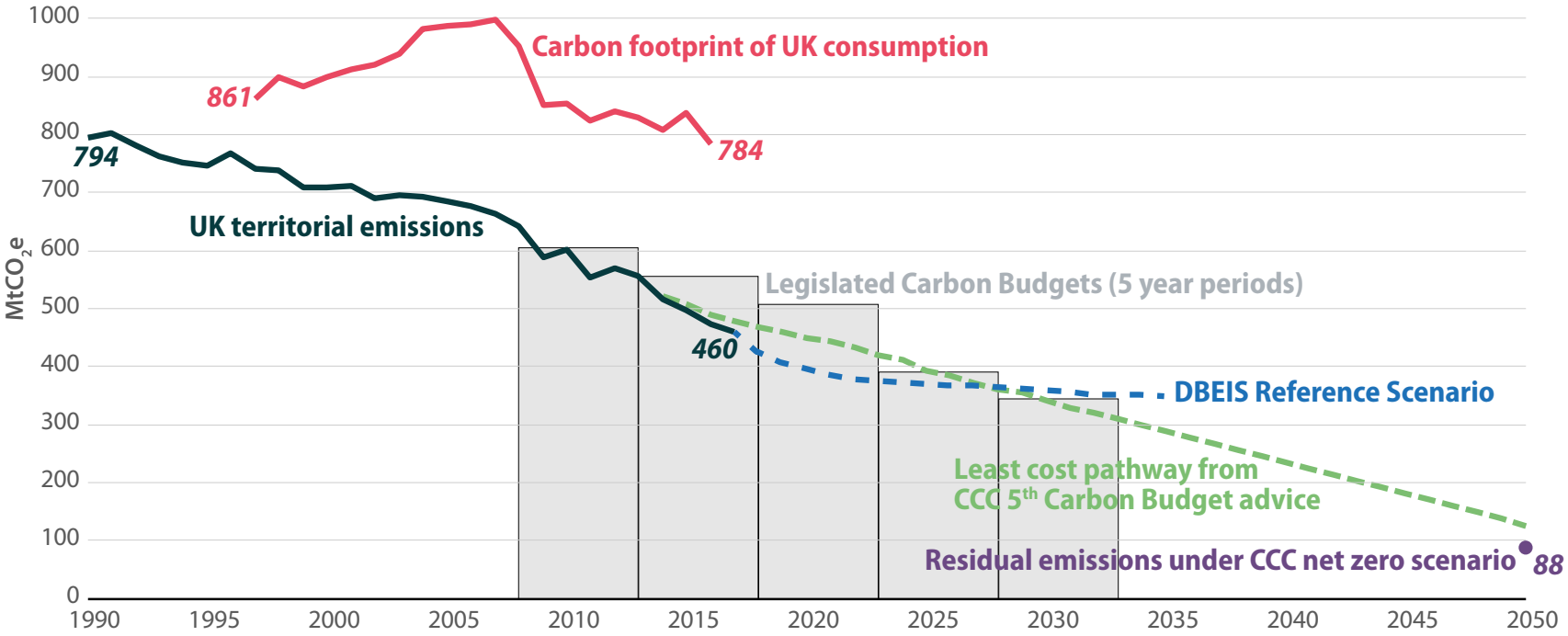
Plus majority of UK principal local authorities

Many **local commitments to more ambitious targets** *e.g. net zero by 2030*

Some political parties have also passed internal motions advocating for an earlier target date *e.g. Green Party 2030, Labour 2030 & Liberal Democrats 2045*

Image CC from Roy on flickr.com/photos/thehutch/40423766093/:

UK greenhouse gas emissions & targets



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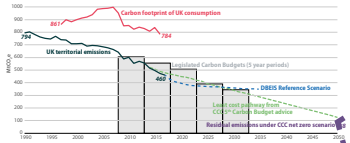
Territorial emissions from official statistics to 2017, carbon footprint to 2016
Residual from CCC (2019) Net Zero. The UK's contribution to stopping global warming

CCC net zero scenario



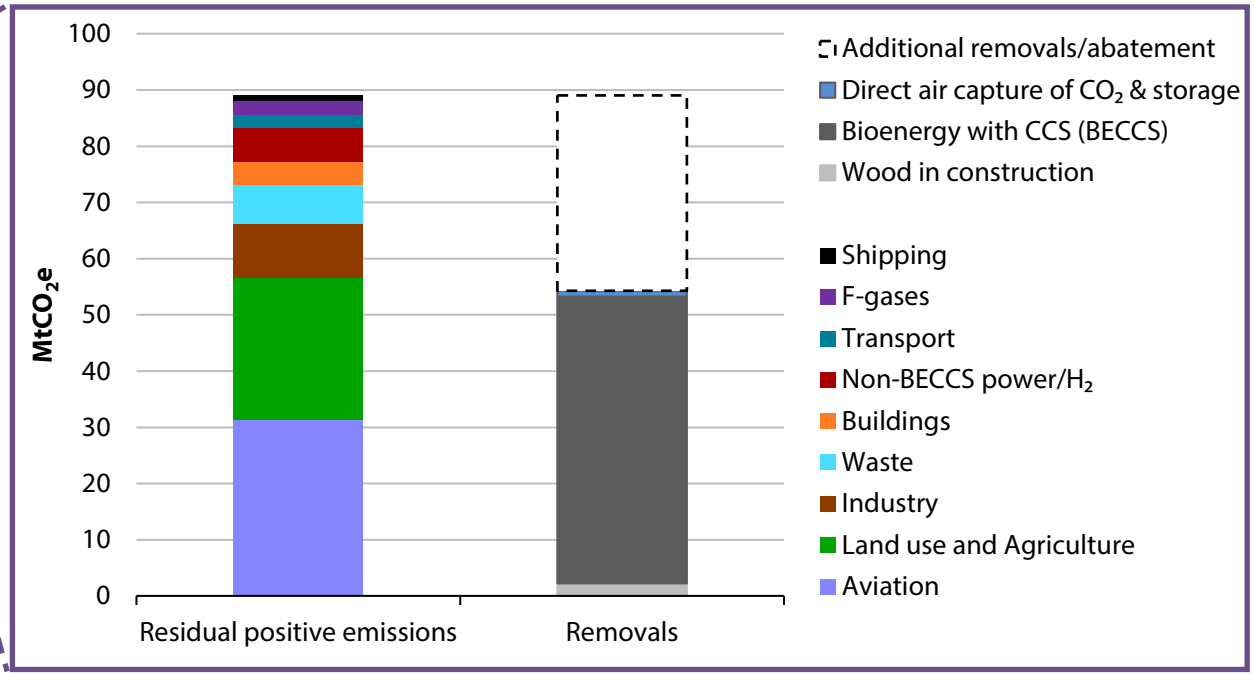
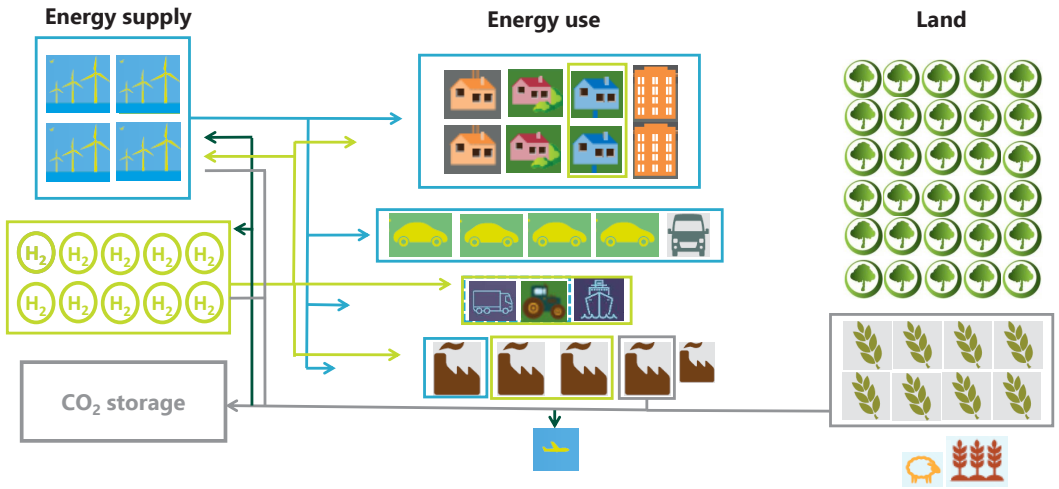


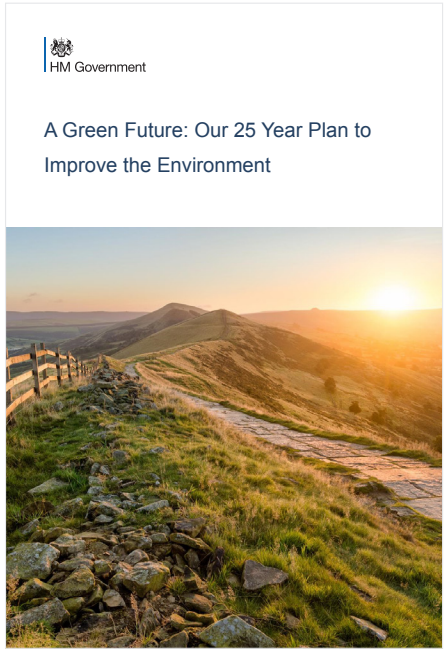
Figure 6.5 from CCC (2019) Net Zero. The UK's contribution to stopping global warming

One vision for a net zero economy



CCC (2019) plus visualisation from presentation by Chris Stark (CCC Chief Executive)

A plan's a plan for a' that



HM Government (2017a,b, 2018,2019)

Progress so far

In 2018 only **7 of 24 indicators on track**

*"The Government's own projections demonstrate that its **policies and plans are insufficient** to meet the fourth or fifth carbon budgets... This **policy gap has widened** in the last year"*

"Last year, the Committee set out 25 headline policy actions for the year ahead...only one has been delivered in full. Ten of the required actions have not shown even partial progress."

*"reaching net-zero requires an **annual rate of emissions reduction...30% higher** than achieved on average since 1990"*

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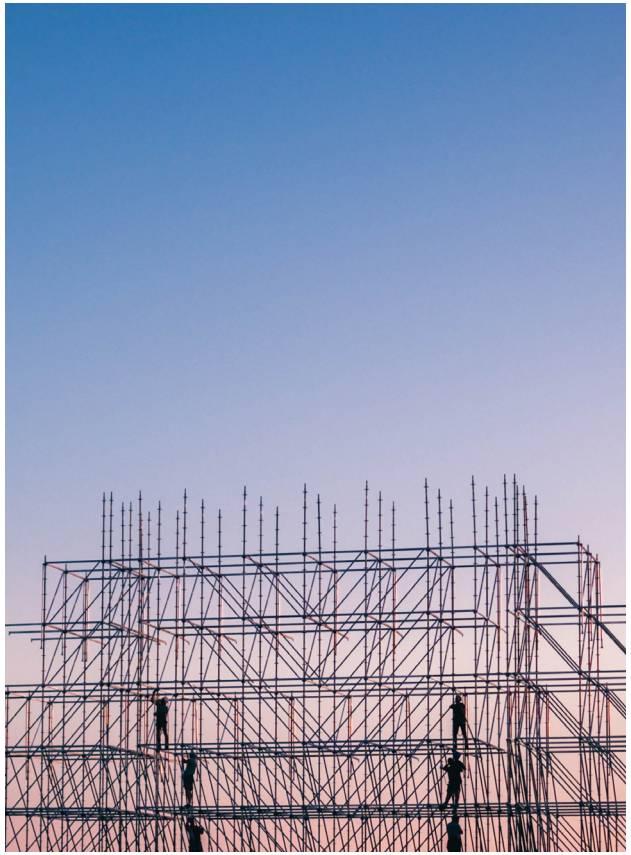


Centre for Research into Energy Demand Solutions (CREDS)

New multi-disciplinary centre, funded by EPSRC and ESRC - £19m over 5 years.

