University of Strathclyde Glasgow

Embodied carbon

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19.07.23

Embodied carbon

- Foundations
- Recent developments
- Where next?
- What should I be teaching?
- Q&A

Hands up if you've used this guidance

RICS professional statement

RICS®

RICS professional standards and guidance, UK

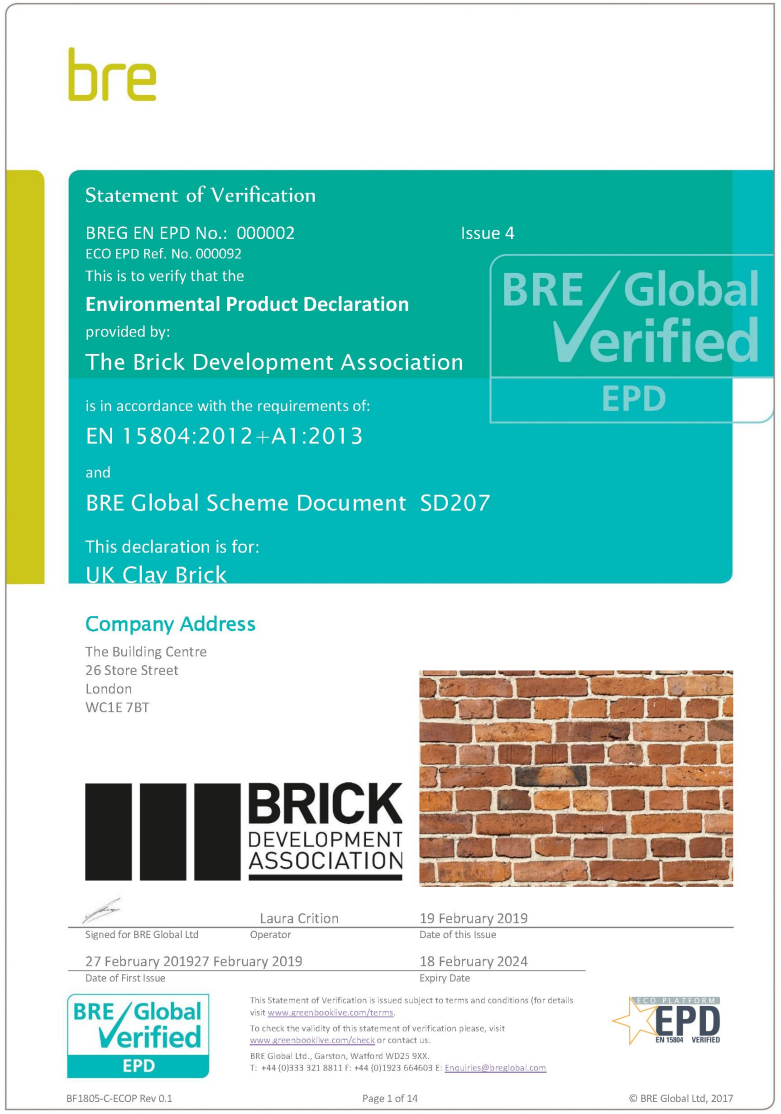
Whole life carbon assessment for the built environment

1st edition, November, 2017

rics.org/guidance

* Decarbonisation applicable - Report decarbonised values alongside non-decarbonised ones.	Global Warming Potential GWP (TCO_2e)																		
	Product stage					Construction process stage		Use stage							End of Life (EoL) stage				TOTAL* [A] to [C] cradle to grave	TOTAL* normalised [A] to [C] cradle to grave ($kgCO_2e/m^2$ or equivalent)	Benefits and loads beyond the system boundary [D]*
	Biogenic (sequestered) carbon	[A]						[B]							[C]						
Building element category		[A1]	[A2]	[A3]	[A4]	[A5]		[B1]	[B2]*	[B3]*	[B4]*	[B5]*	[B6]	[B7]	[C1]	[C2]	[C3]	[C4]			
0 Demolition prior to construction 0.1 Toxic/Hazardous/Contaminated Material Treatment 0.2 Major Demolition Works																					
0.3 Facilitating works 0.4 Temporary Support to Adjacent Structures 0.5 Specialist Ground Works 0.6 Temporary Diversion Works 0.7 Extraordinary Site Investigation																					
1 Substructure																					
2 Superstructure 2.1 Frame 2.2 Upper Floors 2.3 Roof 2.4 Stairs and Ramps																					
2 Superstructure 2.5 External Walls 2.6 Windows and External Doors																					
2 Superstructure 2.7 Internal Walls and Partitions 2.8 Internal Doors																					
3 Finishes																					
4 Fittings, furnishings & equipment															building-related items	building-related items	building-related items	building-related items	building-related items	building-related items	building-related items
5 Services (MEP)	building-related systems non building-related systems	building-related systems non building-related systems		building-related systems non building-related systems	building-related systems non building-related systems		building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems regulated building-related systems others non building-related systems		building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems	building-related systems non building-related systems
6 Prefabricated Buildings and Building Units																					
7 Work to Existing Building																					
8 External works																					
TOTAL																					
TOTAL - normalised ($kgCO_2e/m^2$ or equivalent unit to be stated)																					

Hands up if you use EPD like these



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Statement of Verification

BREG EN EPD No.: 000002 Issue 4

ECO EPD Ref. No. 000092

This is to verify that the

Environmental Product Declaration

provided by:

The Brick Development Association

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

UK Clay Brick

Company Address

The Building Centre
26 Store Street
London
WC1E 7BT

BRICK DEVELOPMENT ASSOCIATION

Laura Crition	19 February 2019
Signed for BRE Global Ltd — Operator	Date of this Issue
27 February 201927 February 2019	18 February 2024
Date of First Issue	Expiry Date

BRE Global Verified EPD

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ECO PLATFORM EPD EN 15804 VERIFIED

BF1805-C-ECOP Rev 0.1 Page 1 of 14 © BRE Global Ltd, 2017

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Statement of Verification

BREG EN EPD No.: 000311 Issue 02

This is to verify that the

Environmental Product Declaration

provided by:

Kingspan Insulation Ltd

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

BRE Global Scheme Document SD207

This declaration is for:

Kingspan Kooltherm K5 External Wallboard, Kingspan Kooltherm K20 Concrete Sandwich Board

Company Address

Kingspan Insulation Limited
Pembridge
Herefordshire
HR6 9LA

Fibre-free Core

Kingspan

Emma Baker	07 April 2022
Signed for BRE Global Ltd — Operator	Date of this Issue
21 January 2021	20 January 2026
Date of First Issue	Expiry Date

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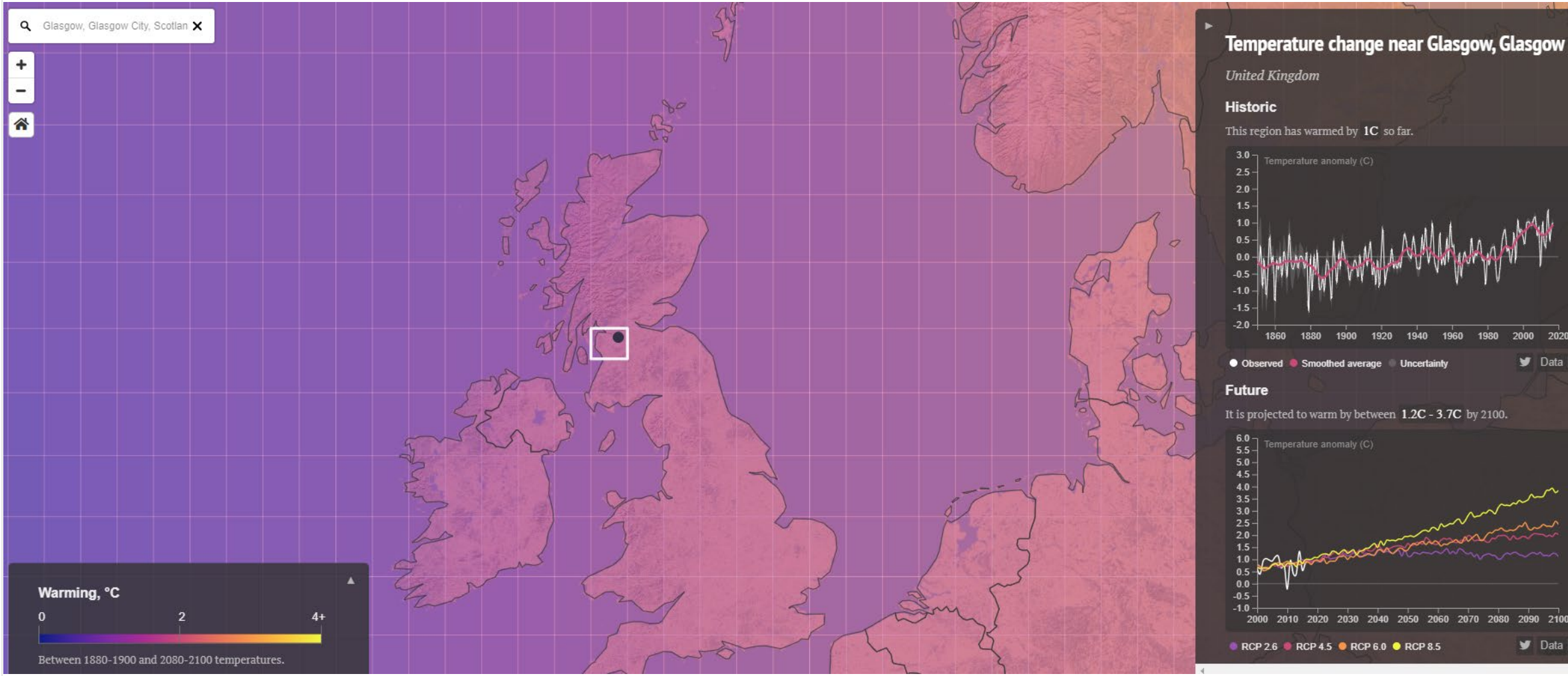
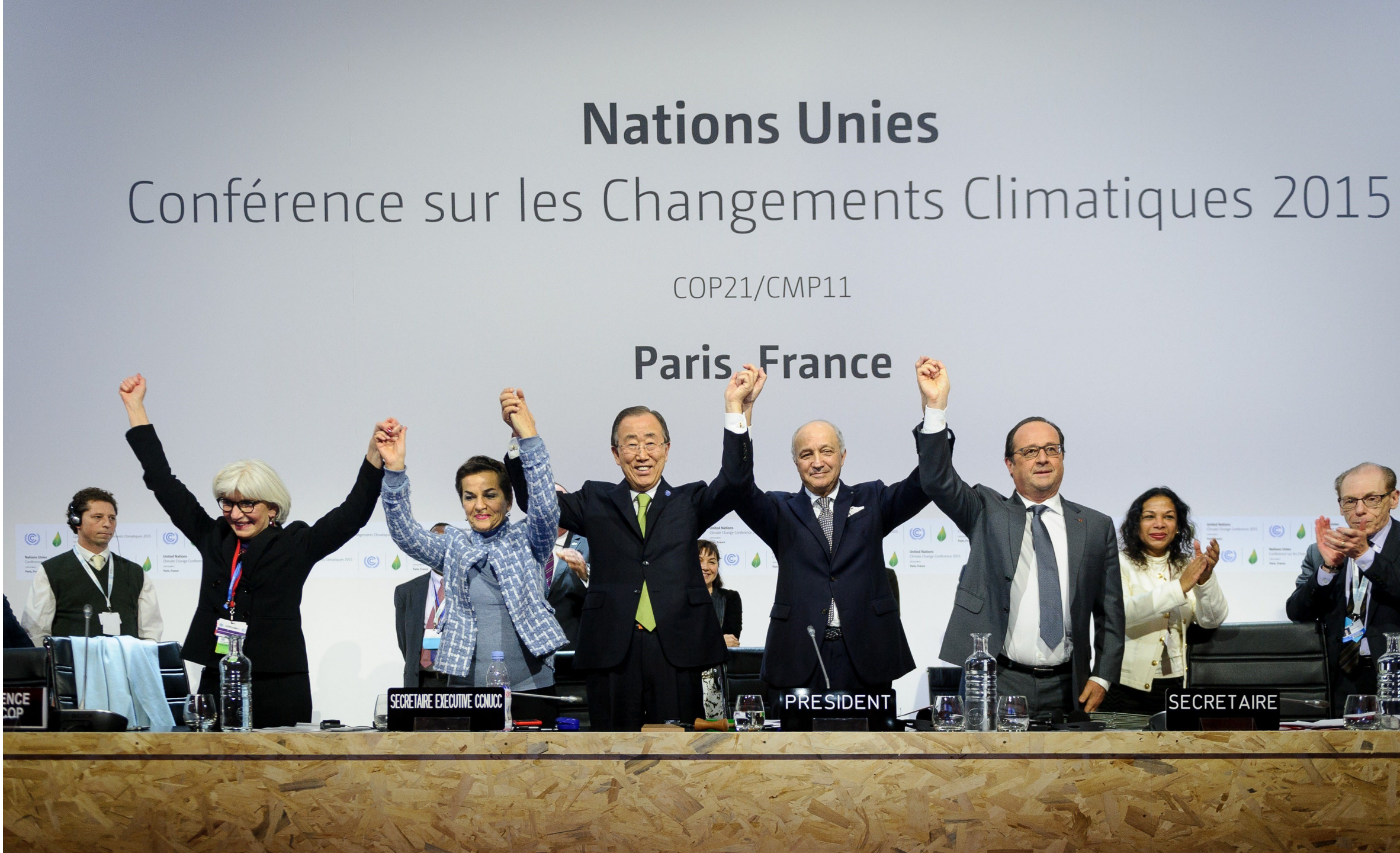
FOUNDATIONS

Climate change – already >1°C



Screenshot from Carbon Brief interactive depicting how an average surface temperature rise plays out differently across the globe

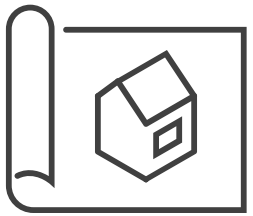

Nations Unies
Conférence sur les Changements Climatiques 2015
COP21/CMP11
Paris France
SECRETAIRE EXECUTIVE CCNUCC
PRESIDENT
SECRETAIRE

From Paris to projects...

International agreement

National policies

Sub-national requirements



Project implications

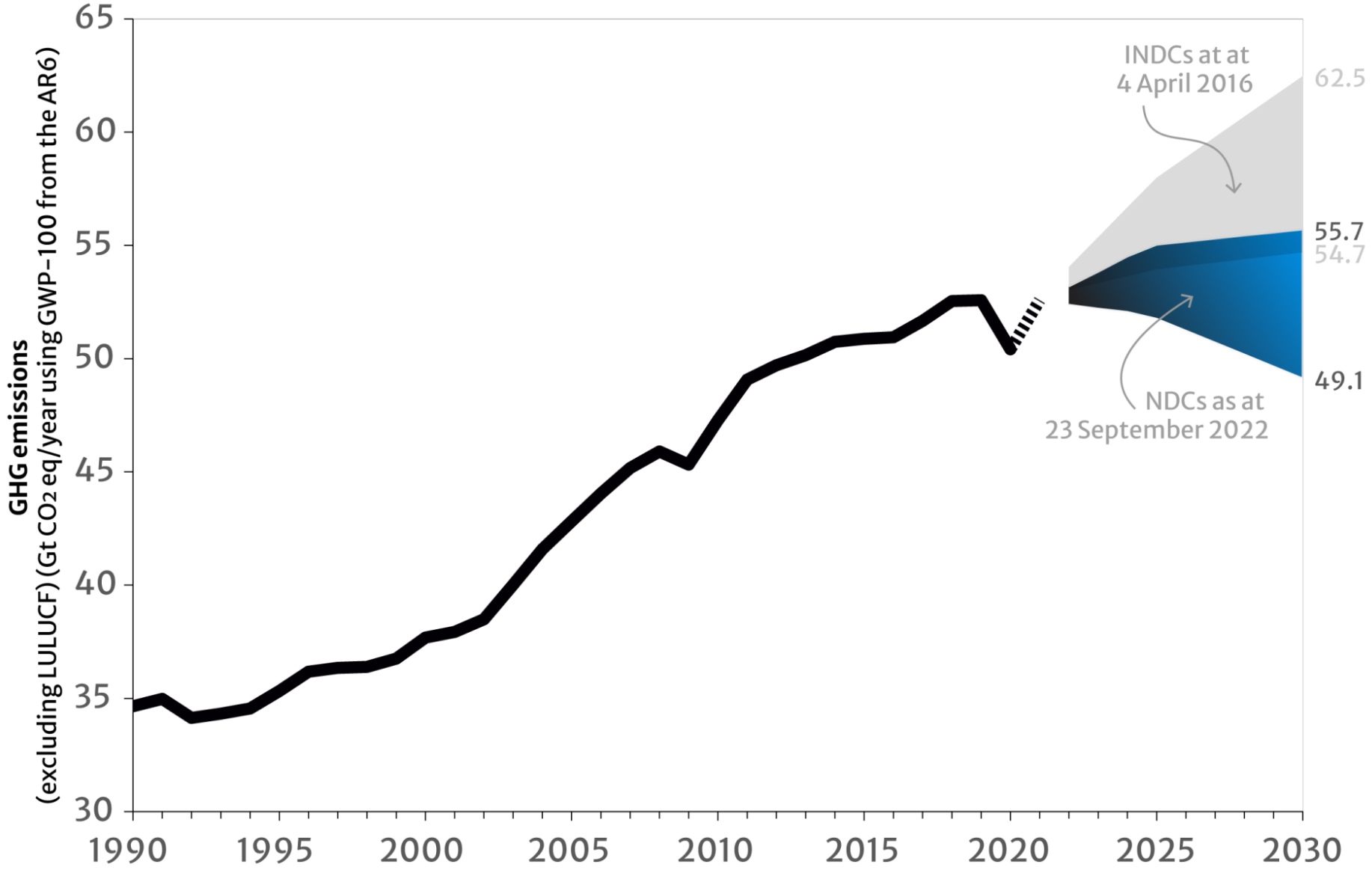
Corporate goals + voluntary standards

SCIENCE BASED TARGETS

UK Net Zero Carbon Buildings Standard

Icons from the Noun project (Andrei Yushchenko, Tom Walsh, Vectors Point & Randomhero)

Progress since Paris Agreement

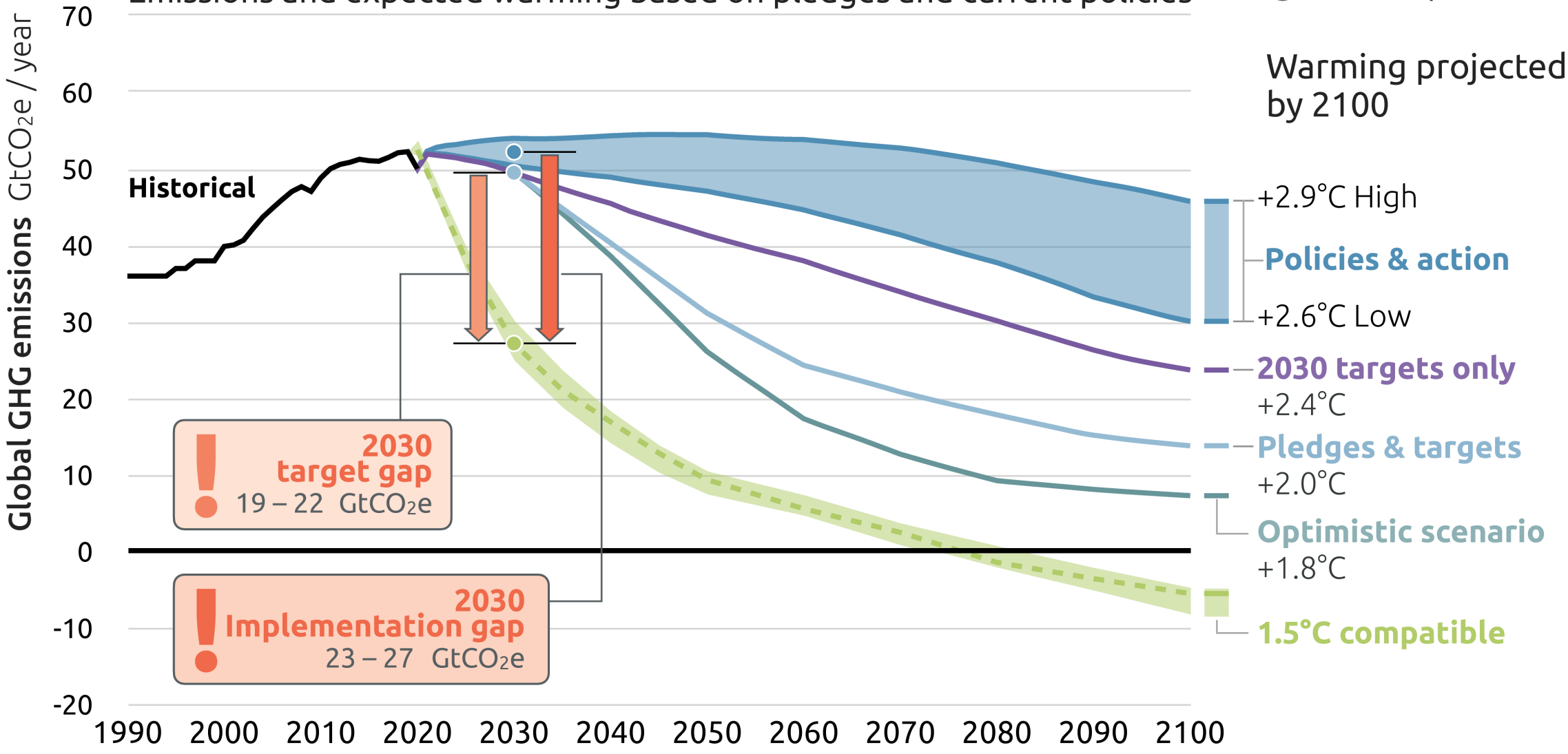


UNFCCC 2022 NDC Synthesis Report

2100 WARMING PROJECTIONS

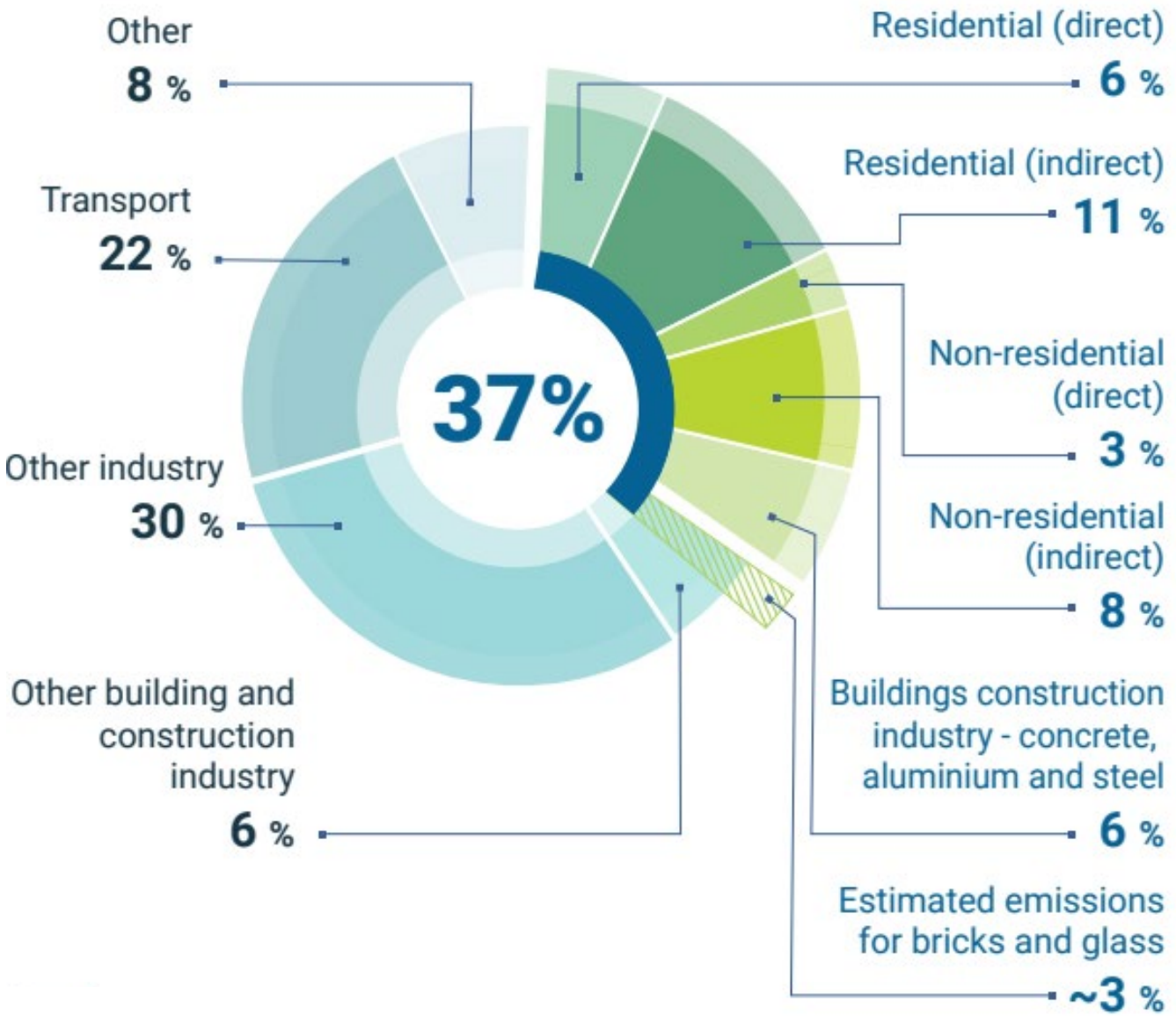
Emissions and expected warming based on pledges and current policies

Climate Action Tracker **Nov 2022** Update



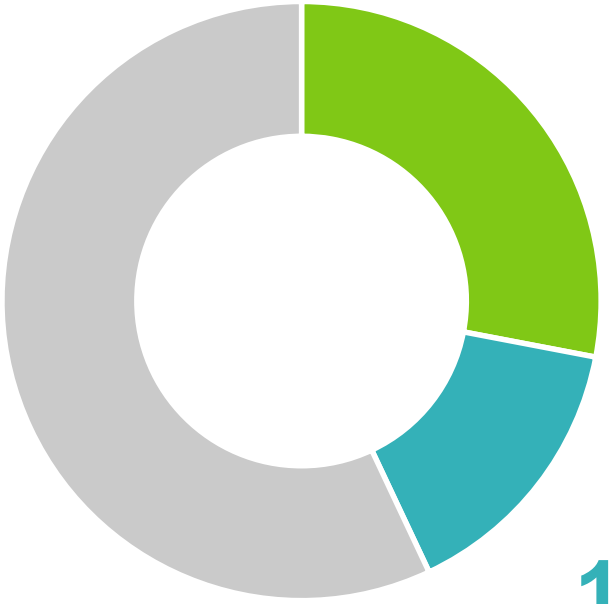
Climate Action Tracker (2022)

2021 global energy & process CO_2 emissions



UNEP/GABC 2022 Global Status Report

2021 global energy & process CO_2 emissions



Everything else 57%

28% Operational carbon

15% Embodied carbon

Adapted from UNEP/GABC 2022 Global Status Report

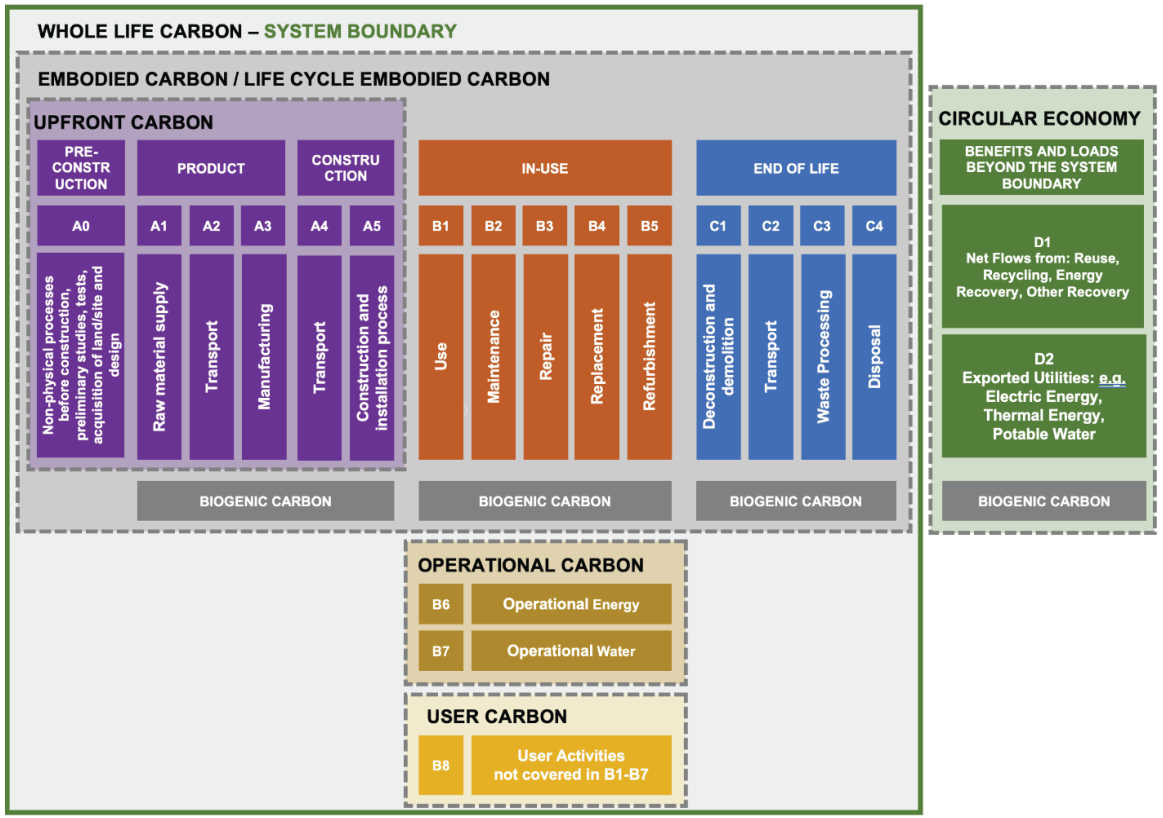
Improving Consistency in Whole Life Carbon Assessment and Reporting

Carbon Definitions for the Built Environment, Buildings & Infrastructure

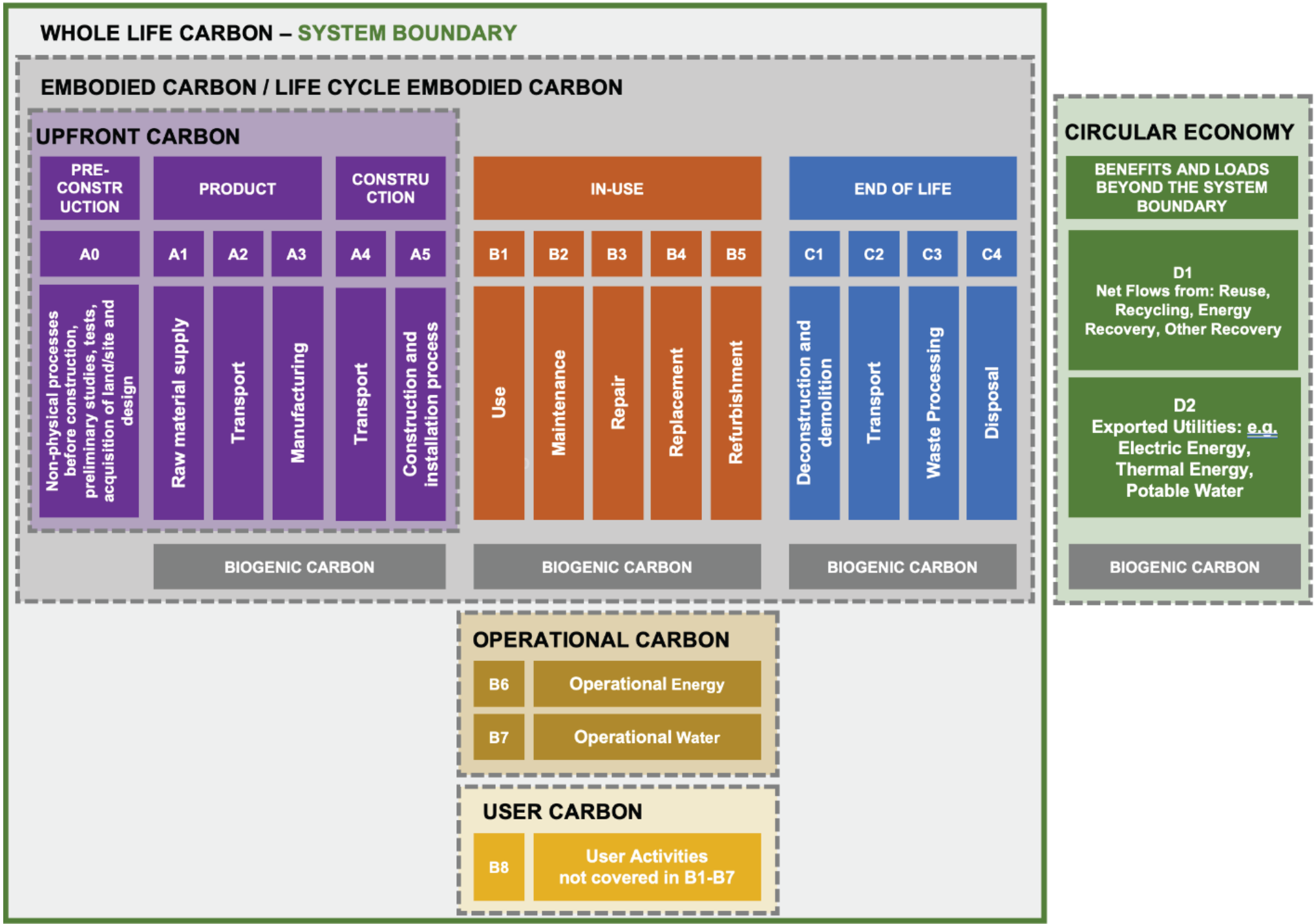
For inclusion in the update of the RICS Professional Statement: 'Whole life carbon assessment for the built environment'- 2023