Centre overview

Vision to make the UK a leader in understanding the changes in **energy demand** needed for the transition to a secure and affordable, low carbon energy system

For updates

Twitter @**CREDS_UK**

Newsletter, blogs & more at **creds.ac.uk**

C R E D S

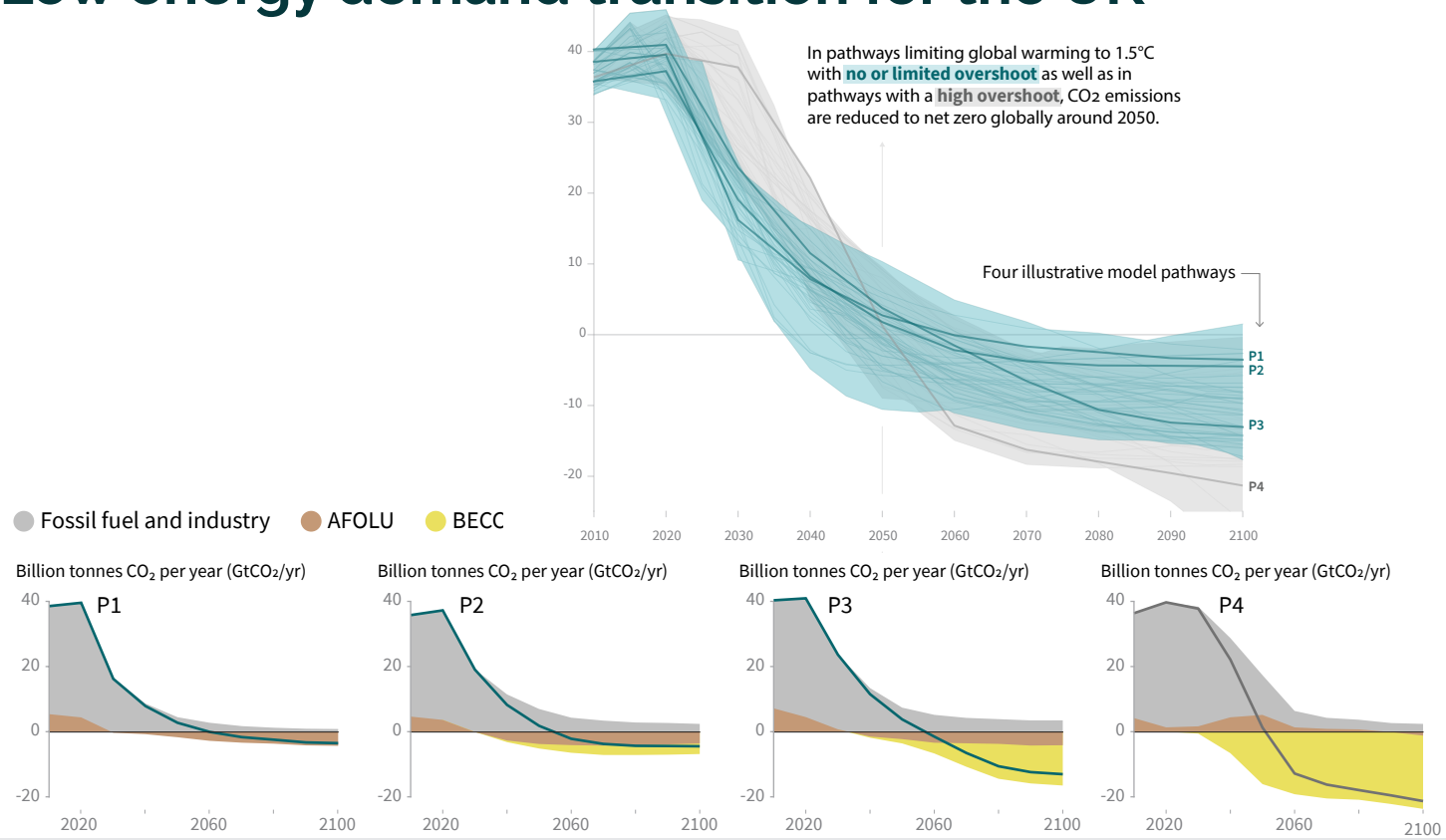
Themes

- Materials & products
- Flexibility
- Digital society
- Buildings
- Policy & governance
- Transport & mobility

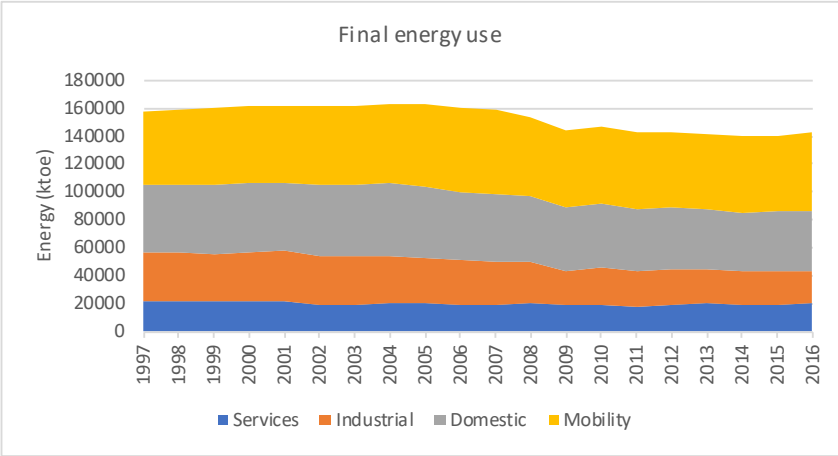
Challenges

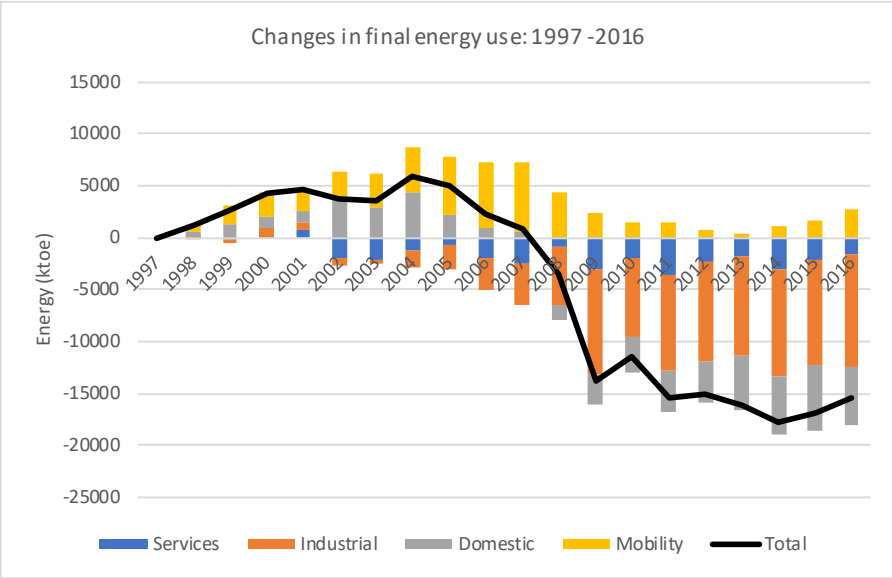
- Decarbonisation of heat
- FAIR

Low energy demand transition for the UK



UK energy demand

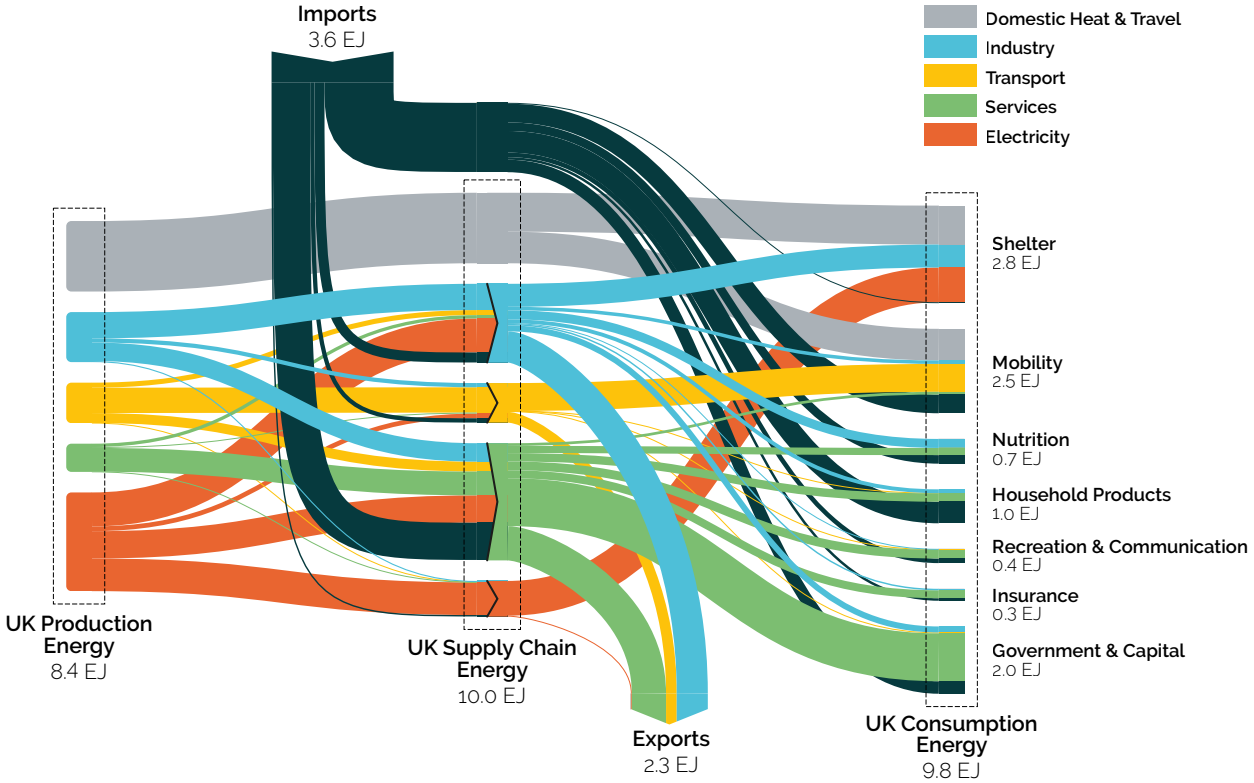




Improve, shift, avoid

	Service	Avoid	Shift	Improve
Transport	Accessibility Mobility	Integrate transport and land-use planning Smart logistics Teleworking Compact cities	Mode shift from car to cycling, walking, or public transit	Electric two-, three- and four-wheelers Eco-driving Electric vehicles Smaller, light weight vehicles
Buildings	Shelter	Passive house or retrofit (avoiding demand for heating/cooling) Change temperature set-points	Heat pumps, district heating and cooling Combined heat and power Invertor air conditioning	Condensing boilers Incremental insulation options Energy-efficient appliances
Manufactured products and services	Clothing Appliances	Long-lasting fabric, appliances, sharing economy Eco-industrial parks, circular economy	Shift to recycled materials, low-carbon materials for buildings and infrastructure	Use of low-carbon fabrics New manufacturing processes and equipment use
Food	Nutrition	Calories in line with daily needs Food waste reduction	Shift from ruminant meat to other protein sources where appropriate	Reuse food waste Smaller, efficient fridges Healthy fresh food to replace processed food

Our view of energy demand



Examples of work from our theme

Roadmaps for the UK steel and cement sector

Role of the industrial strategy in driving energy demand

Measures to reduce household consumption to deliver energy demand reduction

Leeds Embodied Carbon Living Lab

Multi-year programme co-created with local stakeholders addressing **embodied & whole life carbon** emissions on a series of live projects in Yorkshire

Trialling new approaches, conducting a city scale assessment of impacts and proposing amendments to participants' construction standards and the local sustainable construction SPD

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email **J.Giesekam@leeds.ac.uk** if you would like to collaborate

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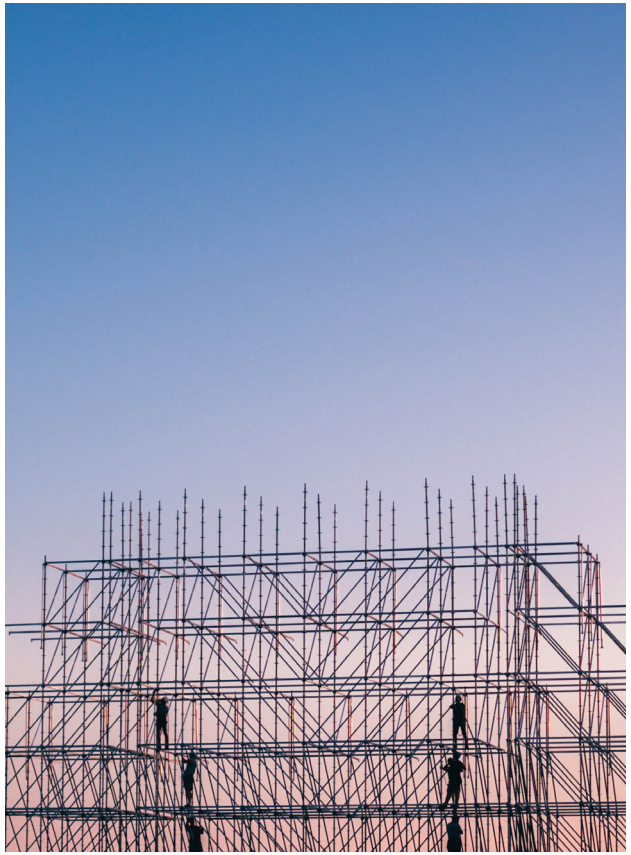


UK construction sector

Economic significance: ~9% of GDP, ~3.1 million jobs, turnover ~£370bn & exports ~£8bn

Long standing challenges: low productivity; ageing workforce (32% over 50); low R&D expenditure (~0.9% of UK business total); avoidable errors are 10-25% of project costs

Short term challenges: tight margins; skills shortage; labour availability post-Brexit; response to Grenfell Tower tragedy; new work declining substantially over last 6 months

Trends: quality & performance; health & wellbeing; modern methods of construction

UK built environment

Buildings account for ~40% of UK energy consumption (inc. ~2/3 of electricity)

Most of 2050 stock has already been built

In 2015, 15% of population lived in a dwelling with a leaking roof, damp walls, floors or foundation, or rot in window frames or floor

Spending ~£50bn/yr on repair & maintenance already; need to retrofit 1.5 homes/min to 2050

High levels of new build anticipated due to rising population; >£600bn infrastructure pipeline; addressing housing crisis requires ~300,000 new homes each year; dramatic growth in cities such as Manchester

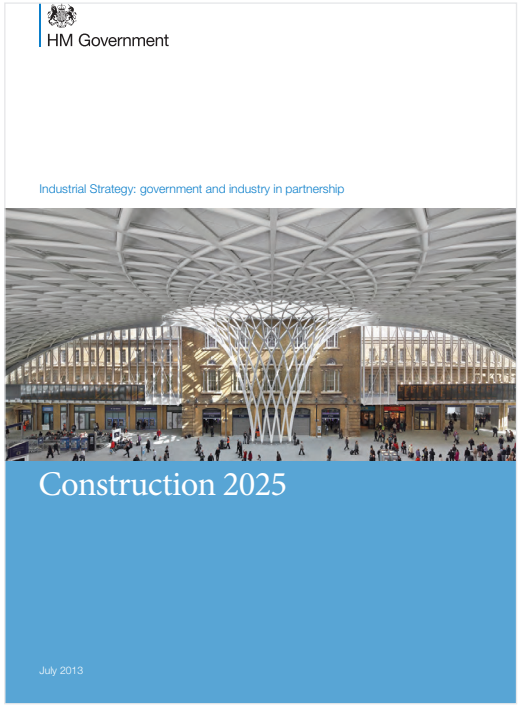
For statistical summary see:

The state of sustainability in the UK built environment

www.ukgbc.org/ukgbc-work/state-sustainability-built-environment/

Targets for 2025

Headline targets established in 2013 and subsumed into subsequent strategies



Lower costs

33%

reduction in the initial cost of construction and the whole life cost of built assets

Faster delivery

50%

reduction in the overall time, from inception to completion, for newbuild and refurbished assets

Lower emissions

50%

reduction in greenhouse gas emissions in the built environment

Improvement in exports

50%

reduction in the trade gap between total exports and total imports for construction products and materials

Transforming construction challenge

Through Industrial Strategy Challenge Fund up to £170m R&D investment, matched by £250m from industry, in new construction processes and techniques

Established a Construction Innovation Hub; the Active Building Centre and N+ network

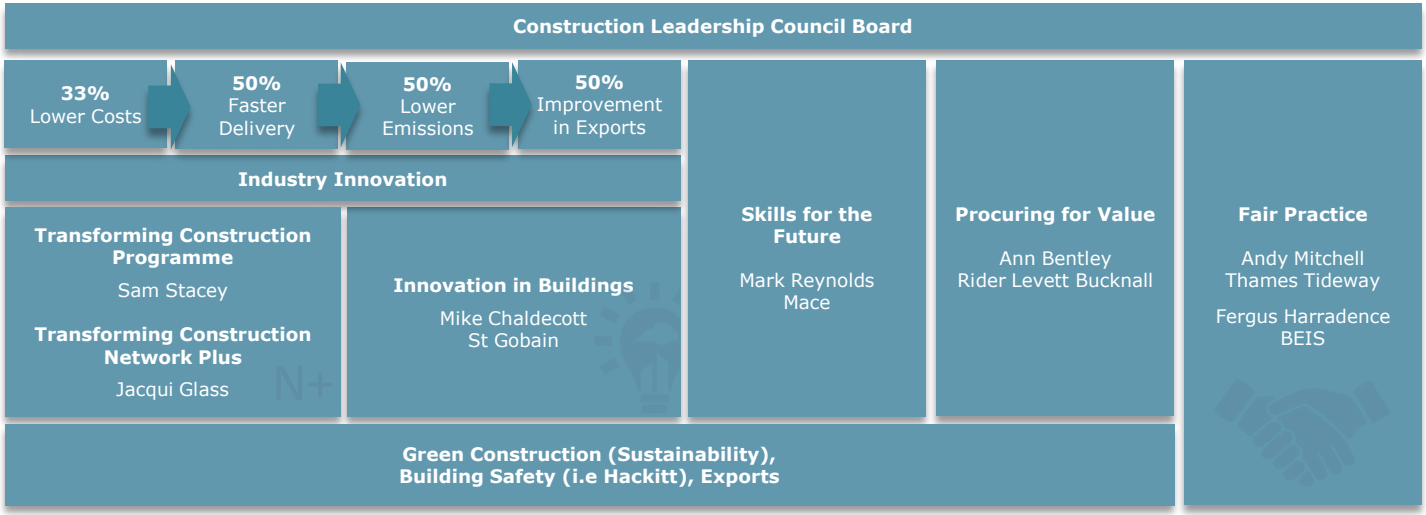
Brought together many existing players such as BRE, Centre for Digital Built Britain etc.

Also related industrial decarbonisation challenge focused on decarbonising industrial clusters

Construction Leadership Council

Tasked with leading transformation and focussed on digital, manufacturing and whole life performance

CLC workstreams and structure

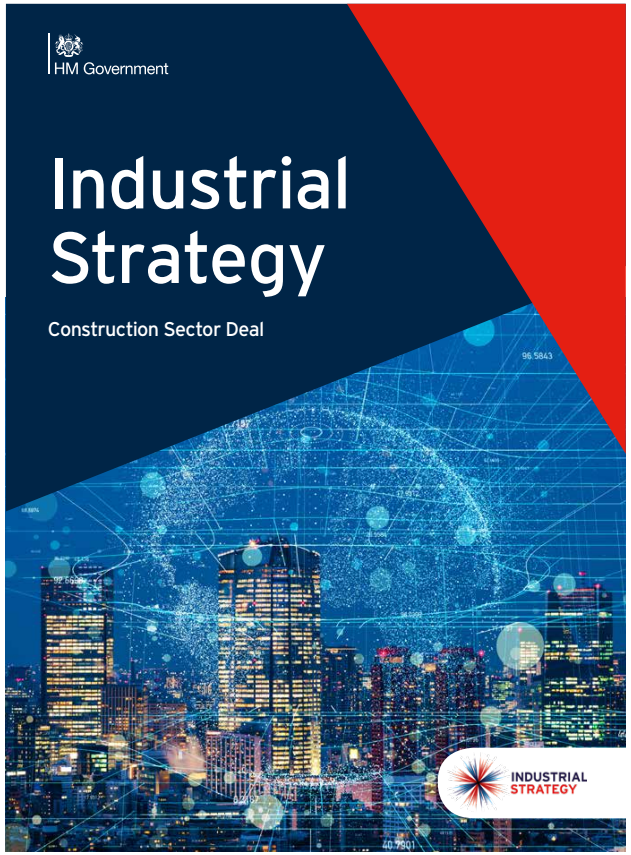


Construction Sector Deal

Targets 50% reduction in greenhouse gas emissions in the built environment by 2025

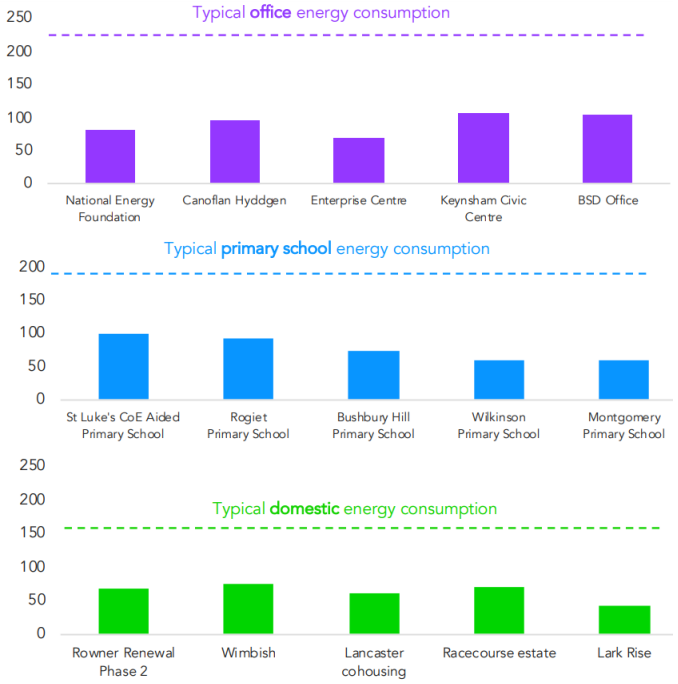
Mission to halve the energy use of new buildings by 2030

In July 2019 the Government also appointed the champion for a 'Built environment sector deal'



Halving energy consumption is already possible

As highlighted by GCB with 15 example buildings from 2004-2017 (all kWh/m²/yr)



1. Contractual energy performance targets

2. Prediction of future energy use (kWh/m²)

3. Optimisation of form to reduce energy use and capital costs

4. "Fabric first" approach

5. Opening windows and MVHR

6. Consideration of all energy uses

7. Quality assurance for construction / commissioning

8. Aftercare to deliver low energy use

50% reduction in energy use

Policy

Focus is exclusively on operational carbon and energy

Number of high profile failures *(e.g. Green Deal)* and cancellations *(e.g. Zero Carbon Homes)* in recent years

Currently consulting on upcoming Future Homes Standard and revisions to Part L; also tightening non-domestic private rented sector Minimum Energy Efficiency Standards

Widely acknowledged gap between current policies and the net zero target


Ministry of Housing, Communities & Local Government

The Future Homes Standard

2019 Consultation on changes to Part L (conservation of fuel and power) and Part F (ventilation) of the Building Regulations for new dwellings