January 2023

Definitions



WLCN et al. (2023) Carbon definitions for the built environment


WHOLE LIFE CARBON – SYSTEM BOUNDARY
EMBODIED CARBON / LIFE CYCLE EMBODIED CARBON
UPFRONT CARBON
PRE-CONSTRUCTION
PRODUCT
CONSTRUCTION
IN-USE
END OF LIFE
A0
A1
A2
A3
A4
A5
B1
B2
B3
B4
B5
C1
C2
C3
C4
Non-physical processes before construction, preliminary studies, tests, acquisition of land/site and design
Raw material supply
Transport
Manufacturing
Transport
Construction and installation process
Use
Maintenance
Repair
Replacement
Refurbishment
Deconstruction and demolition
Transport
Waste Processing
Disposal
BIOGENIC CARBON
BIOGENIC CARBON
BIOGENIC CARBON
OPERATIONAL CARBON
B6
Operational Energy
B7
Operational Water
USER CARBON
B8
User Activities not covered in B1-B7
CIRCULAR ECONOMY
BENEFITS AND LOADS BEYOND THE SYSTEM BOUNDARY
D1
Net Flows from: Reuse, Recycling, Energy Recovery, Other Recovery
D2
Exported Utilities: e.g. Electric Energy, Thermal Energy, Potable Water
BIOGENIC CARBON

UK Greenhouse Gas Emissions

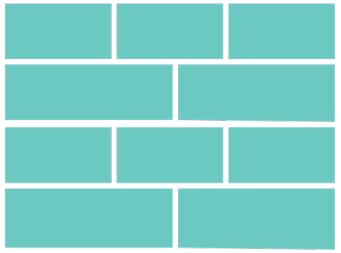
25%

Other sectors of UK economy

Whole-life carbon in the built environment

Embodied carbon

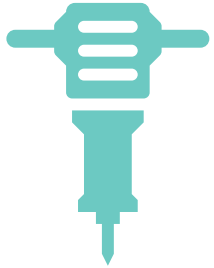
Products



Construction

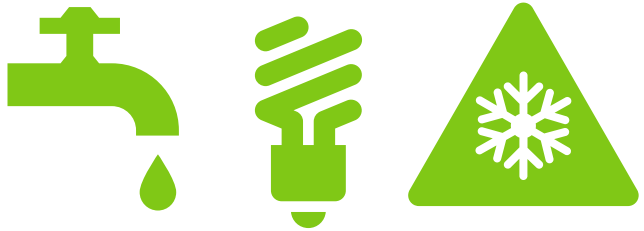
Maintenance

End-of-life

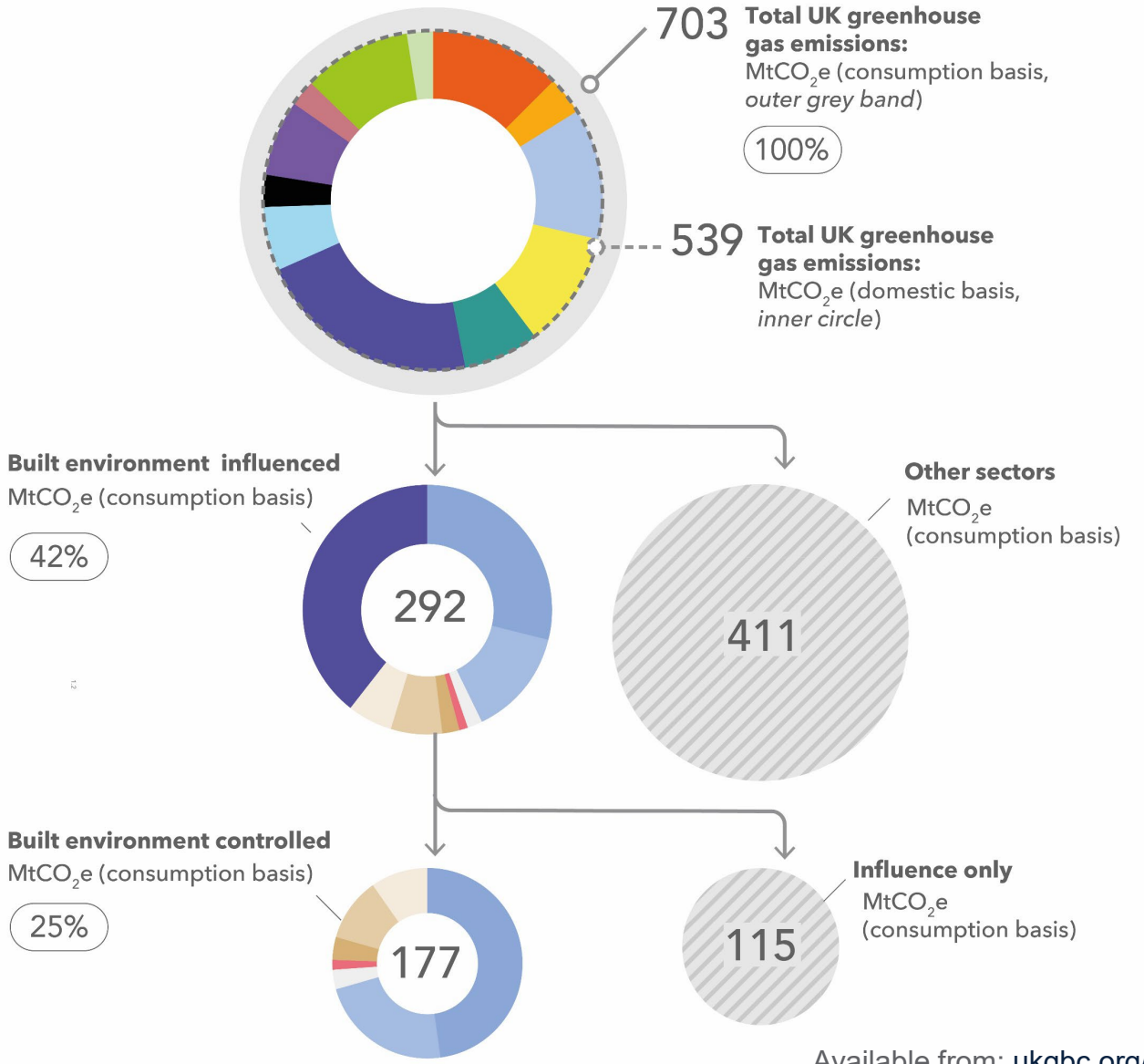


Operational carbon

Power, heating, cooling, water



Total UK GHG emissions (2018 CCC Data) showing proportion of Built Environment emissions



CCC SECTORS (TOP CIRCLE)

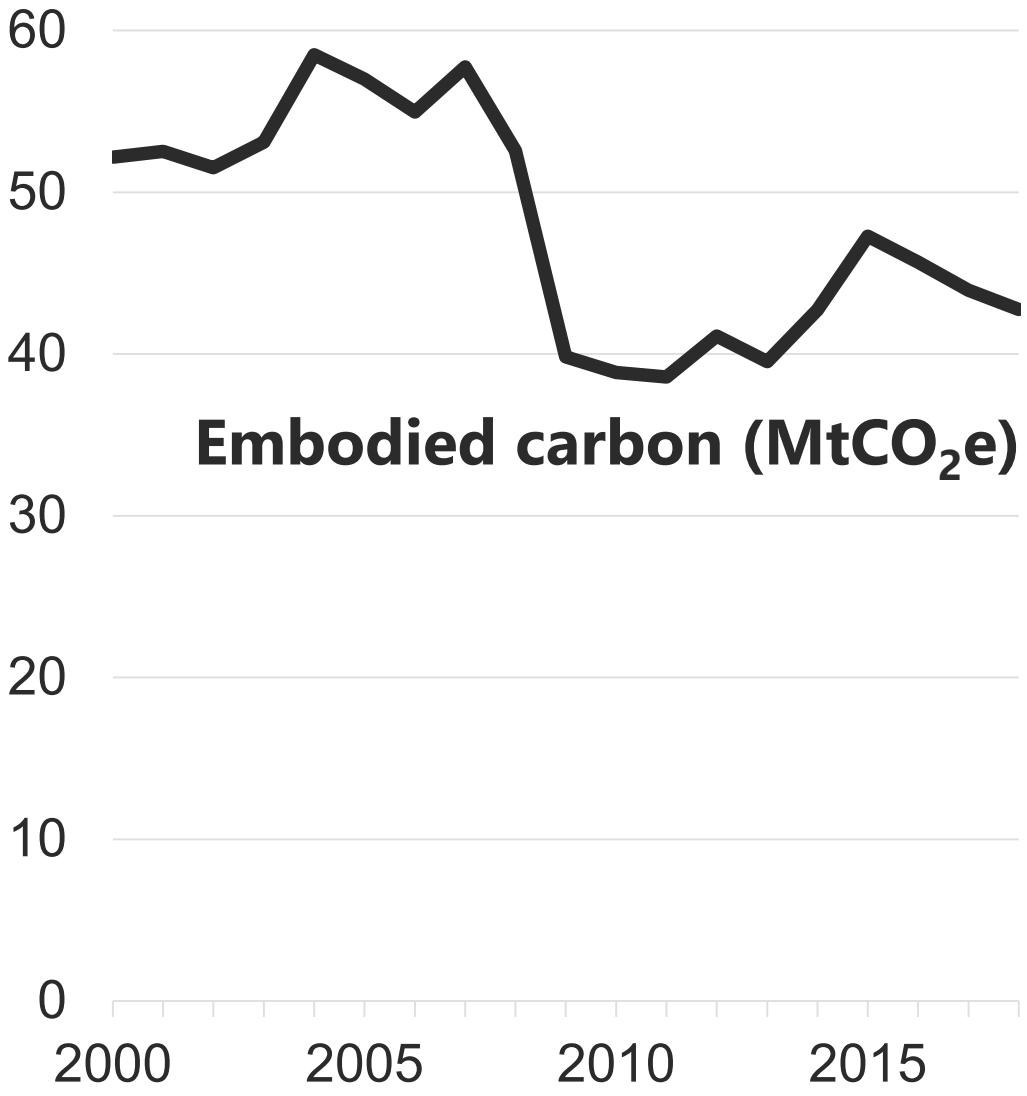
- Residential buildings
- Non-residential buildings
- Manufacturing & construction
- Electricity supply
- Fuel supply
- Surface transport
- Waste
- F-gases
- Aviation
- Shipping
- Agriculture
- Land Use, Land-Use Change & Forestry

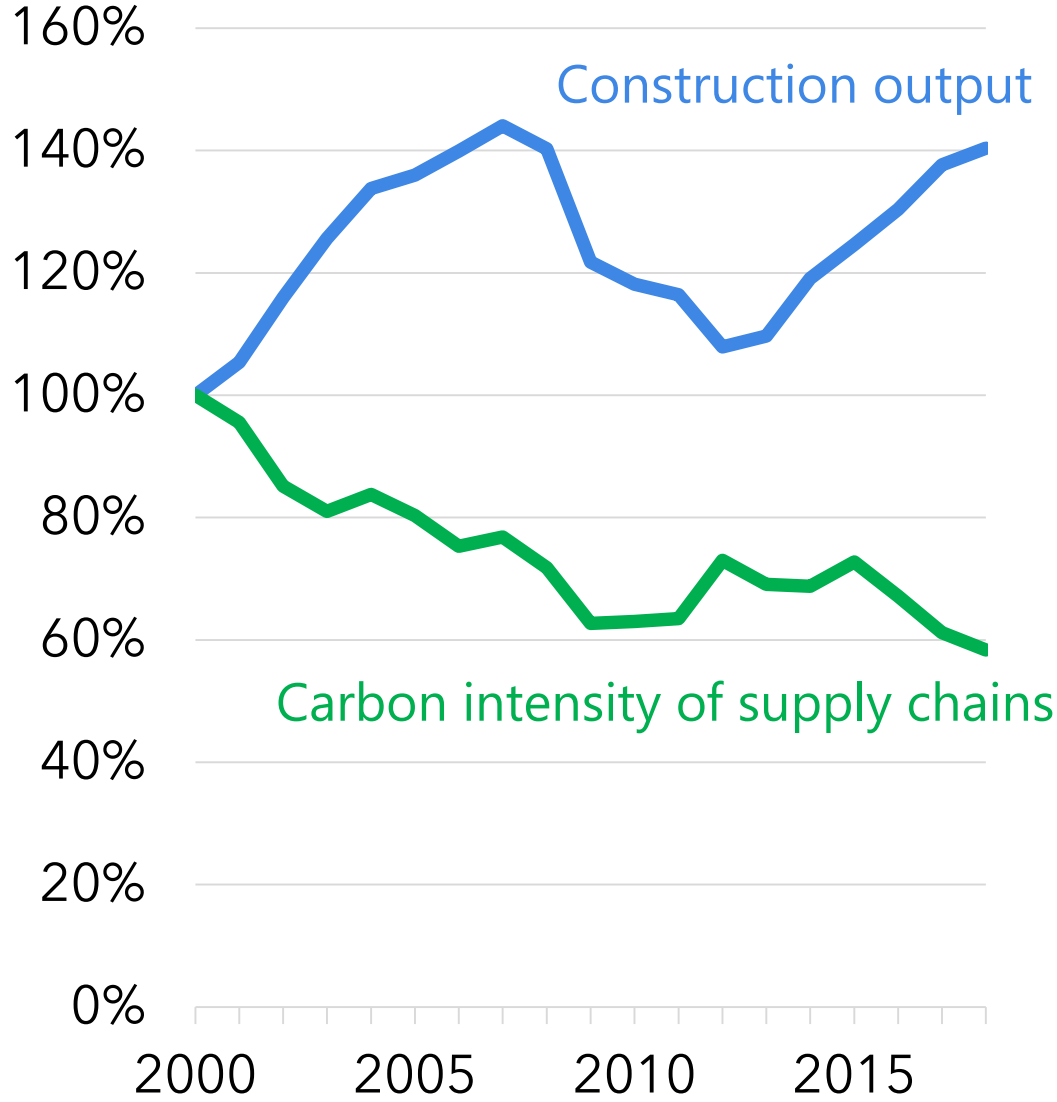
BUILT ENVIRONMENT SECTORS

- Buildings (Non Domestic) Embodied Carbon
- Buildings (Domestic) Embodied Carbon
- Infrastructure Embodied Carbon
- Infrastructure Operational carbon
- Buildings F-Gas
- Buildings (Non-domestic) Operational Carbon
- Buildings (Domestic) Operational Carbon
- Surface transport

Available from: ukgbc.org/ukgbc-work/net-zero-whole-life-roadmap-for-the-built-environment/

UK built environment





Net Zero Roadmap

Outlines a common vision & industry-wide actions for achieving net zero carbon in the construction, operation, & demolition of buildings & infrastructure in the UK.