October 2019
Ministry of Housing, Communities and Local Government


Department for Business, Energy & Industrial Strategy

THE NON-DOMESTIC PRIVATE RENTED SECTOR MINIMUM ENERGY EFFICIENCY STANDARDS

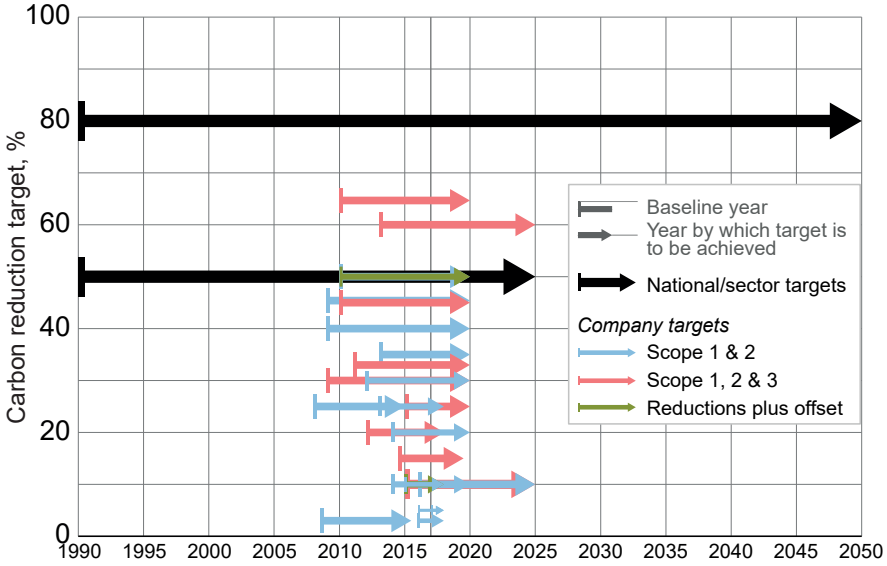
The Future Trajectory to 2030

Closing date: 07 January 2020

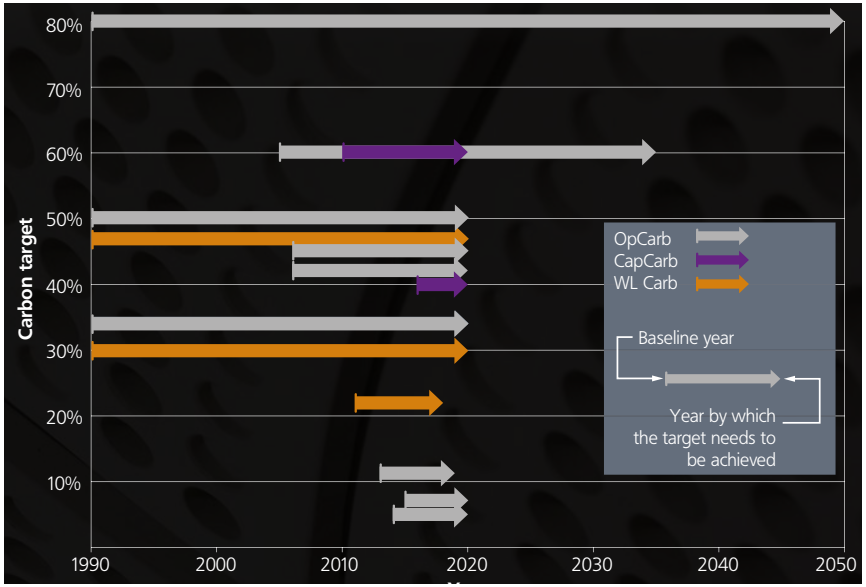
more info at www.gov.uk/government/consultations/

Will voluntary action fill the gap? Unlikely...

Carbon reduction targets of selected UK housebuilders & construction firms (representing turnover of £88.4bn in 2016) - based on July 2017 review



Carbon reduction targets of selected infrastructure clients



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Figures from Giesekam et al. (2018) Aligning carbon targets for construction with (inter)national climate change mitigation commitments & UKGBC (2017) Delivering low carbon infrastructure

Construction Declares

Since May 2019:

Architects Declare: 715 practices

Building Services Engineers: 63 practices

Civil Engineers: 62 practices

Structural Engineers: 120 practices

Architecture Education Declares: 2075 signatories

Range of commitments such as to: *"include life cycle costing, whole life carbon modelling and post occupancy evaluation as part of the basic scope of work, to reduce both embodied and operational resource use"*; and to *"accelerate the shift to low embodied carbon materials in all work"*.

1.5 architecture
10 DESIGN
1200 Works
2030 Architects
3 ideas
31/44 Architects
4M Group
51 architecture
5th Studio
6a architects
7N Architects
A3Associates
AAB architects
AAVA
ABQ Studio Architects
acme
Adam Khan Architects
Adam Richards Architects
Adams & Sutherland
ADP
Adrian James Architects
AECOM UK & Ireland
Aedas
AHR
Alan Phillips Architects
Alec French Architects
Alison Brooks Architects
aLL Design
Allan Curran Architects
Allford Hall Monaghan Morris
Allies and Morrison
alma-nac
Alston Architects
AL_A
AMA_Andy MacFee Architects
Amos Goldreich Architecture
Amy Butt
Andrew Catto Architects
Andris Berzins & Associates
Ann Bodkin Sustainability Consultant + Architect
Anthony Carlile Architects
APG
Apt
AR Architecture
Arboreal
Arc Partnership
Cullinan Studio
Cunniff Design
Cunningham Heavin
Curl La Tourelle Head Architecture
Curry-Hyde
CZWG architects
D'Soto Architects
d-on architects
D3 Architects
DaeWha Kang Design
Dallas-Pierce-Quintero
DAP Architecture
Darling Associates
Darren Oldfield Architects
David Bishop Architecture
David Chipperfield Architects
David Cox Architects
David Holland Architect + Designer
David Kohn Architects
David Leech Architects
David Morley Architects
David Simister Architect
De Matos Ryan
De Rosee Sa
Deacon + Richardson Architects
Delvendahl Martin Architects
Denhof Design
Design International
Designfarm Architects
Designscape Architects
Dexter Moren Associates
Diamond Architects
DK-CM
DLA Design Group
DLG Architects
dMFK Architects
dn-a architecture
Donald Insall Associates
Donald Moir Architect
dRMM
DSDHA
Dyvik Kahlen
e-gg
EBBA Architects
ECD Architects
ECE Group
Eco Arc Passive House Architects
James Grayley A
Jamie Falla archi
Jamie Fobert Arc
Jane Duncan Arc
Jessop and Cook
Jestico + Whiles
Jo Cowen Archite
Jo Townshend ar
John Brown Arch
John Foat Archite
John Manning Cl
John McAslan +
John Robertson
JOMA
Jonathan Clark A
JTP
JWBuckland_Stu
K-Architects
KAST Architects
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Kelsall Architects
Kennedy Woods
Keppie Design
Kirkland Fraser M
Kirsty Maguire A
KLA
Knight Architects
Knox Bhavan Arc
Kohn Pedersen F
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KSS
L1Architecture
Langstaff Day Ar
Lanyon-Hogg Arc
Latitude
Lawray Architect
Lawrence Duck A
LE+Passive Archi
Lee Evans Partne
Lees Associates
LeilaDunning Pro
Levitate Architect
Levitt Bernstein
Lewandowski Ar
Liam Russell Arc
Liberata Architec
Liddicoat & Gold

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number of signatories accurate as of 04/11/19

BBP Climate Change Commitment

Launched in September 2019, includes:

- Development of **net zero carbon pathways** by end of 2020 for new & existing buildings including embodied carbon of development, refurbishment and fit-out works
- Annual **disclosure** of progress against pathways
- Development of **guidance** for property owners that ensures consistency
- Development of **climate change resilience strategies** by 2022

23 signatories have **>£300bn of real estate assets & >11,000 properties** under management

BBP | BETTER BUILDINGS PARTNERSHIP

British Land

CANARY WHARF GROUP PLC

intu

LaSalle INVESTMENT MANAGEMENT

Landsec

lendlease

SEGRO WHERE BUSINESS WORKS

Transport for London

RIBA 2030 climate challenge

Launched in October 2019, includes:

1. Reduce operational energy demand by at least 75%, before UK offsetting
2. **Reduce embodied carbon by at least 50-70%**, before UK offsetting
3. Reduce potable water use by at least 40%
4. Achieve all core health and wellbeing targets

RIBA 2030 Climate Challenge target metrics for non-domestic buildings

RIBA Sustainable Outcome Metrics	Current Benchmarks	2020 Targets	2025 Targets	2030 Targets	Notes
Operational Energy kWh/m²/y	225 kWh/m²/y DEC D rated (CIBSE TM46 benchmark)	< 170 kWh/m²/y DEC C rating	< 110 kWh/m²/y DEC B rating	< 0 to 55 kWh/m²/y DEC A rating	UKGBC Net Zero Framework 1. Fabric First 2. Efficient services, and low-carbon heat 3. Maximise onsite renewables 4. Minimum offsetting using UK schemes (CCC)
Embodied Carbon $kgCO_2e/m^2$	1100 $kgCO_2e/m^2$ (M4i benchmark)	< 800 $kgCO_2e/m^2$	< 650 $kgCO_2e/m^2$	< 500 $kgCO_2e/m^2$	RICS Whole Life Carbon (A-C) 1. Whole Life Carbon Analysis 2. Using circular economy Strategies 3. Minimum offsetting using UK schemes (CCC)

Science Based Targets

SCIENCE BASED TARGETS

685
companies taking action

294
with approved targets

>90
in construction, real estate and supply chain

27 based in UK

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Numbers accurate as of 18/11/19 - see **sciencebasedtargets.org** for more information

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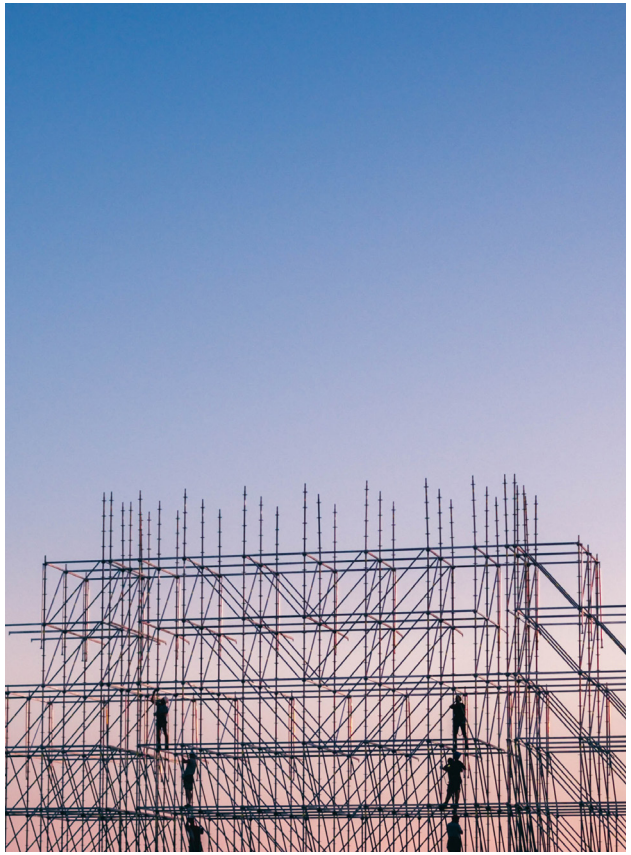


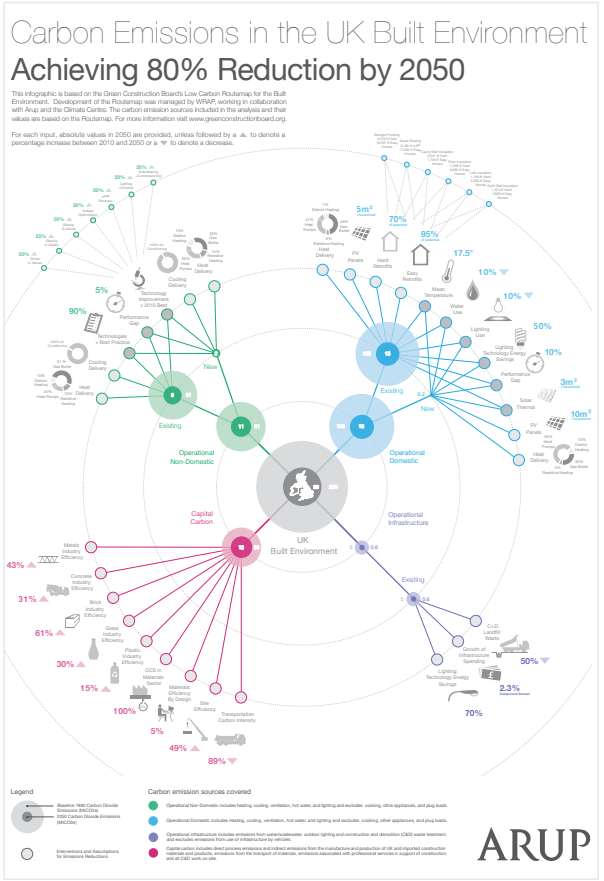
Green Construction Board Routemap

2013 plan to achieve 80% emissions reduction by 2050 across UK built environment

Considered operational carbon and capital carbon

Considered KPIs, policies, and actions

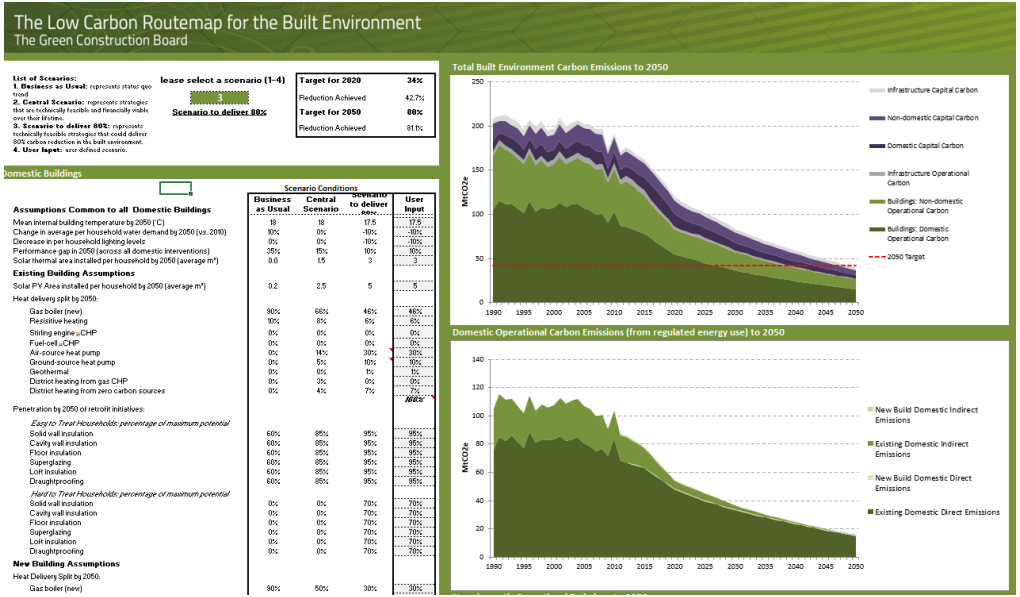
Included report, infographics, and interactive model



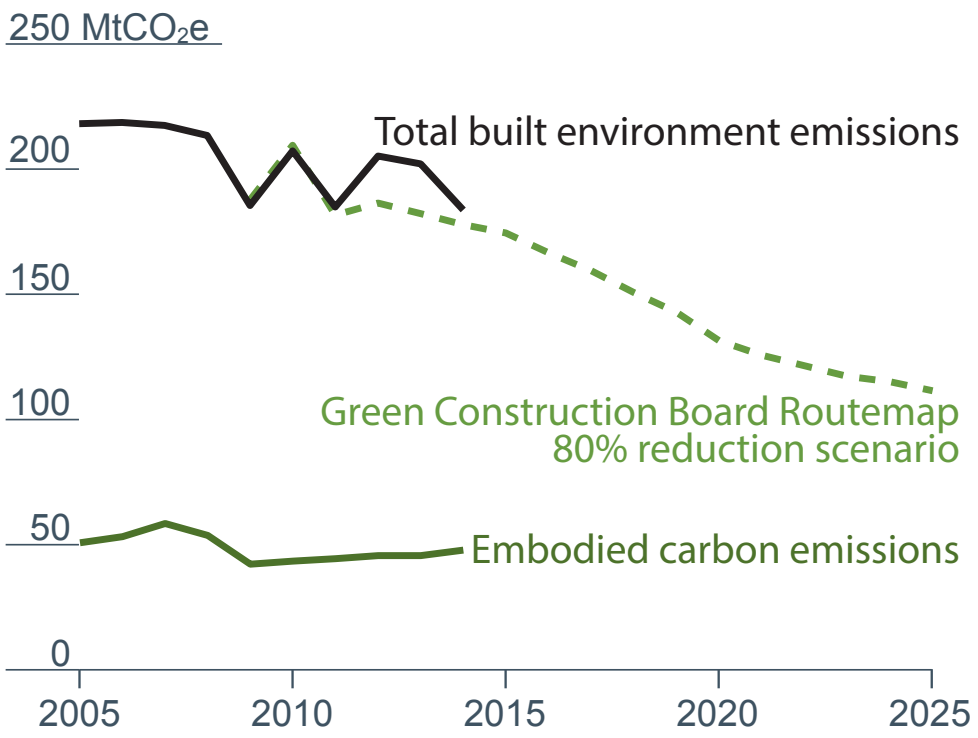
Reaction at the time

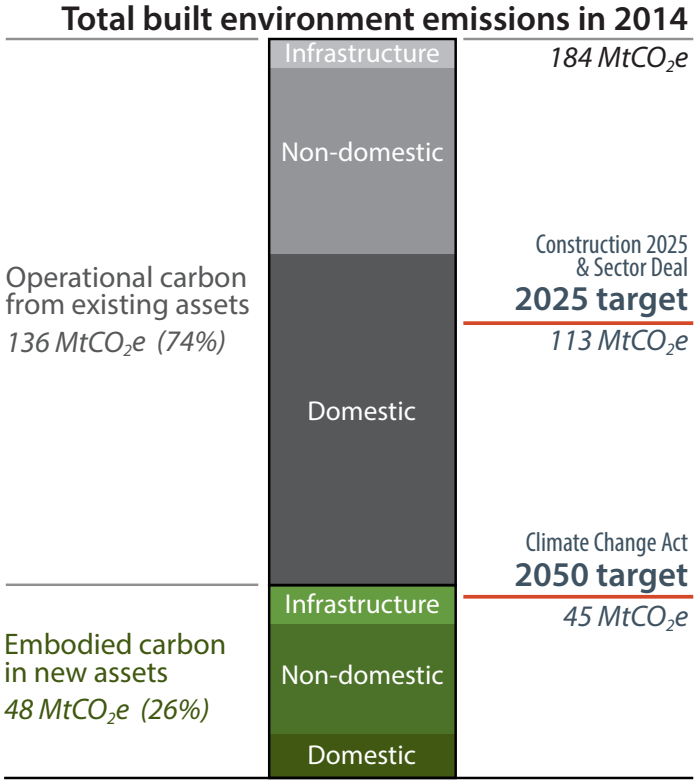
"My personal view is that the assumptions the model makes are so heroic that I don't believe anyone will believe it will happen in the timeframe"

Paul Morrell - Government's chief construction advisor



Routemap progress





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See Giesekam et al. (2018) Aligning carbon targets for construction with (inter)national climate change mitigation commitments *doi:10.1016/j.enbuild.2018.01.023* for detailed discussion

Future roadmap update?

Could include:

1. Updated assessment of progress against KPIs
2. Updated assessment of mitigation potential from a range of technologies, including new options.
3. Development of a new scenario for the built environment in 2050 which is compatible with net zero national emissions.
4. Refreshed action plan with interventions and milestones.
5. Program for further routine updates

SBT pathways are not consistent with national sector goals

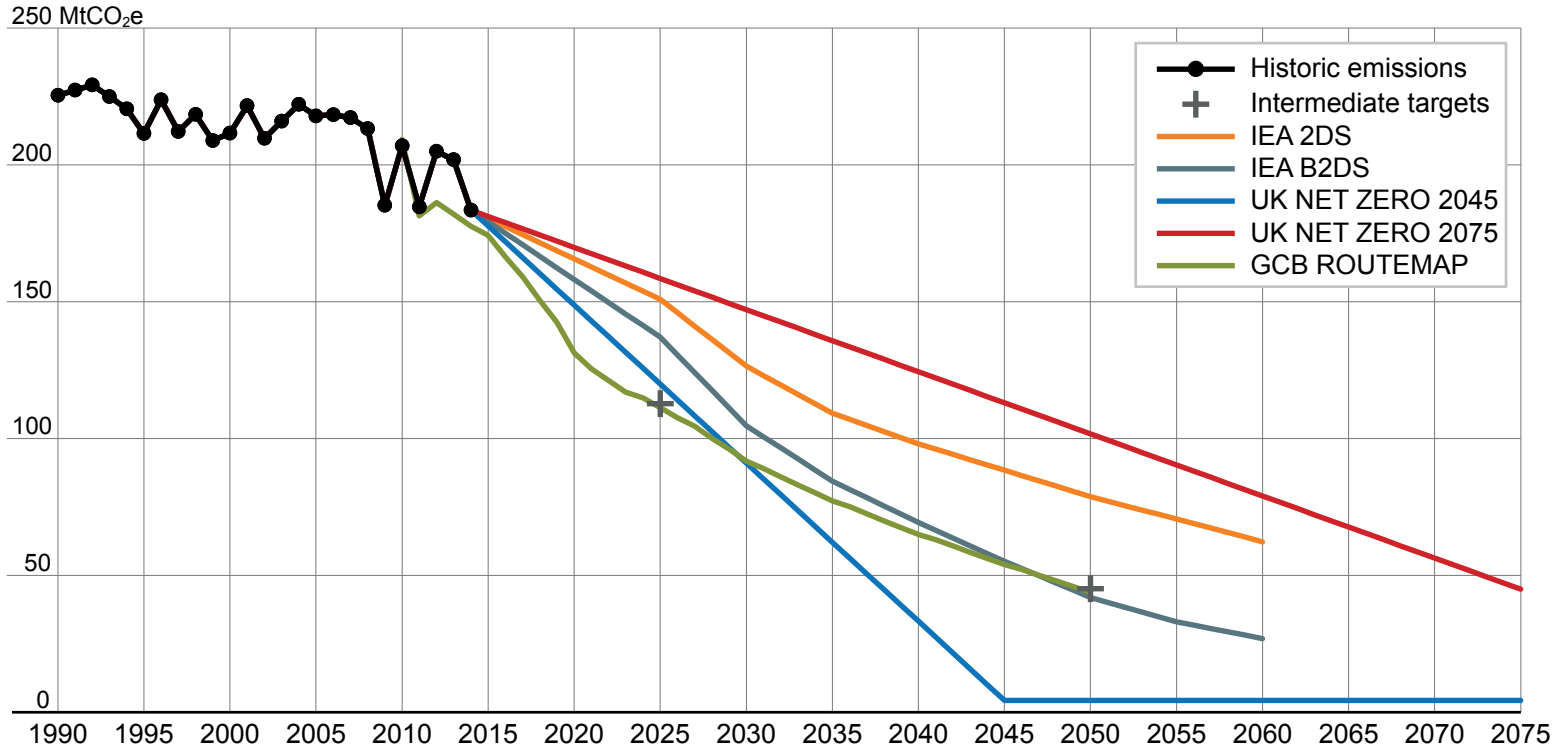

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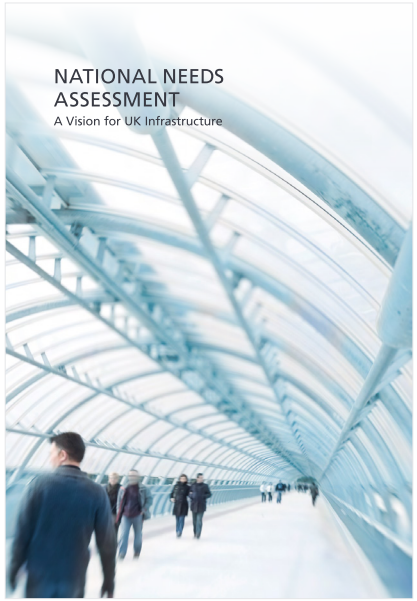
Figure from Giesekam et al. (2018) Aligning carbon targets for construction with (inter)national climate change mitigation commitments