Based on input from >100 stakeholders across industry

see ukgbc.org/ukgbc-work/net-zero-whole-life-roadmap-for-the-built-environment/

Net Zero Whole Life Carbon Roadmap

Summary for Policy-Makers

November 2021

Net Zero Whole Life Carbon Roadmap

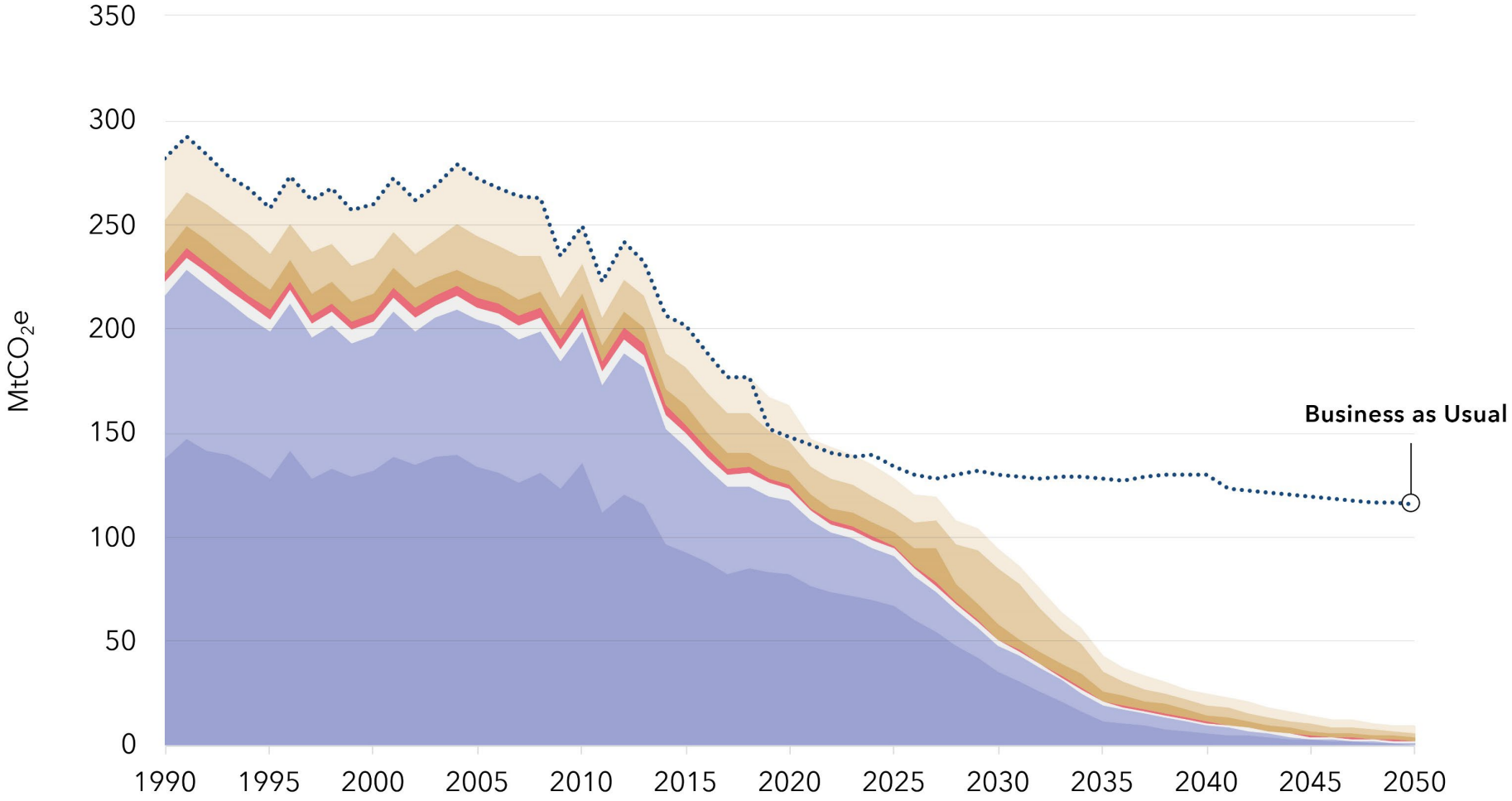
Technical Report

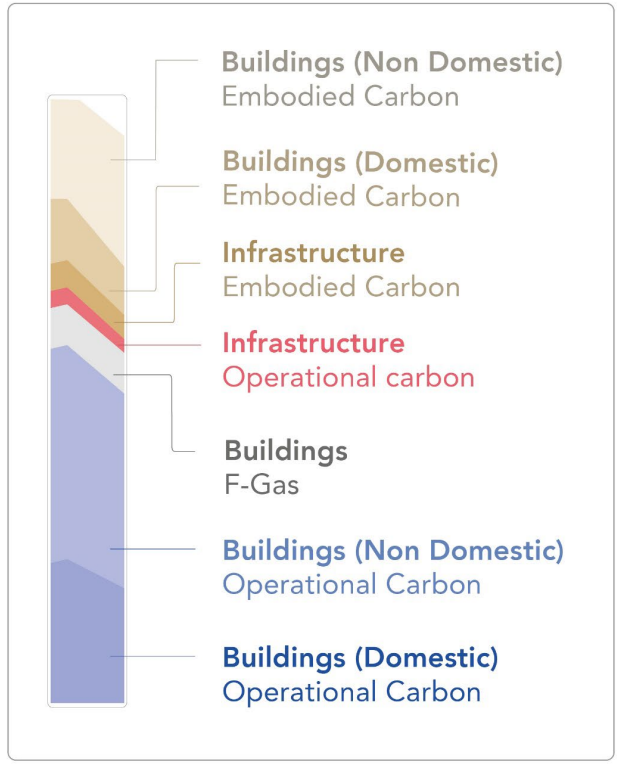
November 2021

Net Zero Whole Life Carbon Roadmap

Stakeholder Action Plans

UK Built Environment GHG Emissions 1990-2050





UK GBC

Available from: ukgbc.org/ukgbc-work/net-zero-whole-life-roadmap-for-the-built-environment/

Typical housing project split

Embodied carbon

Operational carbon

Current mass housebuilder designs that meet regs

46%

54%

Modern, low-energy design that meets FHS

72%

28%

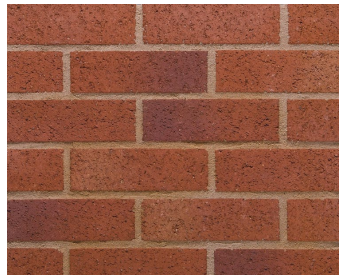
Unregulated

Regulated

Splits based on 2023 analysis of housebuilder designs from Future Homes Hub

Scale – buildings

1t | 10t | 100t | 1kt | 10kt | 100kt



4x brick pallets

~1 tCO2

At 232 kgCO_2e/t brick (A1-A5) from UK clay brick EPD

King's Cross Sports Hall

709 tCO_2e

2000m^2 facility, LETI B-rated for embodied carbon & sequesters 638 tCO_2

5 Broadgate

46,324 tCO_2e

13 storeys, 65,300m^2 of office space to practical completion

Landsec

Development Pipeline

209,051 tCO_2e

Forecasted total embodied carbon in 2021 Sustainability Report

Scale – infrastructure

10 kt | 100 kt | 1 Mt | 10 Mt

M54-M6 Link Road
81,890 tCO2e
1.6 miles new road
2 new junctions
& some realignment

A14 extension
981,432 tCO2e
23 miles of upgrades
7 miles widening
new bypass
& local modifications

HS2
13.3 MtCO2e

Heathrow 3rd runway
3.6 MtCO2e

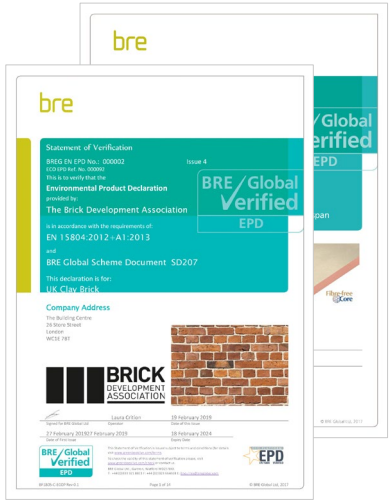
Basic calculation

$$\text{Embodied carbon } (kgCO_2e) = \sum_{\text{Sum for all materials}} \left(\text{Quantity (kg)} \times \text{Carbon factor } (kgCO_2e/kg) \right)$$

Typical assessment of a building

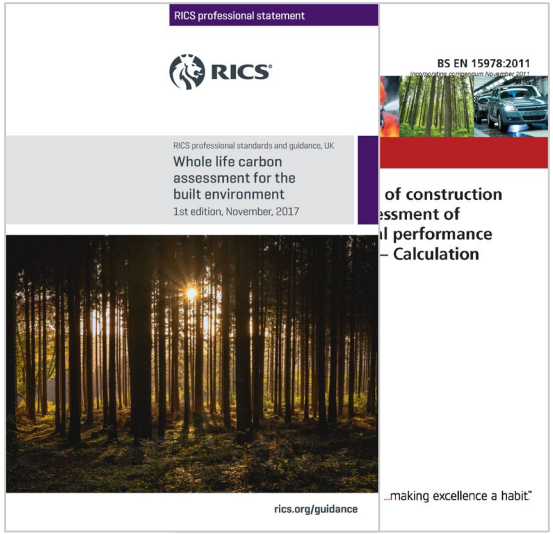
Material quantities
e.g. from building model or BoQ

+



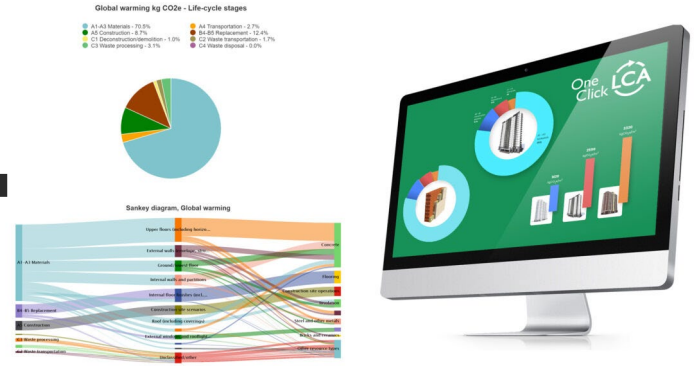
EPD or generic carbon factors

+



Assessment methodology
e.g. BS EN 15978 + RICS PS

+



Software/tool
e.g. OneClickLCA

What is an EPD?

- An Environmental Product Declaration provides environmental information from a LCA in a standardised format using a consistent methodology
- Based on standards (e.g. EN 15804) combined with Product Category Rules (PCR) and independently verified
- Basically LCA+PCR = EPD

See these introductory resources on EPD from the Alliance for Sustainable Building Products for further information

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Statement of Verification

BREG EN EPD No.: 000311 Issue 02

This is to verify that the

Environmental Product Declaration

provided by:

Kingspan Insulation Ltd

BRE Global Verified EPD

is in accordance with the requirements of:

EN 15804:2012+A1:2013

and

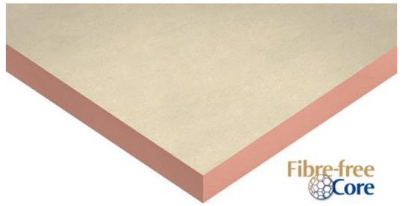
BRE Global Scheme Document SD207

This declaration is for:

Kingspan Kooltherm K5 External Wallboard, Kingspan Kooltherm K20 Concrete Sandwich Board

Company Address

Kingspan Insulation Limited
Pembridge
Herefordshire
HR6 9LA



Kingspan

Signed for BRE Global Ltd	Emma Baker Operator	07 April 2022 Date of this Issue
21 January 2021 Date of First Issue		20 January 2026 Expiry Date

BRE Global Verified EPD

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Environmental Product Declaration

EPD Number: 000311

General Information

EPD Programme Operator	Applicable Product Category Rules
BRE Global Watford, Herts WD25 9XX United Kingdom	BRE Environmental Profiles 2013 Product Category Rules for Type III environmental product declaration of construction products to EN 15804:2012+A1:2013
Commissioner of LCA study	**LCA consultant/Tool**
Kingspan Insulation Limited Pembridge Herefordshire HR6 9LA	BRE LINA Tool v2.07
Declared Unit	**Applicability/Coverage**
1m² of insulation at a thickness that gives an R-value of 2.857m².K/W (60mm)	Product Specific
EPD Type	**Background database**
Cradle to Gate with options	Ecoinvent 3.2

Demonstration of Verification
CEN standard EN 15804 serves as the core PCR [a]
Independent verification of the declaration and data according to EN ISO 14025:2010 ☐Internal ☒ External
(Where appropriate [b])Third party verifier: Nigel Jones
a: Product category rules b: Optional for business-to-business communication; mandatory for business-to-consumer communication (see EN ISO 14025:2010, 9.4)

Comparability
Environmental product declarations from different programmes may not be comparable if not compliant with EN 15804:2012+A1:2013. Comparability is further dependent on the specific product category rules, system boundaries and allocations, and background data sources. See Clause 5.3 of EN 15804:2012+A1:2013 for further guidance

Main Product Contents

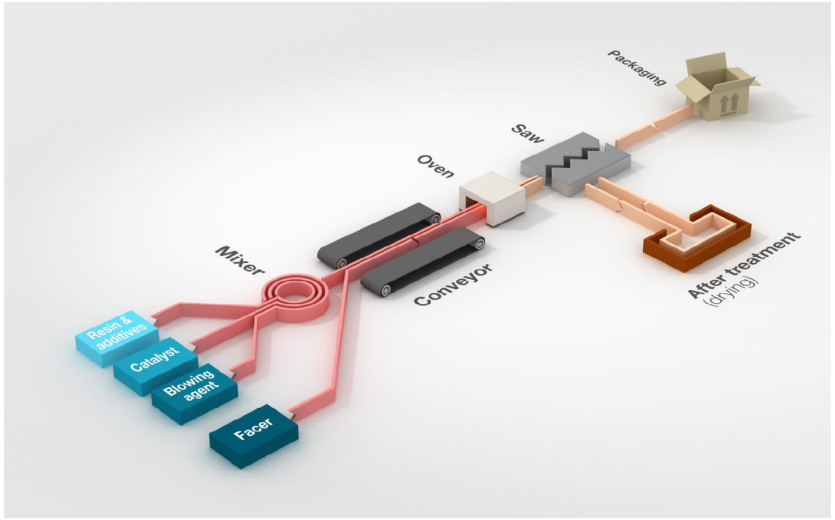
Material/Chemical Input	%
Rigid thermoset fibre free phenolic insulation core	89%
Glass tissue facer	11%

**Average percentages applicable for 1m^2 of insulation at thickness that gives an R-value of 2.857m^{2}K/W*

Manufacturing Process

Kingspan Kooltherm is made through a manufacturing process in which a foam forms an insulating core between two facing elements. At the start of the process a mix of chemicals is added directly to the bottom layer of facing and then expands to meet the top layer of facing. As it dries, the foam becomes tacky and adheres itself to the facing, top and bottom. Once it has reached the necessary thickness the foam is cooked under pressure. It is then moved onto a secondary oven to cure and harden, becoming bright pink in colour. The insulation boards are then cut into the necessary sizes, packaged and sent to the loading bay for collection.

Process flow diagram



Construction Installation

The product will be installed in wall applications using standard construction techniques.

Use Information

The product will be left alone after installation, and there are no known associated environmental impacts.

End of Life

The insulation will be removed for disposal when the building reaches the end of its life.

Life Cycle Assessment Calculation Rules

Declared unit description

1m^2 of insulation at a thickness that gives an R-value of 2.857m^2.K/W (60mm)

System boundary

Cradle to gate with options: Modules A1-3, A4, A5, C2, C3 and C4.
The following processes are included in the A1-A3 production stage of Kooltherm: Manufacture of preliminary products (resin, blowing agent, additives). Transportation of raw materials and preliminary products to the manufacturing site. Manufacturing process on the production site including, energy, disposal of residual materials, water consumption and VOC emissions to air.
The following process is included within the A4 construction stage: Transportation of the product to the construction site.
The following processes are included in the A5 construction stage of Kooltherm: installation wastage rate, material wastes produced by installation.
The following processes are included in C2, C3 and C4 stage of Kooltherm: End of life scenarios: Transportation of waste from the construction site to the waste processing plant, incineration of waste processing operations for recovery, waste sent to landfill.

Data sources, quality and allocation

This EPD covers all Kooltherm K5 External Wall Board and K20 Concrete Sandwich Board manufactured at both the Pembridge and Castleblayney sites, representing 100% of production of these products in 2018 over all Kingspan production sites included in this EPD, and 0.7% of the total site output at the Pembridge site (168.5 tonnes) and 6.0% at the Castleblayney site (808.51 tonnes).

A profile for the Kooltherm foam was created separately as this covered a range of Kooltherm products. The profile included all the impacts from the manufacture of the product, including all the data for the following sections: 'ancillary materials', 'packaging', 'fuel/energy', 'water', 'emissions to air, water and soil', 'production waste, 'other waste' and 'water discharged'. Allocation of these factors to the products was achieved by using a proportion of the total Kooltherm foam output. The foam profile was then used as an input for this (and other) end-product profiles.

Secondary data has been drawn from the BRE LINA database v2.0.64 and the background LCI datasets are based on Ecoinvent v3.2.

Cut-off criteria

No inputs or outputs have been excluded. All raw materials, packaging materials, associated transport to the manufacturing site, and from the manufacturing site to the building site, process energy, water use, direct production waste, installations waste and emissions are included.