Infrastructure requirements

Several initiatives to understand infrastructure requirements, including detailed system of systems modeling - but not yet integrated with building stock models and routemap



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HM Treasury (2013) Infrastructure Carbon Review. Atkins, ICE & ITRC (2016) National Needs Assessment. National Infrastructure Commission (2019) National Infrastructure Assessment

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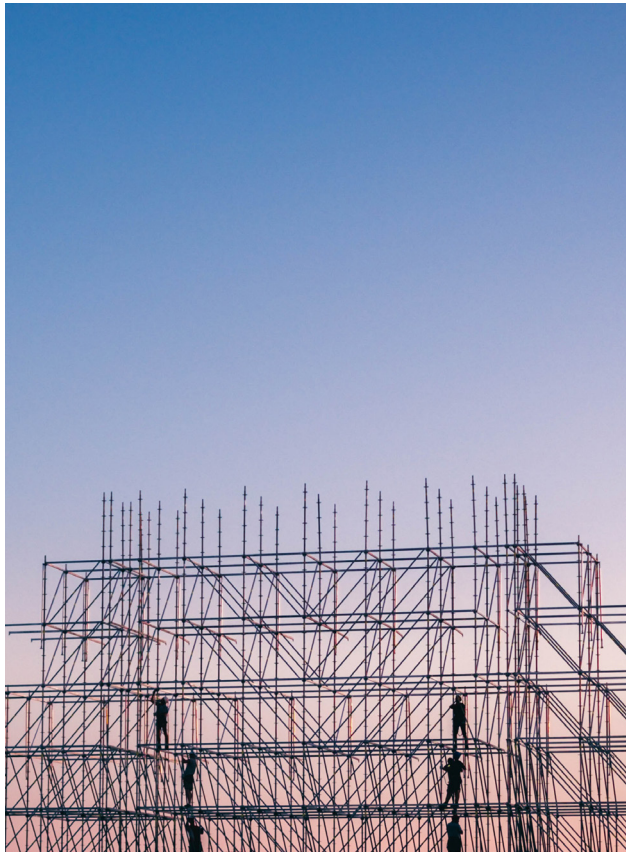
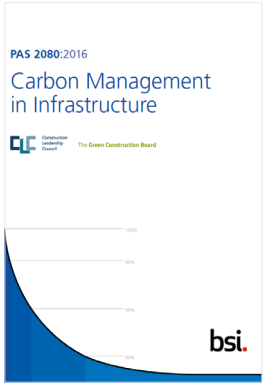
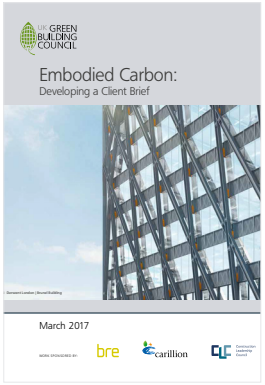
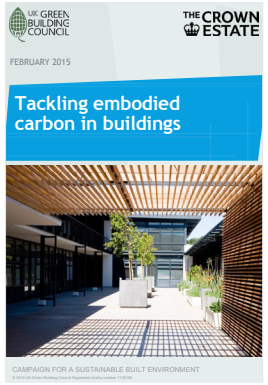
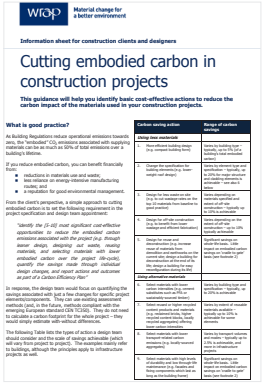


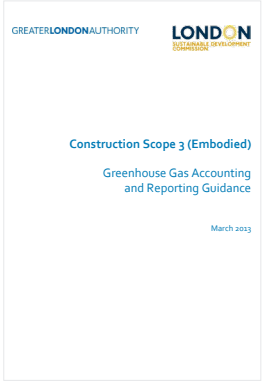
UK guidance & standards

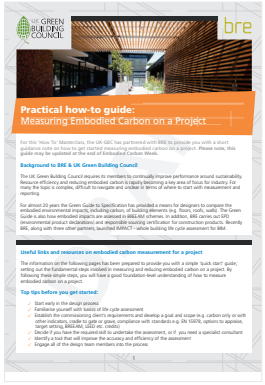


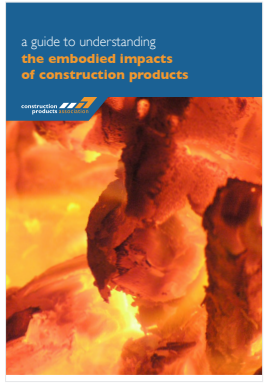












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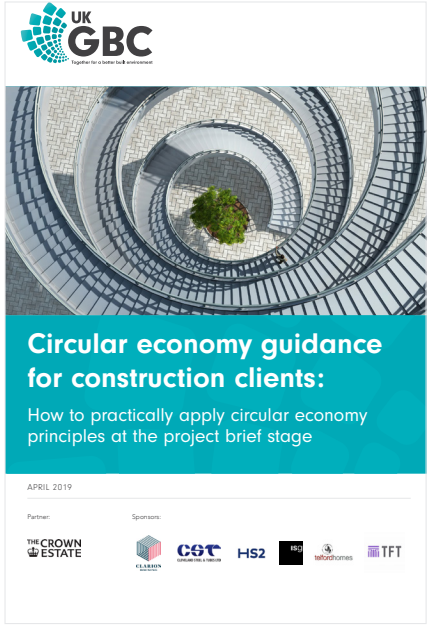
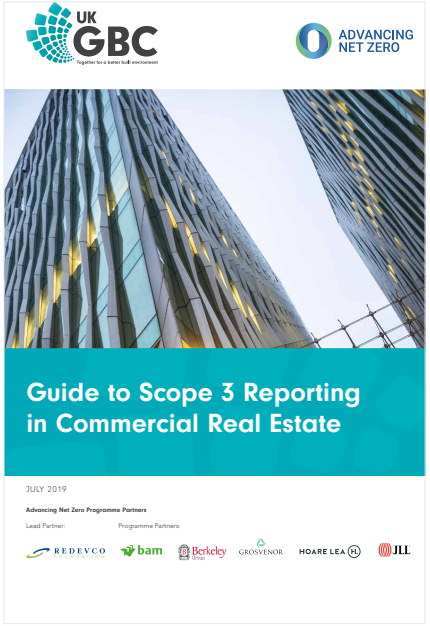
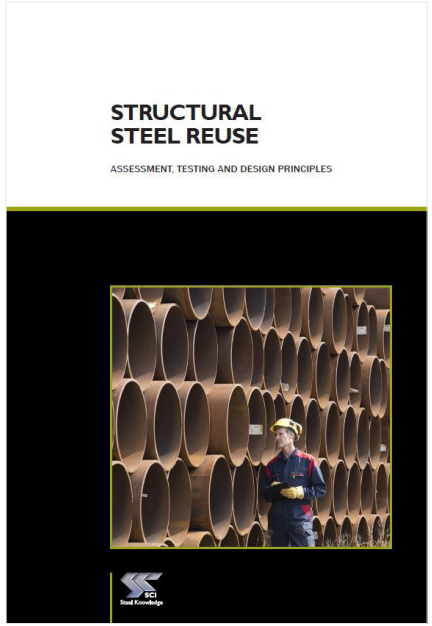
RIBA (2018); RICS (2017); UKGBC (2015,2016,2017); GCB & CLC (2016); WRAP (2014); GLA(2013); CPA (2012)

Recent & upcoming guidance

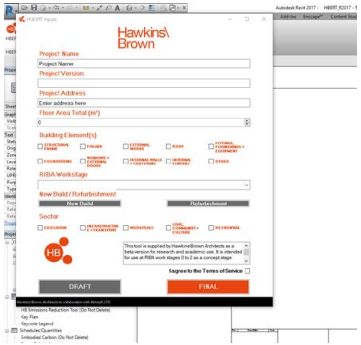






UKGBC (2019); SCI (2019); WGBC (2019); LETI (in draft - planned for early 2020)

Tools



ICE database v3 launched in May 2019

download for free at circularecology.com/embodied-energy-and-carbon-footprint-database.html

H\B:ERT Revit-based tool for visualising embodied carbon

download for free at hawkinsbrown.com/services/hbert

ECCOLAB web based integrated cost, carbon & energy assessment

currently commercial beta - more information at rapiere.net

Numerous bespoke carbon calculators (e.g. RSSB Rail Carbon Tool; Environment Agency's ERIC Carbon Planning Tool; Highways England Carbon Emissions Calculator)

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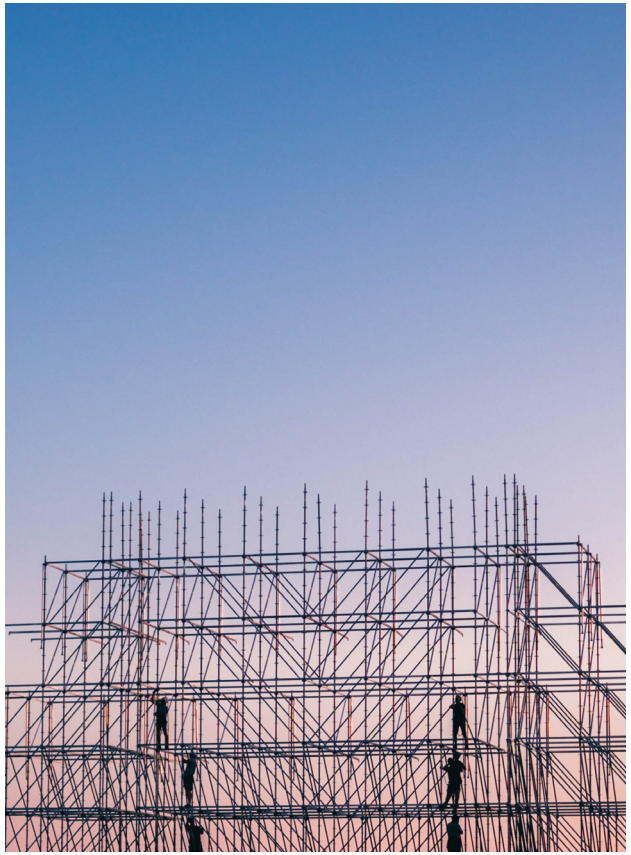
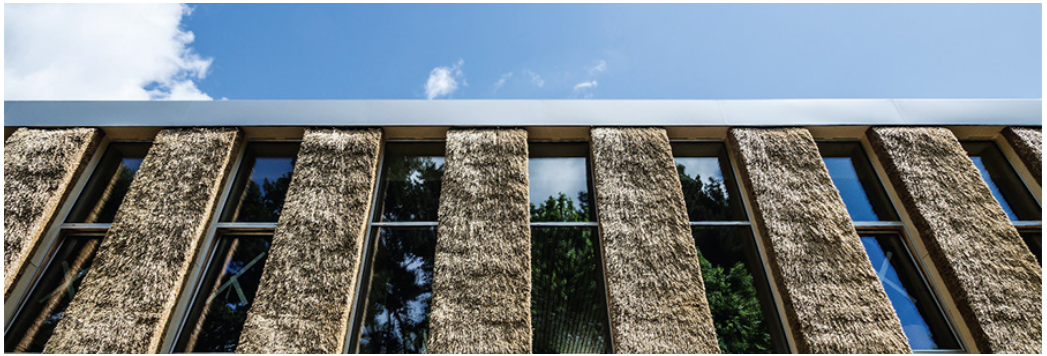