Scenarios and additional technical information

Scenarios and additional technical information			
Scenario	**Parameter**	**Units**	**Results**
A4 – Transport to the building site	Description of scenario		
	Fuel type / Vehicle type	Litre of fuel type per distance or vehicle type	Lorry >32 metric tons
	Distance	km	523
	Capacity utilisation (incl. empty returns)	%	86
	Bulk density of transported products	kg/m^3	35
A5 – Installation in the building	Description of scenario		
	Installation wastage rate	% of product	2
	Installation waste sent to landfill	kg	0.042
C1 to C4 End of life,	Description of scenario		
	Transport type	Vehicle type	Lorry >32 metric tons
	Distance	km	523
	Crushing and compacting of waste into briquettes	MJ	9.48e-8
	Waste for energy recovery	kg	1.87
	Waste to landfill	kg	0.19

LCA Results

(MND = module not declared; MNR = module not relevant; INA = indicator not assessed; AGG = aggregated)

Parameters describing environmental impacts									
			GWP	ODP	AP	EP	POCP	ADPE	ADPF
			kg CO_2 equiv.	kg CFC 11 equiv.	kg SO_2 equiv.	kg $(PO_4)^{3-}$ equiv.	kg C_2H_4 equiv.	kg Sb equiv.	MJ, net calorific value.
Product stage	Raw material supply	A1	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Transport	A2	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Manufacturing	A3	AGG	AGG	AGG	AGG	AGG	AGG	AGG
	Total (of product stage)	A1-3	3.98e+0	4.83e-7	2.30e-2	5.14e-3	3.92e-3	3.07e-5	1.32e+2
Construction process stage	Transport	A4	1.00e-1	1.90e-8	3.43e-4	9.04e-5	7.10e-5	1.68e-7	1.56e+0
	Construction	A5	8.21e-2	1.02e-8	4.69e-4	1.06e-4	8.03e-5	6.19e-7	2.69e+0
Use stage	Use	B1	MND	MND	MND	MND	MND	MND	MND
	Maintenance	B2	MND	MND	MND	MND	MND	MND	MND
	Repair	B3	MND	MND	MND	MND	MND	MND	MND
	Replacement	B4	MND	MND	MND	MND	MND	MND	MND
	Refurbishment	B5	MND	MND	MND	MND	MND	MND	MND
	Operational energy use	B6	MND	MND	MND	MND	MND	MND	MND
	Operational water use	B7	MND	MND	MND	MND	MND	MND	MND
End of life	Deconstruction, demolition	C1	MND	MND	MND	MND	MND	MND	MND
	Transport	C2	1.00e-1	1.90e-8	3.43e-4	9.04e-5	7.10e-5	1.68e-7	1.56e+0
	Waste processing	C3	1.58e-8	1.02e-15	8.58e-11	1.97e-11	4.88e-12	1.91e-14	2.44e-7
	Disposal	C4	1.97e-3	5.18e-10	1.38e-5	4.52e-6	2.29e-6	1.79e-9	4.83e-2
Potential benefits and loads beyond the system boundaries	Reuse, recovery, recycling potential	D	MND	MND	MND	MND	MND	MND	MND

GWP = Global Warming Potential;
ODP = Ozone Depletion Potential;
AP = Acidification Potential for Soil and Water;
EP = Eutrophication Potential;
POCP = Formation potential of tropospheric Ozone;
ADPE = Abiotic Depletion Potential – Elements;
ADPF = Abiotic Depletion Potential – Fossil Fuels;

How might I use an EPD?

- Selecting a product (e.g. comparing two different suppliers)
- Comparing design options
- Meeting a reporting requirement of clients
- Supporting a marketing claim
- Integrating EPD into a larger assessment of a building or infrastructure asset

Calculation tools

One Click LCA

eTool
A Cerclos Product

The Structural Carbon Tool v2

FCBS CARBON

tally™

EC3

HB:ERT
Hawkins\Brown: Emission Reduction Tool

ZEBRA
Carbon and Energy Model

+ many more!

Click logos for the tools. The Carbon Leadership Forum also provide a good overview of most tools

RECENT DEVELOPMENTS

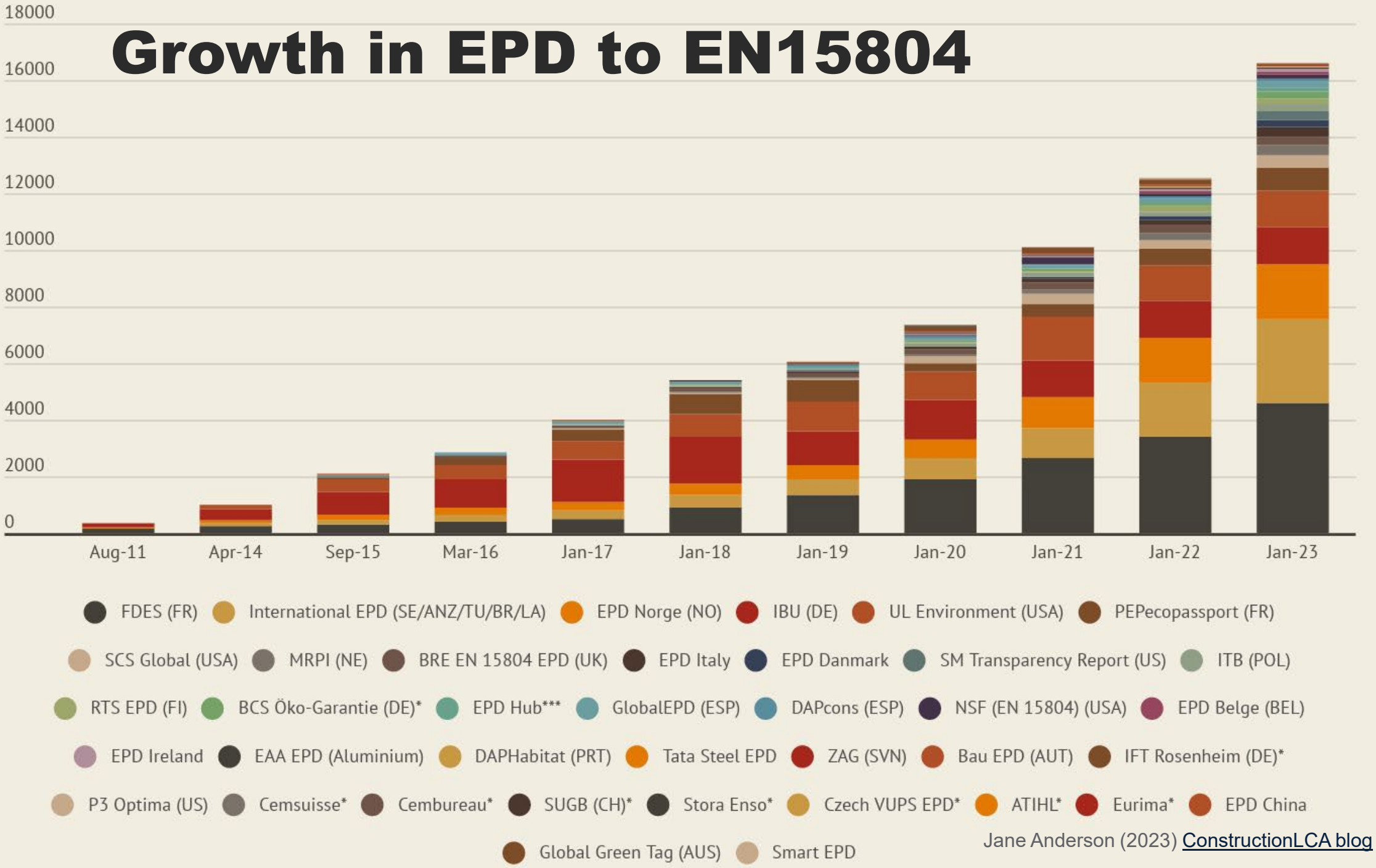
Recent developments

1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations

Recent developments

1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations

Growth in EPD to EN15804

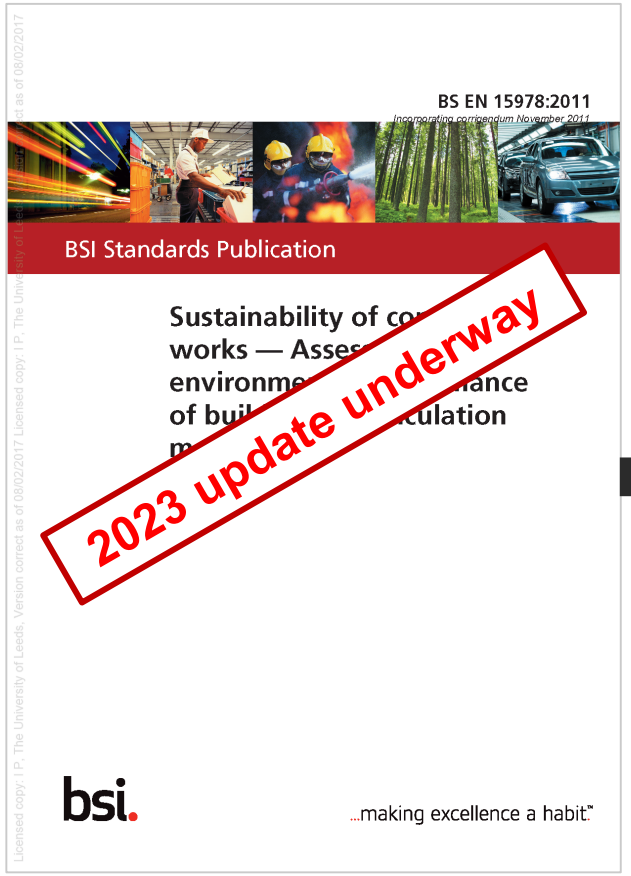


Jane Anderson (2023) ConstructionLCA blog

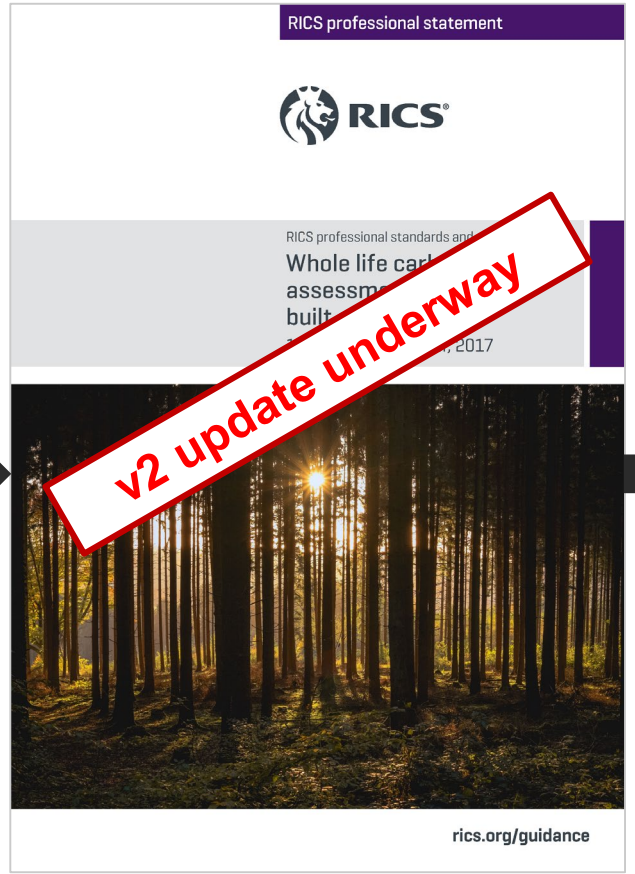
Recent developments

1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations

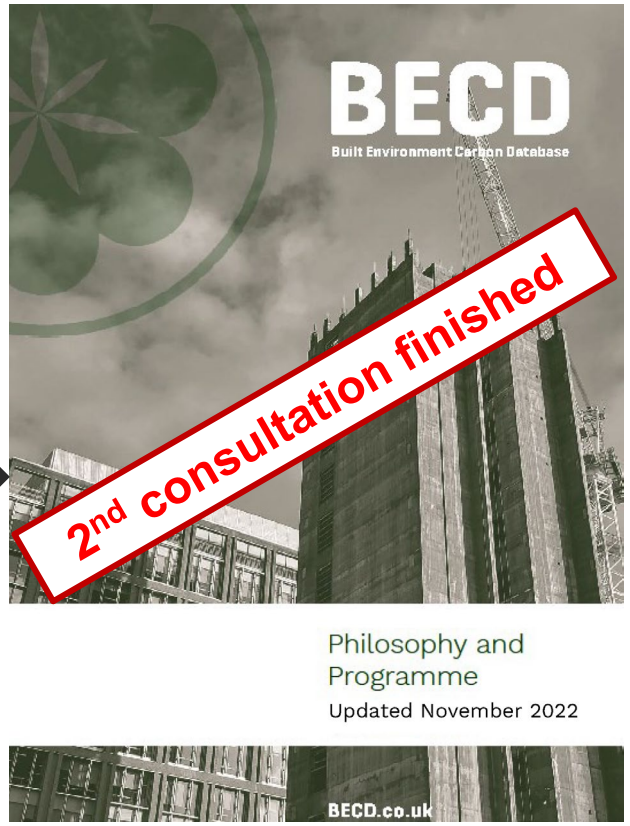
Evolution of reporting standards



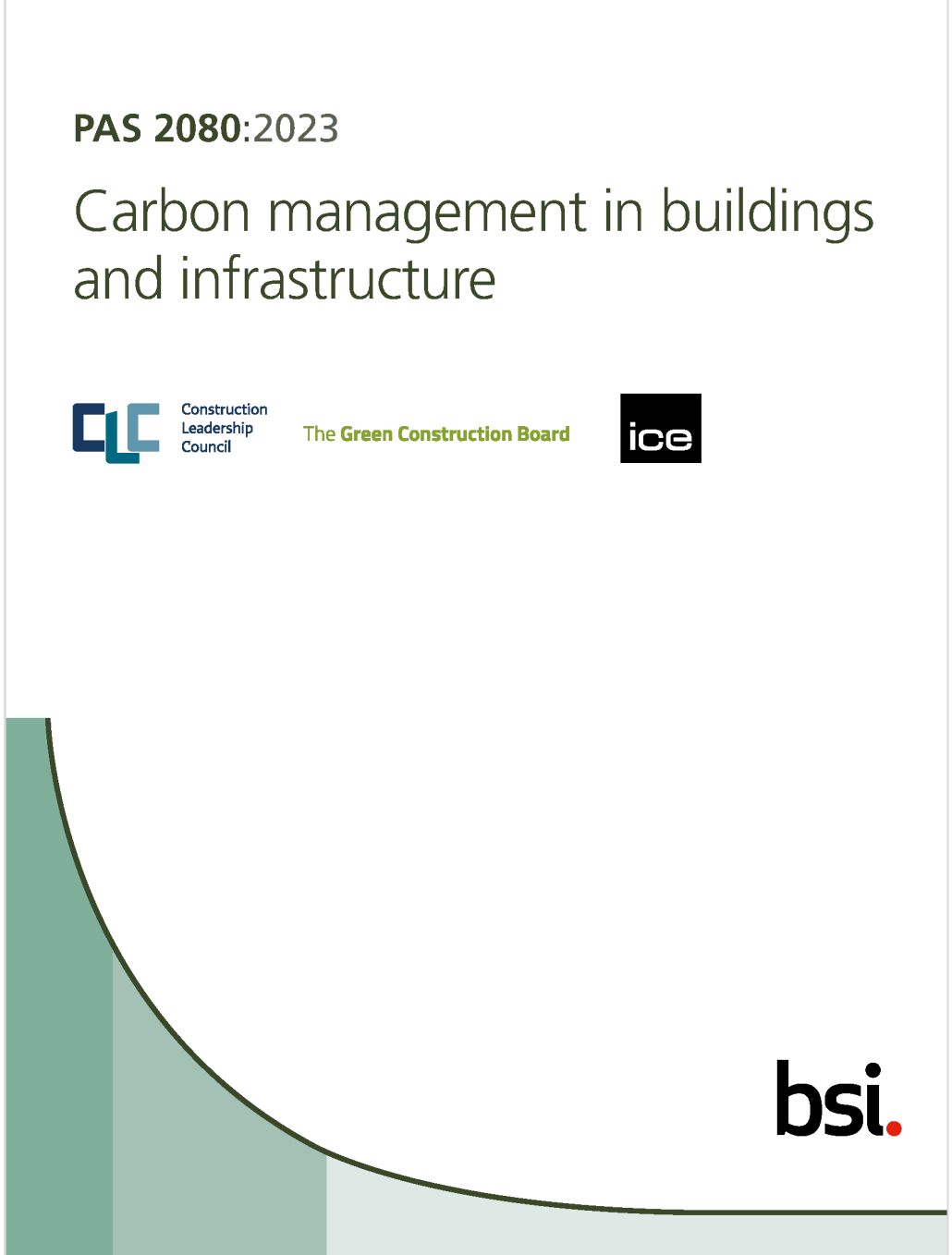
British & European standards
BS EN 15978 etc.



RICS PS



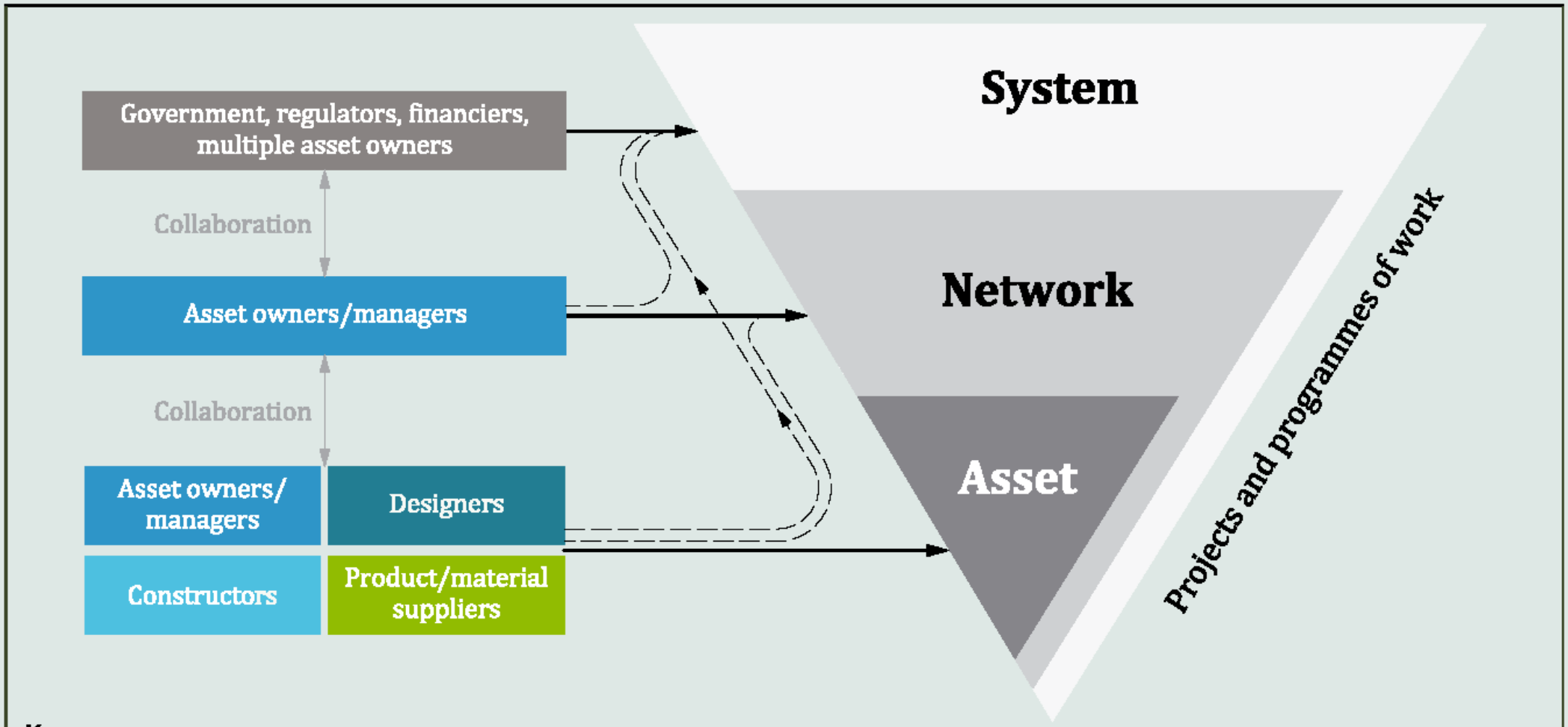
Built Environment Carbon Database



PAS 2080:2023

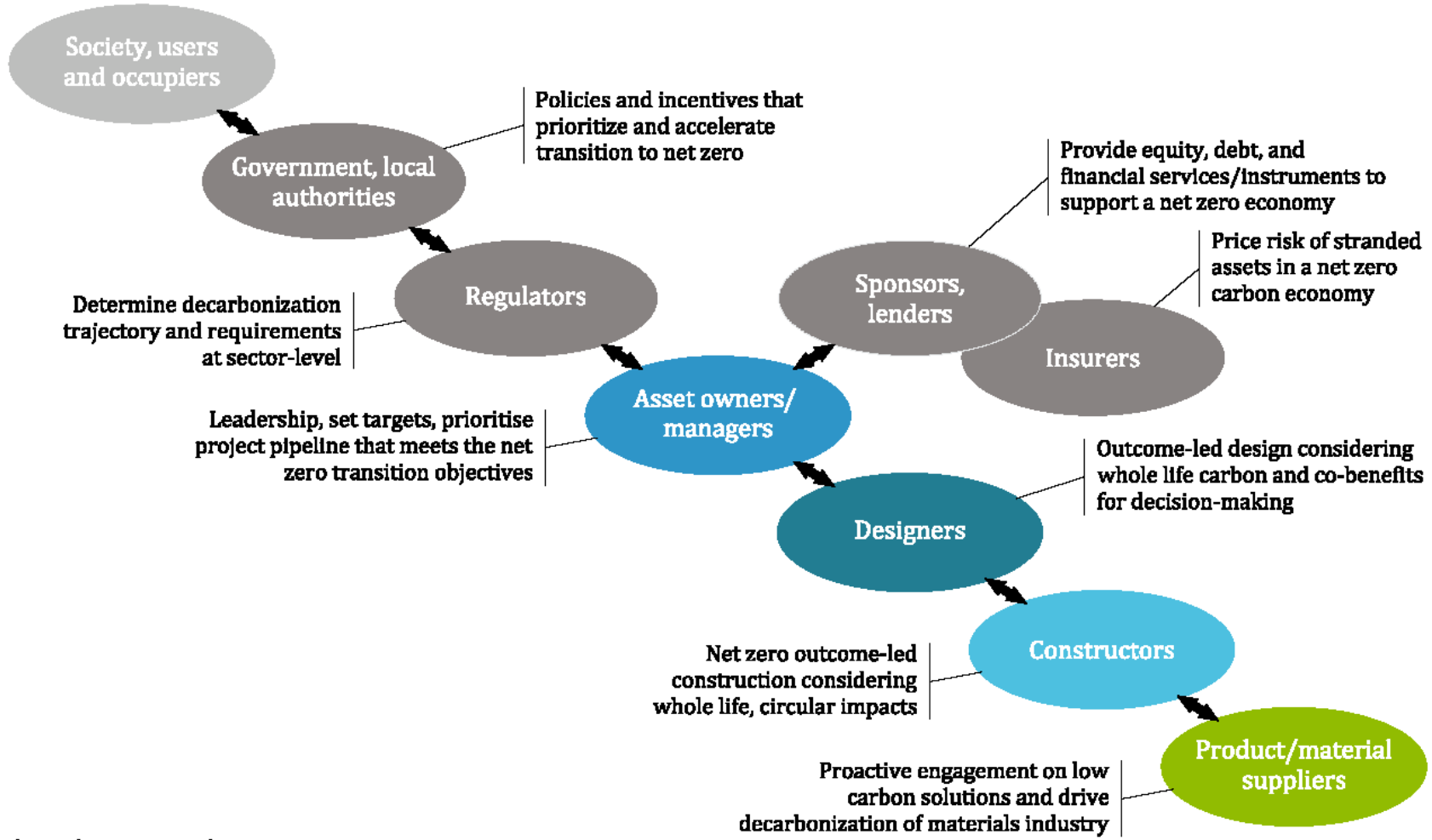
Defines common language for carbon management with defined requirements for each value chain member at each work stage

Figure 1 – Relationships between value chain members across assets, networks and systems



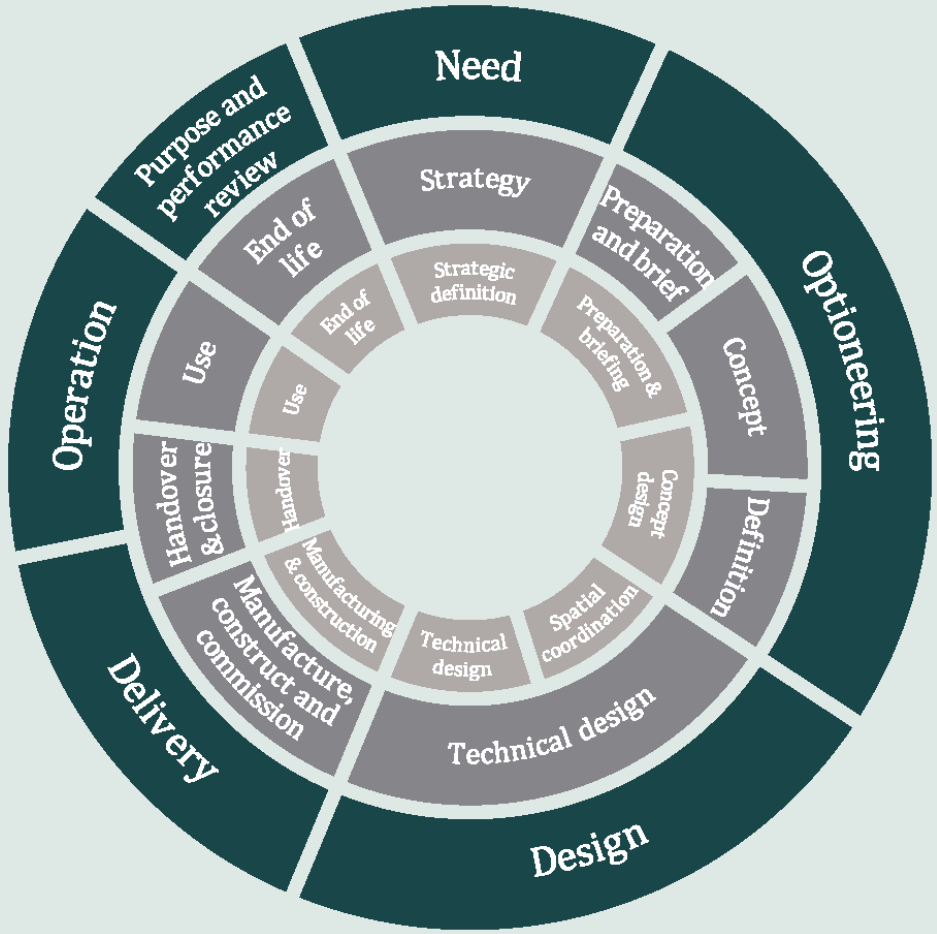
NOTE *A building or infrastructure asset is part of a network, which in turn is part of a system. The control of decision-making sits with different members of the value chain, but some of them often have greater ability to influence decarbonization, depending on the level at which they are operating.*

Figure 3 – Value chain members in the built environment and their roles in carbon management



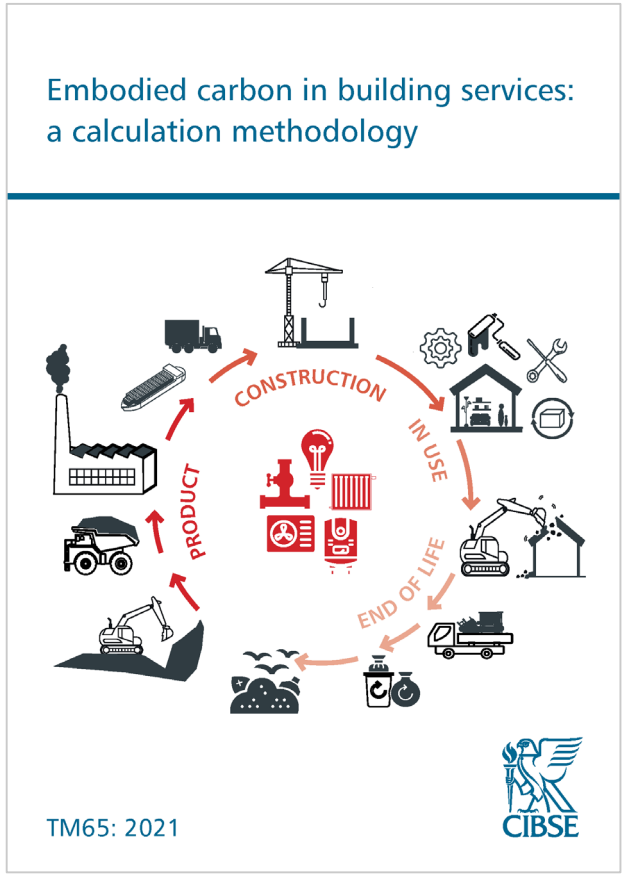
NOTE *Other stakeholders who have influence on carbon reduction but are not subject to the requirements of the PAS include, among others, letting agencies, academia and quantity surveyors.*

Figure 2 – Unifying work stages for projects and programmes of work

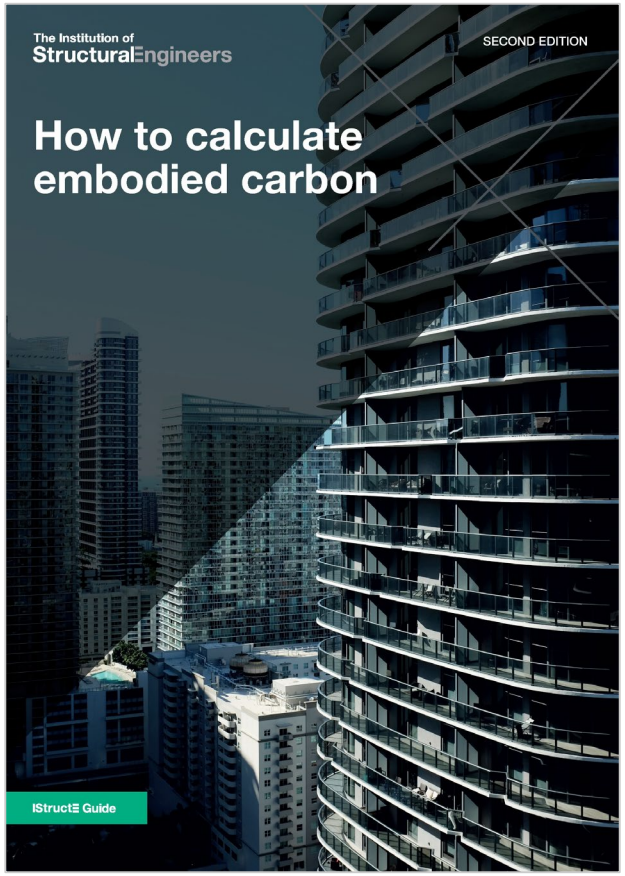


NOTE *This figure introduces work stages in PAS 2080 that are similar to those of the Value Toolkit (developed by the Construction Innovation Hub) [4]. For the purposes of this document, these stages map to the work stages of infrastructure (adapted from BS 8536:2022, with an additional "end-of-life" stage) and the work stages of the built environment (Plan of Work [5] developed by the Royal Institute of British Architects), as shown. There are other sector-specific definitions of work stages that differ from those shown in Figure 2, but this is not enough to hinder value chain members from implementing a carbon management process.*