Project carbon targets

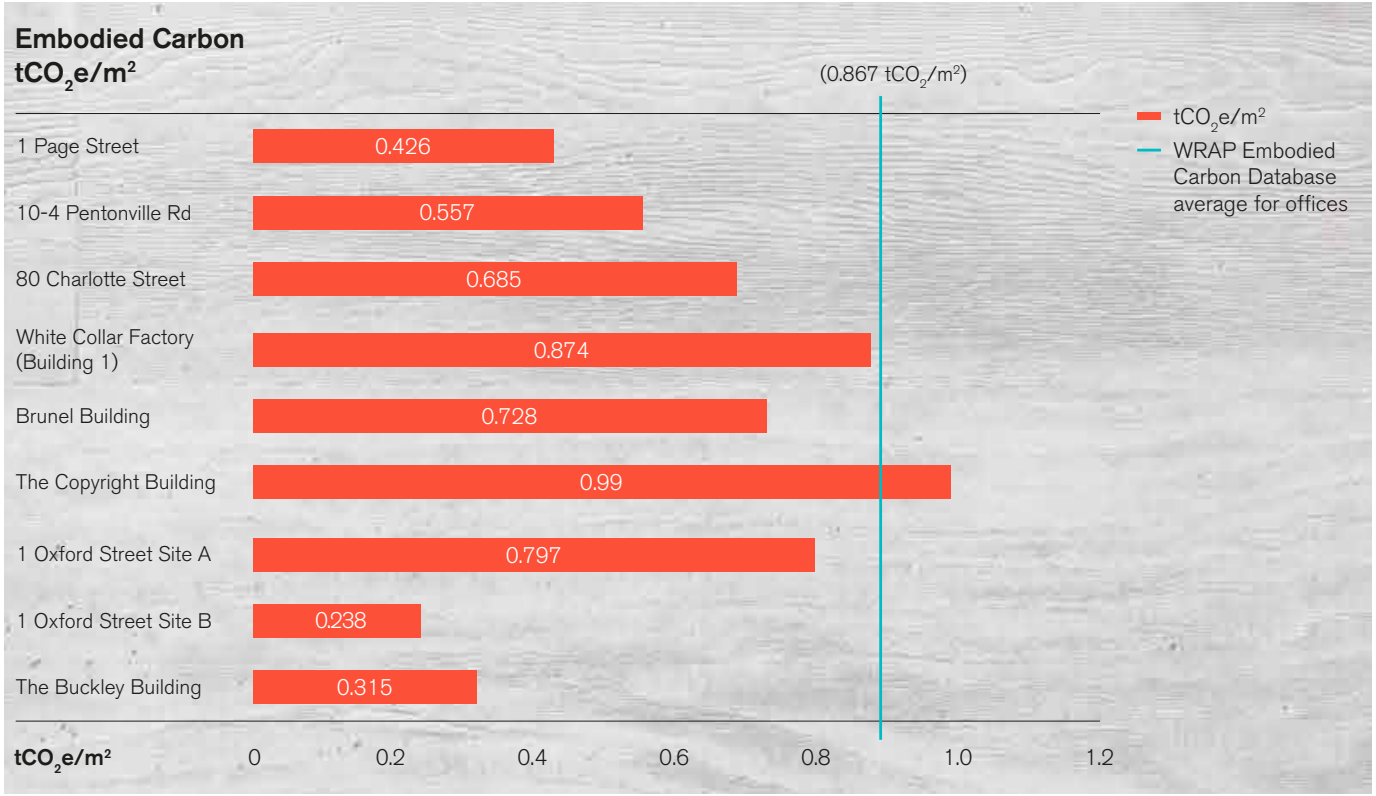
Client set ambitious targets which drove exploration of novel material options *e.g. development of thatch cassette cladding*

Ultimately delivered embodied carbon of 193kgCO_2/m² compared with benchmark of 845kgCO_2/m²

3 years of post occupancy monitoring showed better than predicted operational performance



Developers voluntarily benchmarking embodied carbon



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See Derwent London resources at:
www.derwentlondon.com/sustainability/performance/carbon-footprint

Requirements included in development briefs

Such as:

Assessment boundaries & metrics
e.g. Cradle-to-completion, tCO_2e

Reporting requirements
e.g. use of RICS 2017 PS

Preferred design options
e.g. rapidly renewable materials like timber

Emission intensity targets
e.g. 900 $kgCO_2/m^2$

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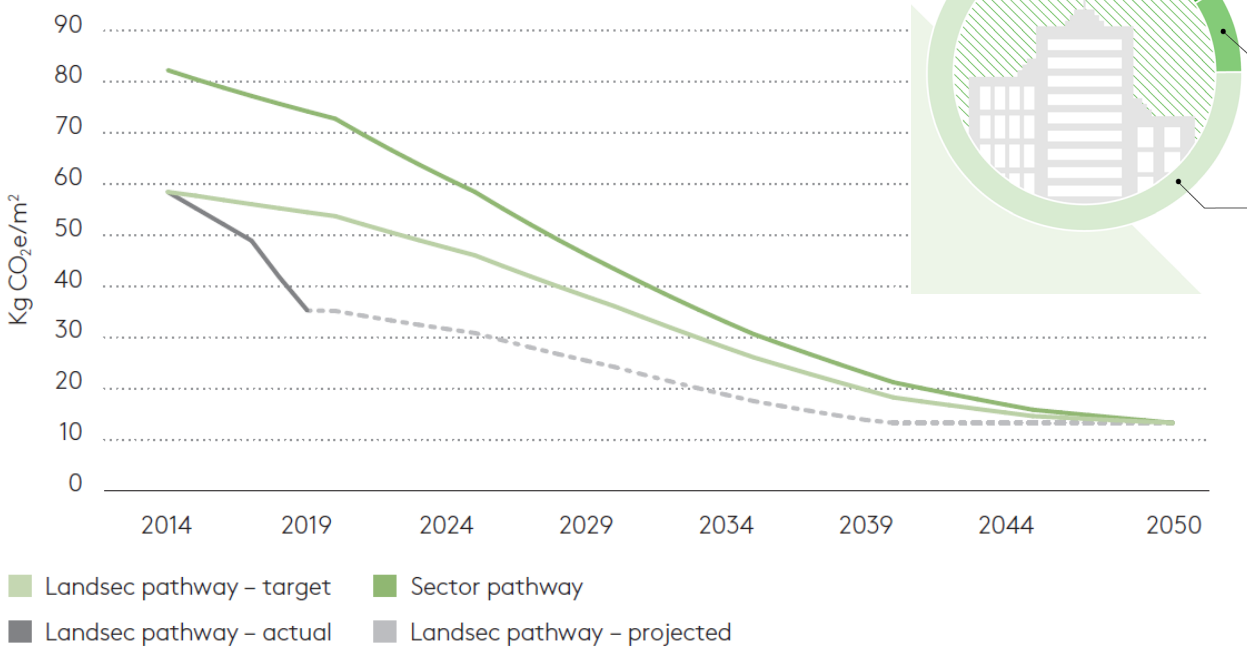
landsec.com/sites/default/files/2018-02/SGP_Landsec_Sustainability_Brief.pdf &
www.derwentlondon.com/sustainability/performance/carbon-footprint

Reducing carbon in line with Science Based Targets

Landsec carbon emissions intensity pathway



Scope 1 emissions

4%

Direct emissions from activities controlled by us

Scope 2 emissions

9%

Indirect emissions associated with our consumption of purchased energy

Scope 3 emissions

87%

Indirect emissions which are caused by our activities but not controlled by us

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See Landsec performance at: landsec.com/sustainability

Construction activities accounted for ~28% of total emissions last year

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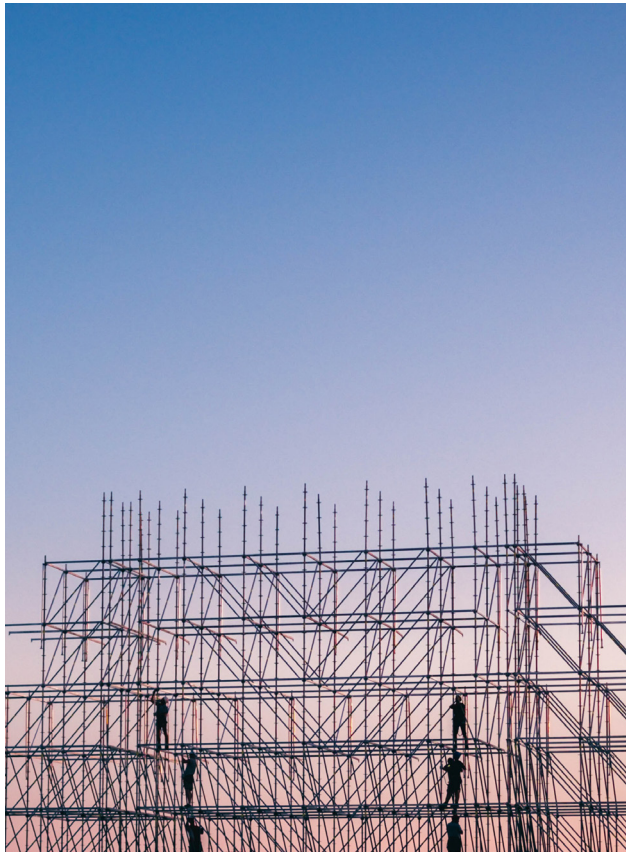
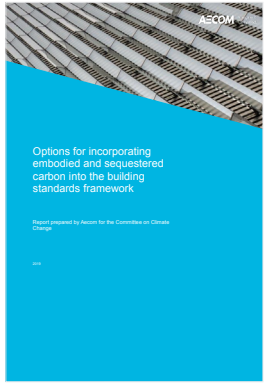


CCC: new UK policy is necessary

*"Ministry for Housing, Communities and Local Government should develop **new policies to support** a substantial increase in the use of **wood in construction**"*

*"**A new mechanism** is needed to incentivise and drive **whole-life carbon savings** for new buildings. This should cover embodied emissions and carbon sequestration."*

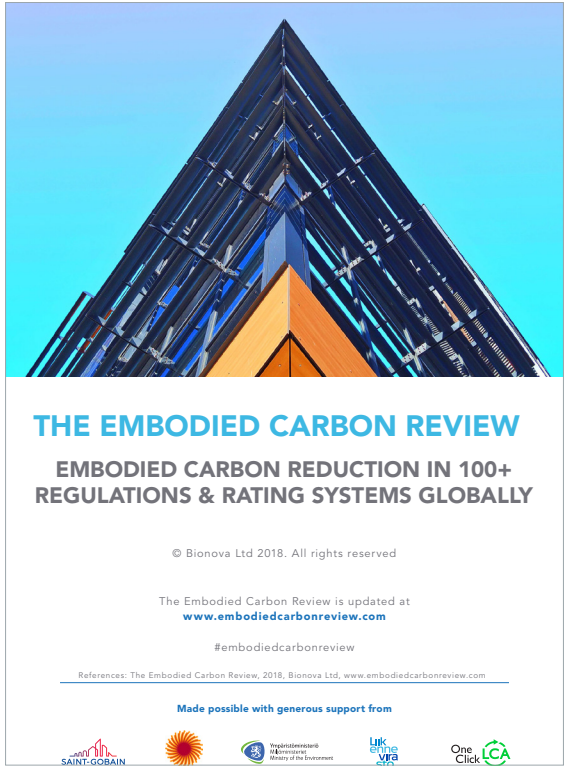


International precedents

105 systems with direct measures for embodied carbon (69% are voluntary certification systems, 14% regulations, 12% standards and 7% guidelines)

Local systems in 26 countries + 19 international systems available for adoption globally

Number of systems has more than doubled in last 5 years



Options

Prescription of specific design options
(e.g. timber first)

Assessment plus qualitative statements
(e.g. quantify whole life emissions & demonstrate design choices to achieve reductions)

Environmental performance-based requirements
(e.g. must be <500 kgCO_2/m² to practical completion)

Dalston Lane in London - 121 apartments in CLT - credit: Daniel Shearing

Draft London Plan

August 2018 revisions include:

New Policy SI2 DB: *"Development proposals referable to the Mayor should* ***calculate whole life-cycle carbon emissions*** *through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions."*

This is expanded upon in new 9.2.9A section and included in the energy strategy requirements.

Contract recently awarded for design of policy detail

New Greater Manchester Spatial Framework

GMSF 2019 draft includes:

Policy GM-S 2: "*An expectation that new development will be* ***net zero carbon from 2028****"* & all developments will *"****include a carbon assessment*** *to demonstrate how the design and layout of the development sought to* ***maximize reductions in whole life*** CO_2 *equivalent carbon emissions*"

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GMCA (2019) Greater Manchester Spatial Framework Revised Draft - January 2019
Image from Sue Langford: https://www.flickr.com/photos/sue_langford

Bristol One City Plan

Includes ambitions that:

By 2025: "*standard practice for major developments in Bristol to be **carbon neutral**"*

By 2030: "*standard practice that major developments in Bristol are **net carbon negative**"*

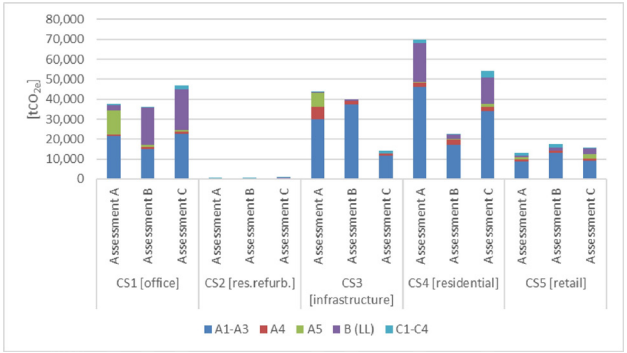
Bristol City Council (2019) Bristol One City Plan
Image from FLH: https://www.flickr.com/photos/french_landscape_hunter/

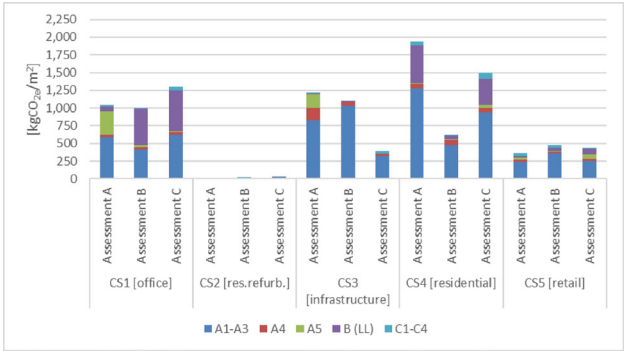
Barriers

National: lack of political awareness & support; political aversion to prescriptive options narrows solution space; lack of cross-departmental collaboration; failure to recognise policy synergies

Local: limited knowledge & resources; lack of legal clarity; start-up costs

Across all scales: availability & quality of data; inconsistencies in interpretation of standards; perceived additional costs





Example of 3 different LCA practitioners ariving at substantially different results for the same set of case studies using same project info, from Pomponi et al. (2019) doi: 10.1016/j.enbuild.2018.02.052

Enablers

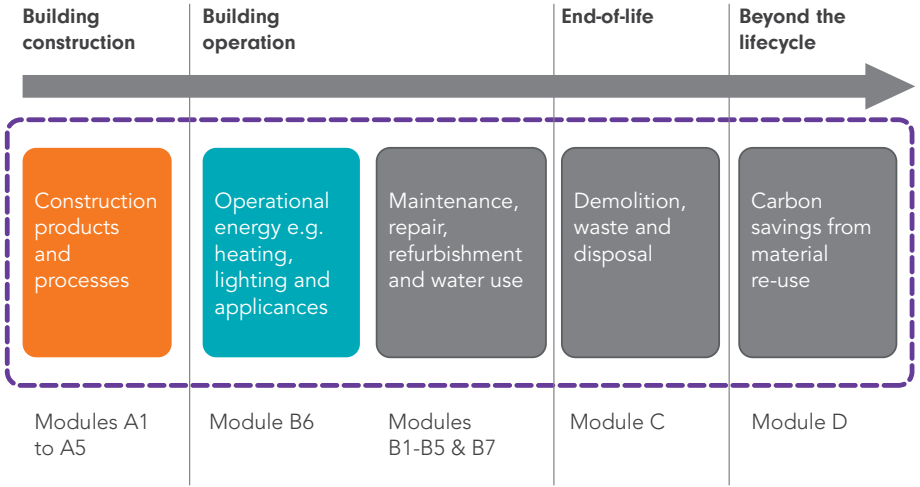
Common resources
(e.g. databases, tools, methodologies, guidance)

Platforms for collaboration & knowledge-sharing
(e.g. GBC programmes, living labs)

Targeted support for development/testing
(e.g. funding for leading local authorities, HAs)

Integration with established reporting
(e.g. company reporting, city carbon budgets)

UKGBC Net Zero Framework

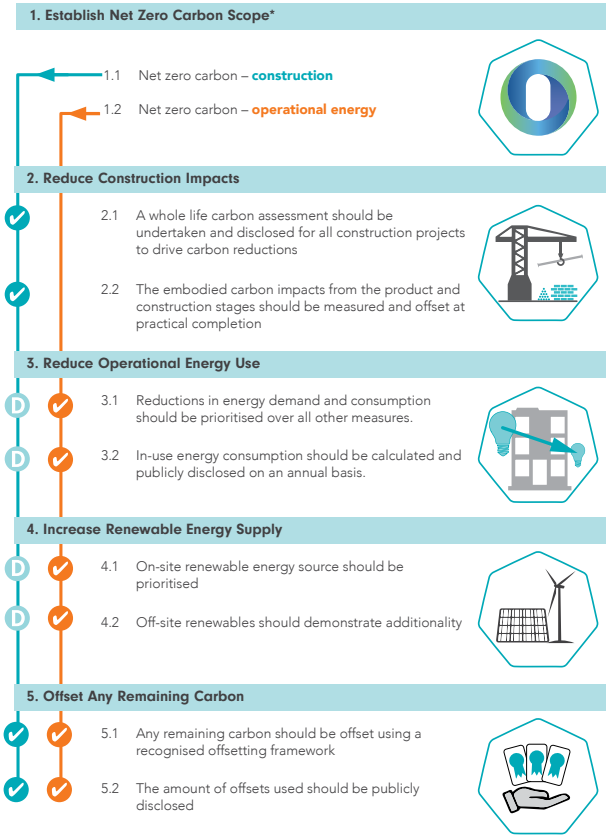


All Modules referred to are from EN15978 Sustainability of construction works – Assessment of environmental performance of buildings – Calculation method

Net Zero Carbon – Construction (1.1)

Net Zero Carbon – Operational Energy (1.2)

Net Zero Carbon – Whole Life (future development) (1.3)



D New buildings and major refurbishments targeting net zero carbon for construction should be designed to achieve net zero carbon for operational energy by considering these principles.

* Please also note, a further scope for net zero whole life carbon (1.3) will be developed in the future.

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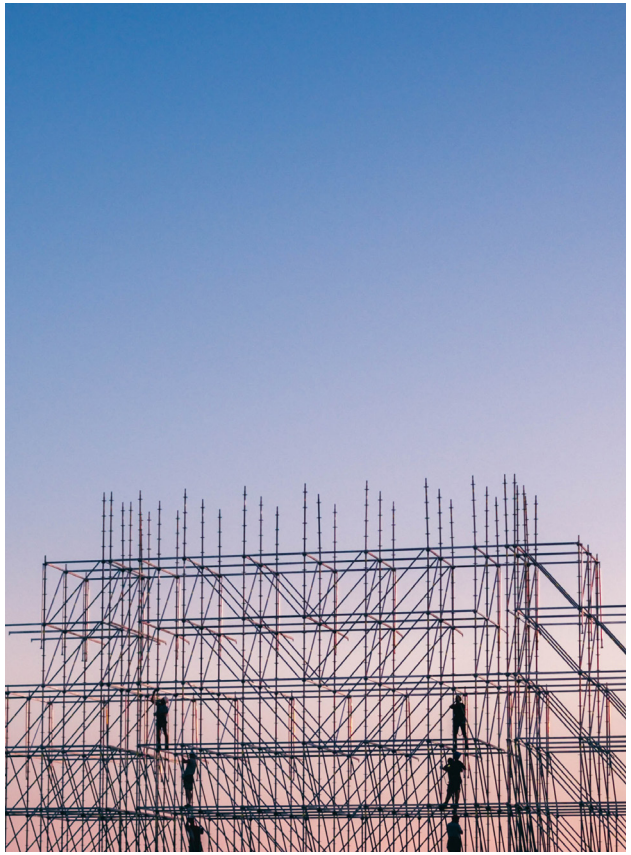


Summary

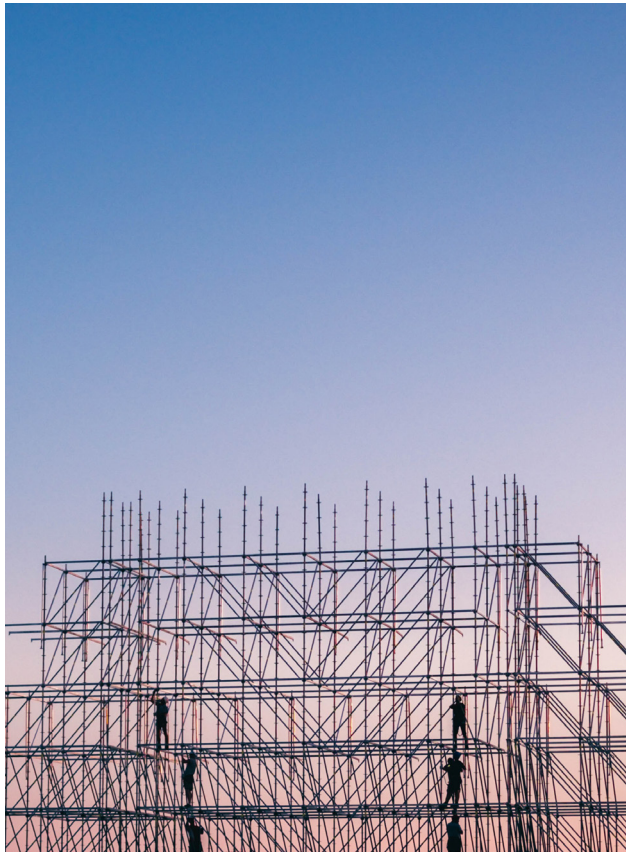
The UK has recently established ambitious national, sectoral & company decarbonisation targets

Targets supported by wide range of voluntary initiatives & commitments from across the industry

Growing body of guidance documents, standards & tools for reducing embodied carbon

But limited policy drivers, with developments in the short term led by local authorities rather than national policy makers

A coherent updated roadmap & action plan to support the sector's transition to net zero is urgently needed



CENTRE FOR RESEARCH INTO
ENERGY DEMAND SOLUTIONS

Thank you

Please get in touch with any queries

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slides available from **www.jannikgiesekam.co.uk**