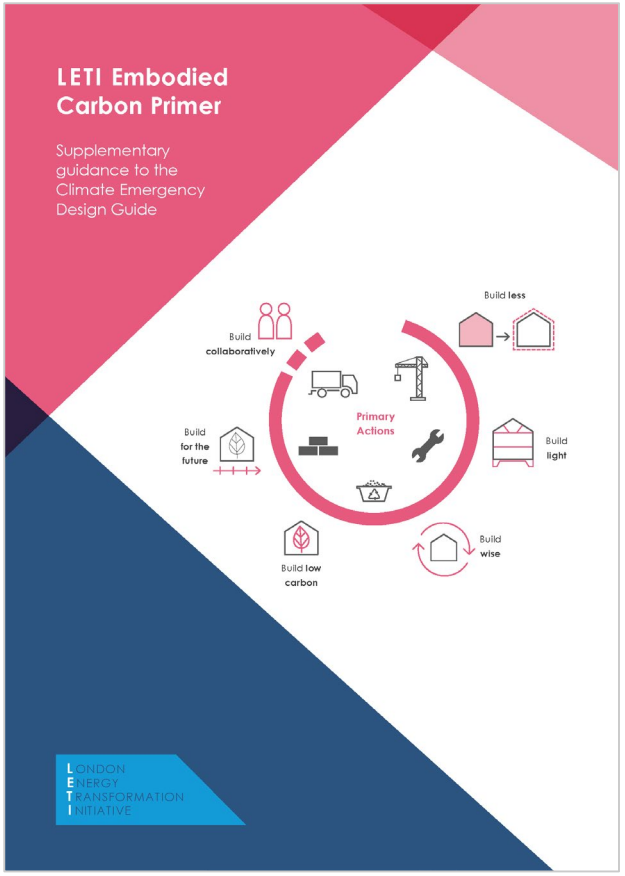
Other key UK guidance



CIBSE TM65



IStructE methodology

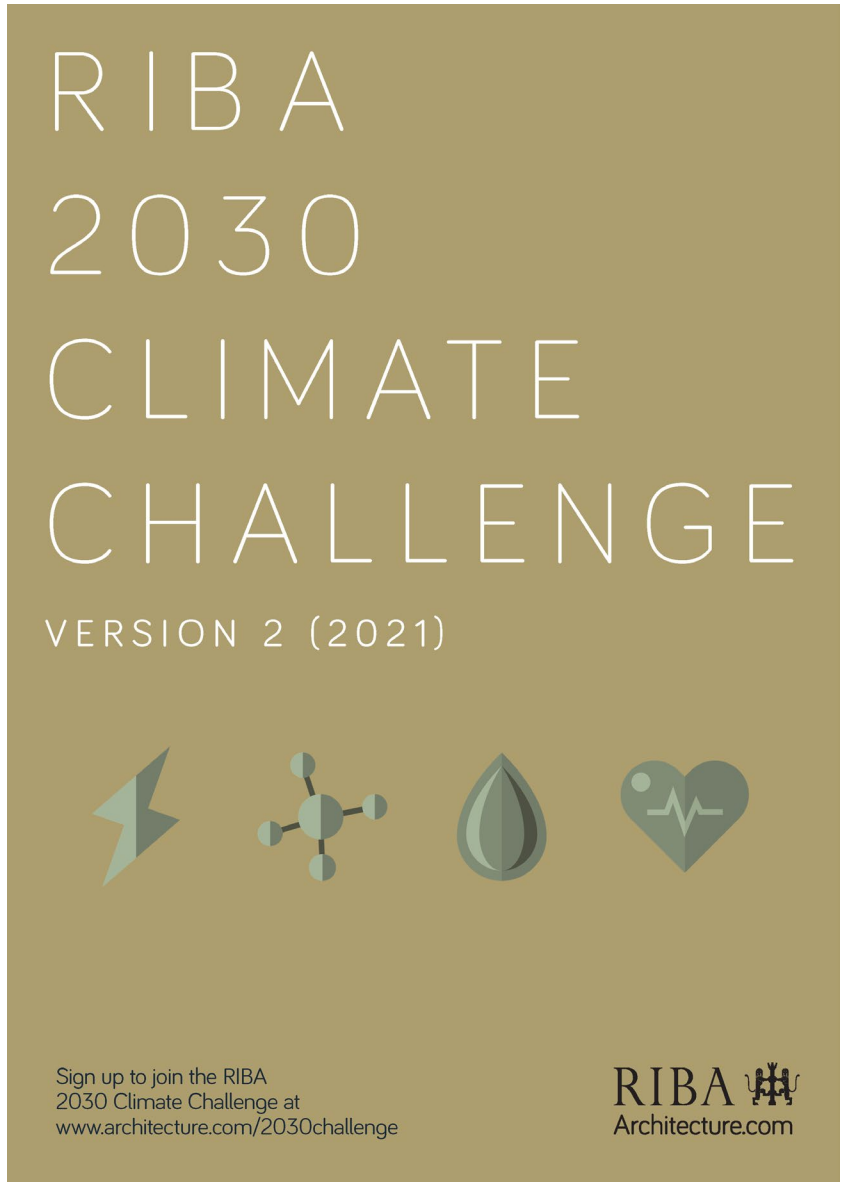


LETI primer

Recent developments

1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations

RIBA & LETI targets



LETI

Upfront Carbon, A1-5 (exc. sequestration)

	Band	Office	Residential	Education	Retail
	A++	<100	<100	<100	<100
	A+	<225	<200	<200	<200
LETI 2030 Design Target	A	<350	<300	<300	<300
	B	<475	<400	<400	<425
LETI 2020 Design Target	C	<600	<500	<500	<550
	D	<775	<675	<625	<700
	E	<950	<850	<750	<850
	F	<1100	<1000	<875	<1000
	G	<1300	<1200	<1100	<1200

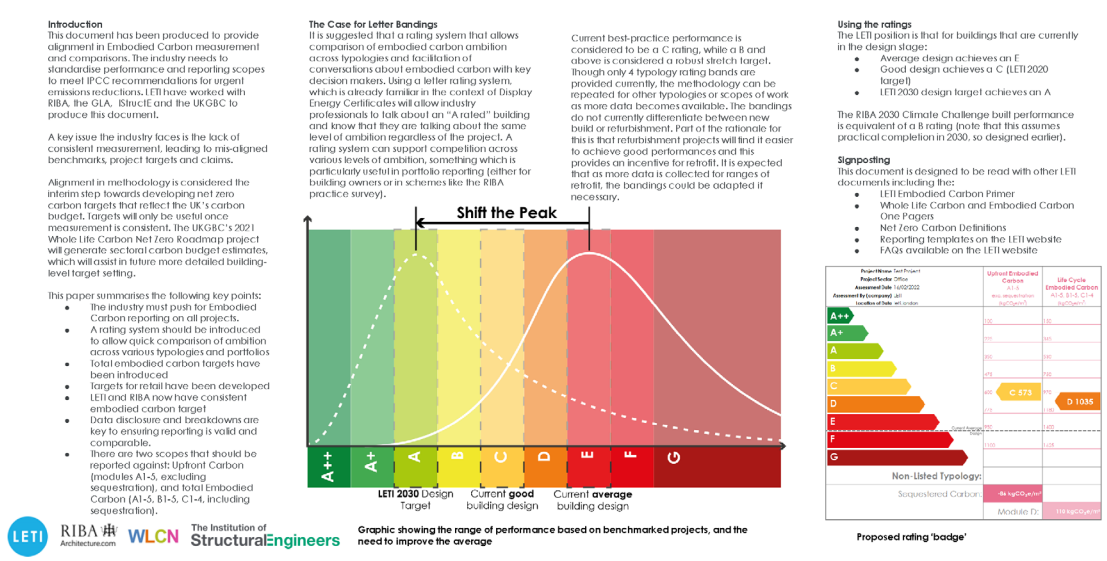
Embodied Carbon, A1-5, B1-5, C1-4 (inc. sequestration)

	Band	Office	Residential	Education	Retail
	A++	<150	<150	<125	<125
	A+	<345	<300	<260	<250
	A	<530	<450	<400	<380
RIBA 2030 Built Target	B	<750	<625	<540	<535
	C	<970	<800	<675	<690
	D	<1180	<1000	<835	<870
	E	<1400	<1200	<1000	<1050
	F	<1625	<1400	<1175	<1250
	G	<1900	<1600	<1350	<1450

All values in $kgCO_2e/m^2$ (GIA)

LETI grades – King's Cross Sports Hall

Embodied Carbon Target Alignment



Introduction
This document has been produced to provide alignment in Embodied Carbon measurement and comparisons. The industry needs to standardise performance and reporting scopes to meet IPCC recommendations for urgent emissions reductions. LETI have worked with RIBA, the GLA, IStructE and the UKGBC to produce this document.

A key issue the industry faces is the lack of consistent measurement, leading to mis-aligned benchmarks, project targets and claims.

Alignment in methodology is considered the interim step towards developing net zero carbon targets that reflect the UK's carbon budget. Targets will only be useful once measurement is consistent. The UKGBC's 2021 Whole Life Carbon Net Zero Roadmap project will generate sectoral carbon budget estimates, which will assist in future more detailed building-level target setting.

This paper summarises the following key points:

- The industry must push for Embodied Carbon reporting on all projects.
- A rating system should be introduced to allow quick comparison of ambition across various typologies and portfolios
- Total embodied carbon targets have been introduced
- Targets for retail have been developed
- LETI and RIBA now have consistent embodied carbon target
- Data disclosure and breakdowns are key to ensuring reporting is valid and comparable.
- There are two scopes that should be reported against: Upfront Carbon (modules A1-5, excluding sequestration), and total Embodied Carbon (A1-5, B1-5, C1-4, including sequestration).

The Case for Letter Bandings
It is suggested that a rating system that allows comparison of embodied carbon ambition across typologies and facilitation of conversations about embodied carbon with key decision makers. Using a letter rating system, which is already familiar in the context of Display Energy Certificates will allow industry professionals to talk about an "A rated" building and know that they are talking about the same level of ambition regardless of the project. A rating system can support competition across various levels of ambition, something which is particularly useful in portfolio reporting (either for building owners or in schemes like the RIBA practice survey).

Current best-practice performance is considered to be a C rating, while a B and above is considered a robust stretch target. Though only 4 typology rating bands are provided currently, the methodology can be repeated for other typologies or scopes of work as more data becomes available. The bandings do not currently differentiate between new build or refurbishment. Part of the rationale for this is that refurbishment projects will find it easier to achieve good performances and this provides an incentive for retrofit. It is expected that as more data is collected for ranges of retrofit, the bandings could be adapted if necessary.

Shift the Peak

A++ A+ A B C D E F G

LETI 2030 Design Target | Current good building design | Current average building design

Graphic showing the range of performance based on benchmarked projects, and the need to improve the average

Using the ratings
The LETI position is that for buildings that are currently in the design stage:

- Average design achieves an E
- Good design achieves a C (LETI 2020 target)
- LETI 2030 design target achieves an A

The RIBA 2030 Climate Challenge built performance is equivalent of a B rating (note that this assumes practical completion in 2030, so designed earlier).

Signposting
This document is designed to be read with other LETI documents including the:

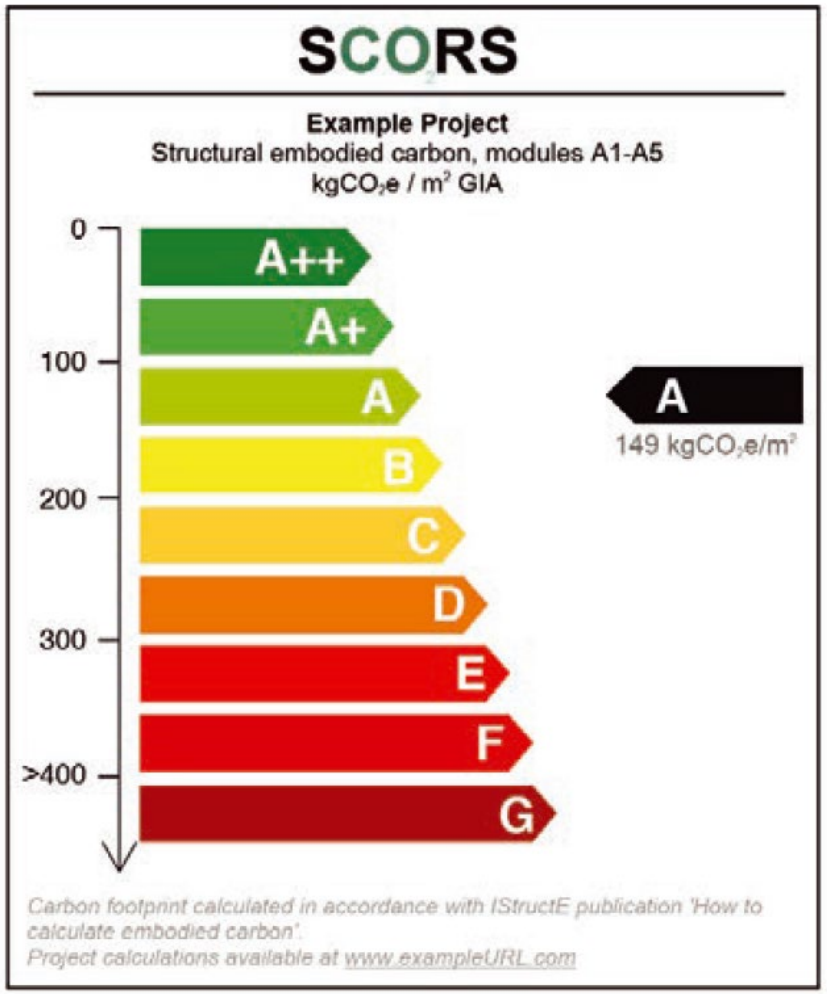
- LETI Embodied Carbon Primer
- Whole Life Carbon and Embodied Carbon One Pagers
- Net Zero Carbon Definitions
- Reporting templates on the LETI website
- FAQs available on the LETI website

Proposed rating 'badge'

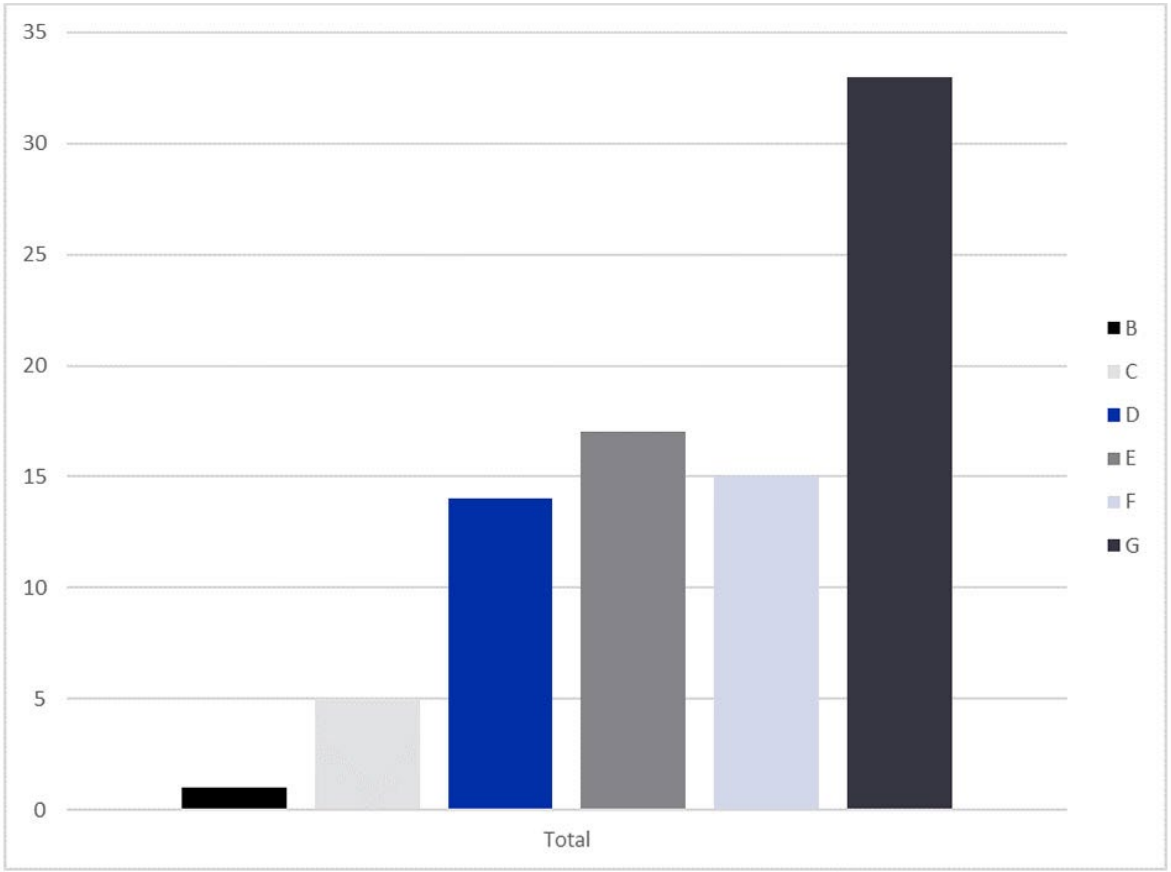
Project Name Sports Hall, King's Cross **Project Sector** Education **Assessment Date** 31/12/2020 **Assessment By (company)** BAM **Location of Data** https://bit.ly/3fXAmd4	**Upfront Carbon** A1-5 exc. sequestration ($kgCO_2e/m^2$)	**Embodied Carbon** A1-5, B1-5, C1-4 ($kgCO_2e/m^2$)
A++	100	125
A+	200	260 **A+ 201.8**
A	300	400
B **B 352.7**	400	540
C	500	675
D	625	835
E Current Average Design	750	1000
F	875	1175
G		
Non-Listed Typology:		
Sequestered Carbon:	-314 $kgCO_2e/m^2$	
Module D:		-186 $kgCO_2e/m^2$

LETI have published a great series of case studies including this example here

SCORS example



Price & Myers 2021 projects dataset SCORS

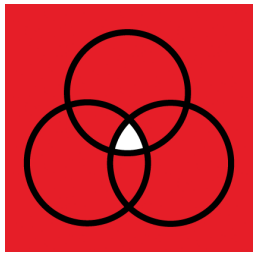


Graph showing the number of designs in each SCORS category

Find out more about SCORS or view the latest Price & Myers dataset (v3 2023)

Company benchmarking – Arup Zero

Since our commitment in 2021 we have assessed:



950+

Assets

30

Countries

5

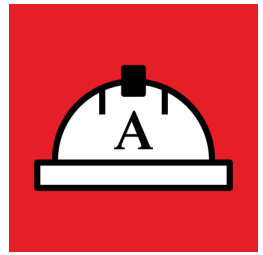
Continents

650m²

Gross floor area

16

Building typologies



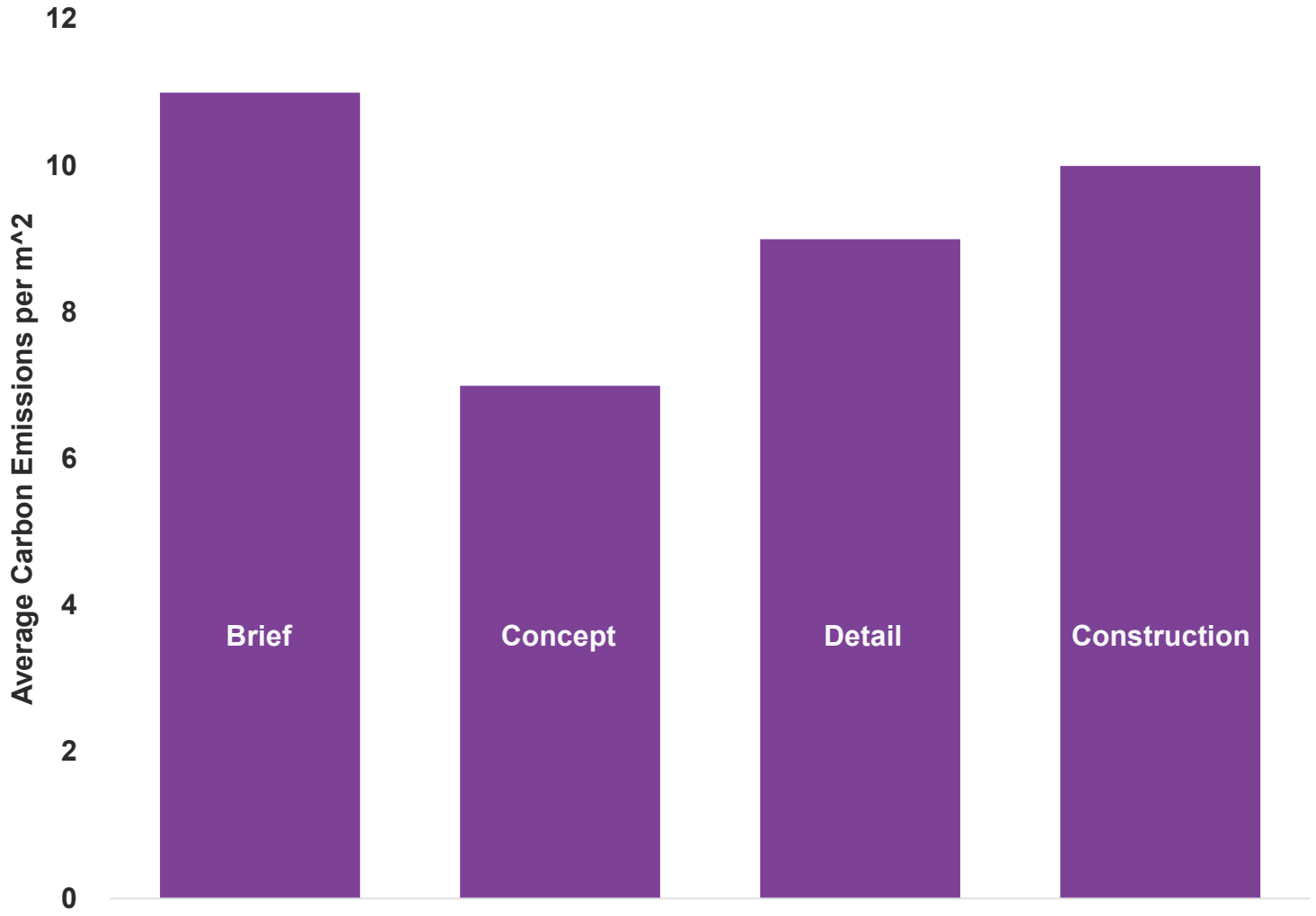
1100+

Arup engineers contributed data

Slide from Nigel Tonks (Arup)

Example insight – carbon creep

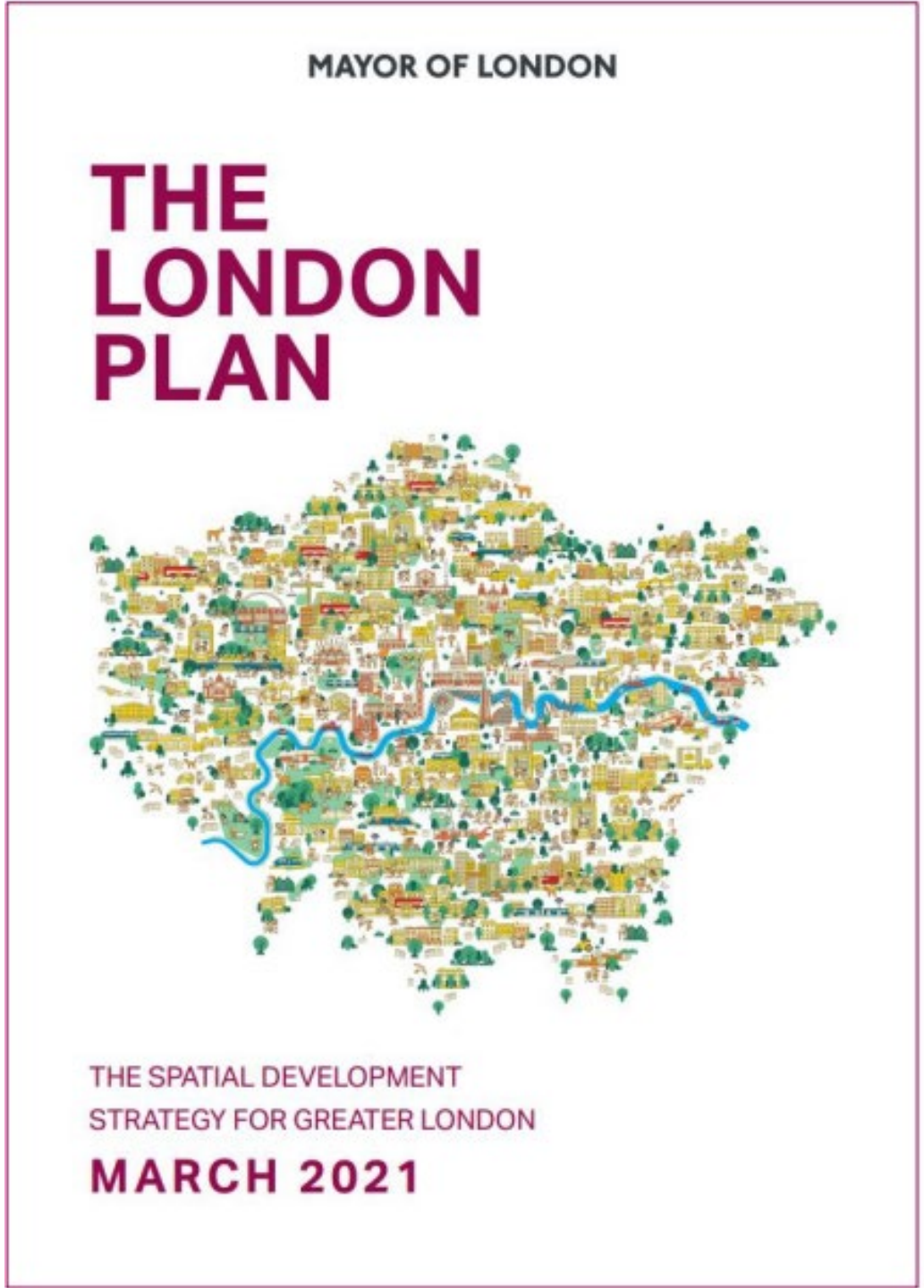
Buildings' whole life carbon is lowest at concept stage, and then creeps up.



Slide from Nigel Tonks (Arup)

Recent developments

1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations



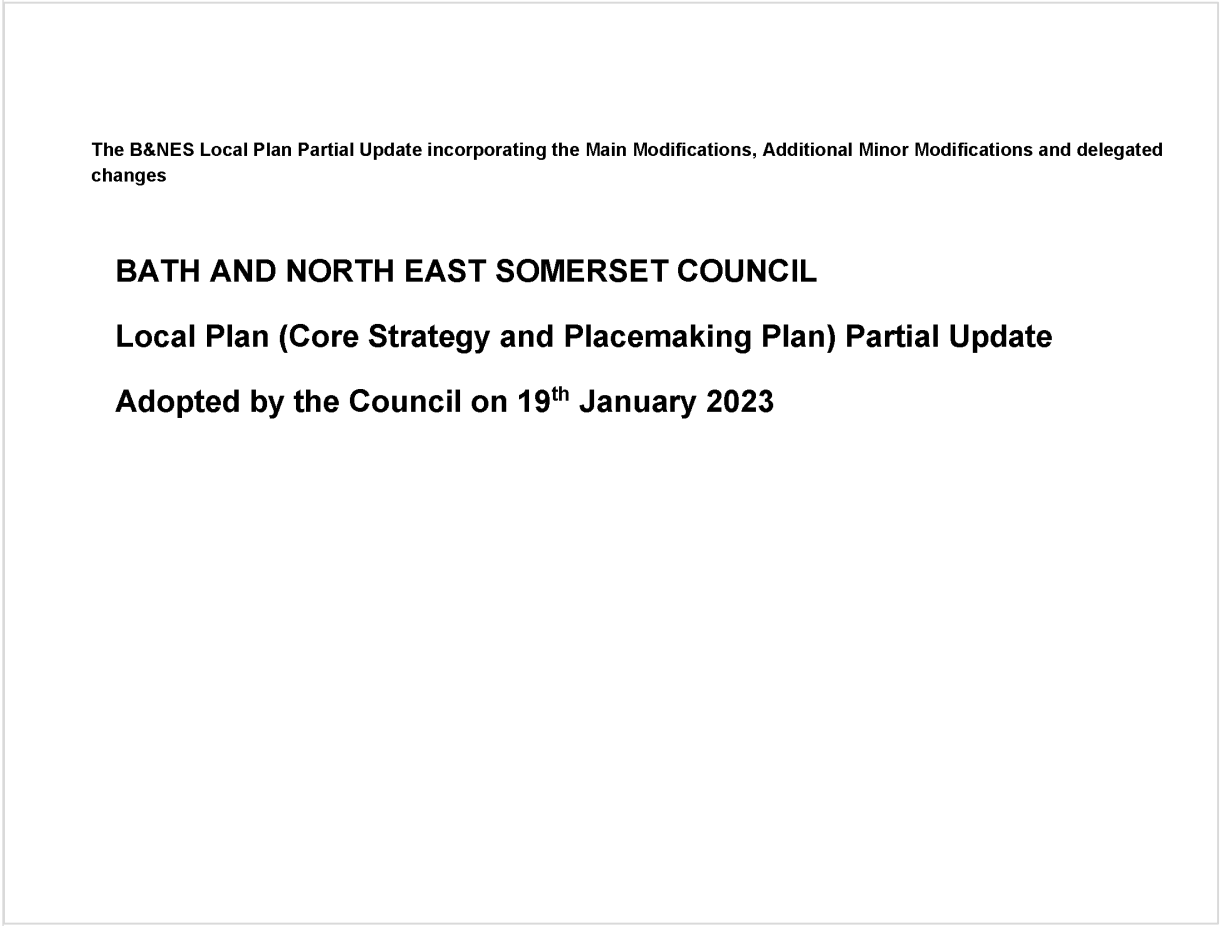
London Policy SI2

F 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

3 stage process

1. Pre-application
2. Stage 1 submission (i.e. RIBA Stage 2/3)
3. Post-construction

Results submitted using common template


The B&NES Local Plan Partial Update incorporating the Main Modifications, Additional Minor Modifications and delegated changes

BATH AND NORTH EAST SOMERSET COUNCIL

Local Plan (Core Strategy and Placemaking Plan) Partial Update

Adopted by the Council on 19th January 2023

B&NES Policy SCR8

"Large scale new-build developments (a minimum of 50 dwellings or a minimum of 5000m^2 of commercial floor space) are required to submit an Embodied Carbon Assessment having regard to the Sustainable Construction Checklist SPD that demonstrates a score of less than 900kgCO_2e/m^2 can be achieved within the development for the substructure, superstructure and finishes."

Keep an eye out for summer 2023 report on project assessing implementation over first 6 months

Others with emerging requirements

- Bristol City Council
- North Somerset
- Greater Cambridgeshire
- Central Lincolnshire
- Leeds City Council
- Milton Keynes
- Cornwall
- And more…

Impact on high profile developments

FINANCIAL TIMES

The battle over M&S Oxford Street and construction's carbon footprint

Retailer's redevelopment bid has raised questions about the environmental costs of demolishing and replacing older buildings as opposed to retrofitting them

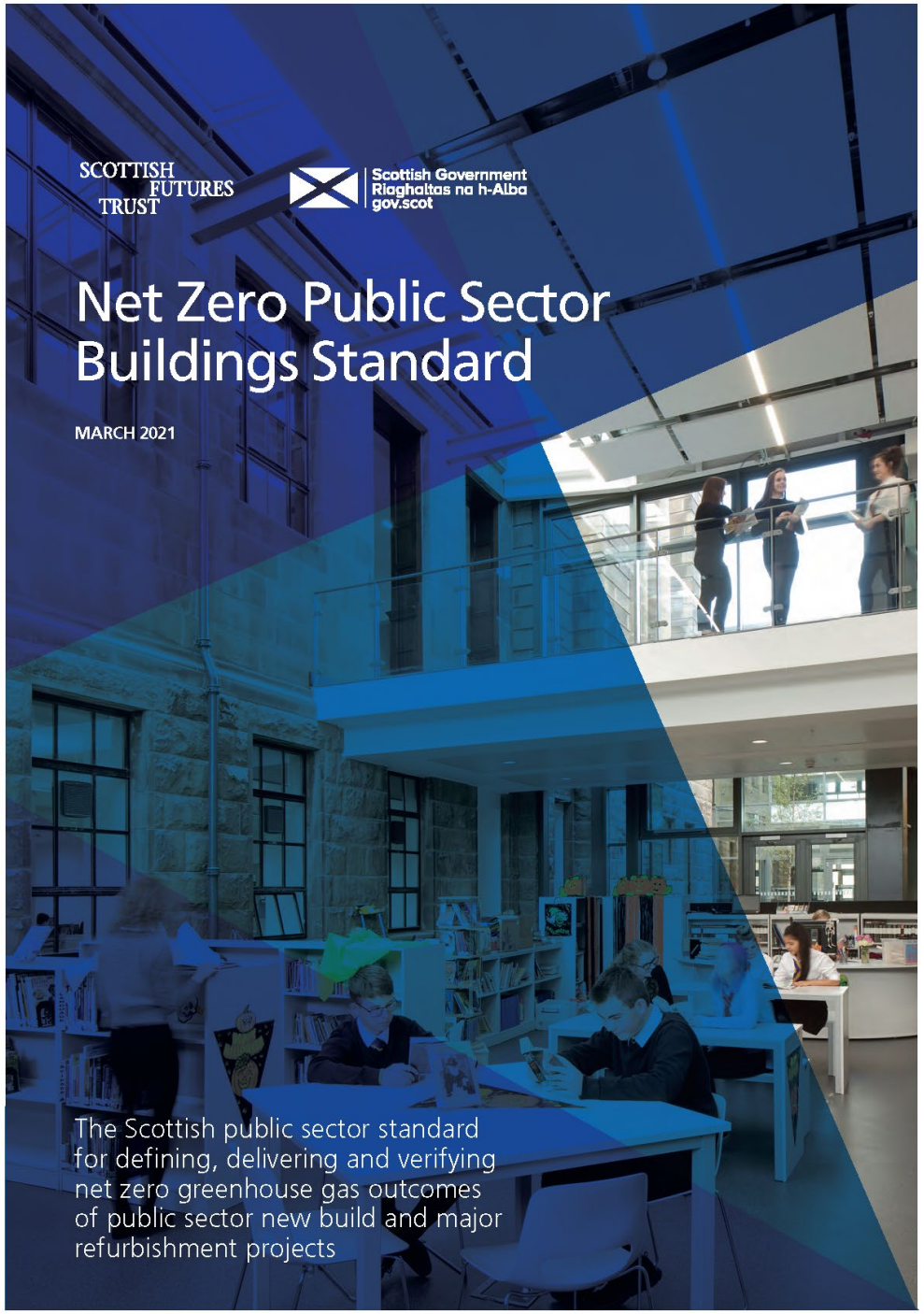
AJ Architects' Journal

Tulip rejected over embodied carbon and heritage concerns

11 NOVEMBER 2021 • BY WILL ING

Recent developments

1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations

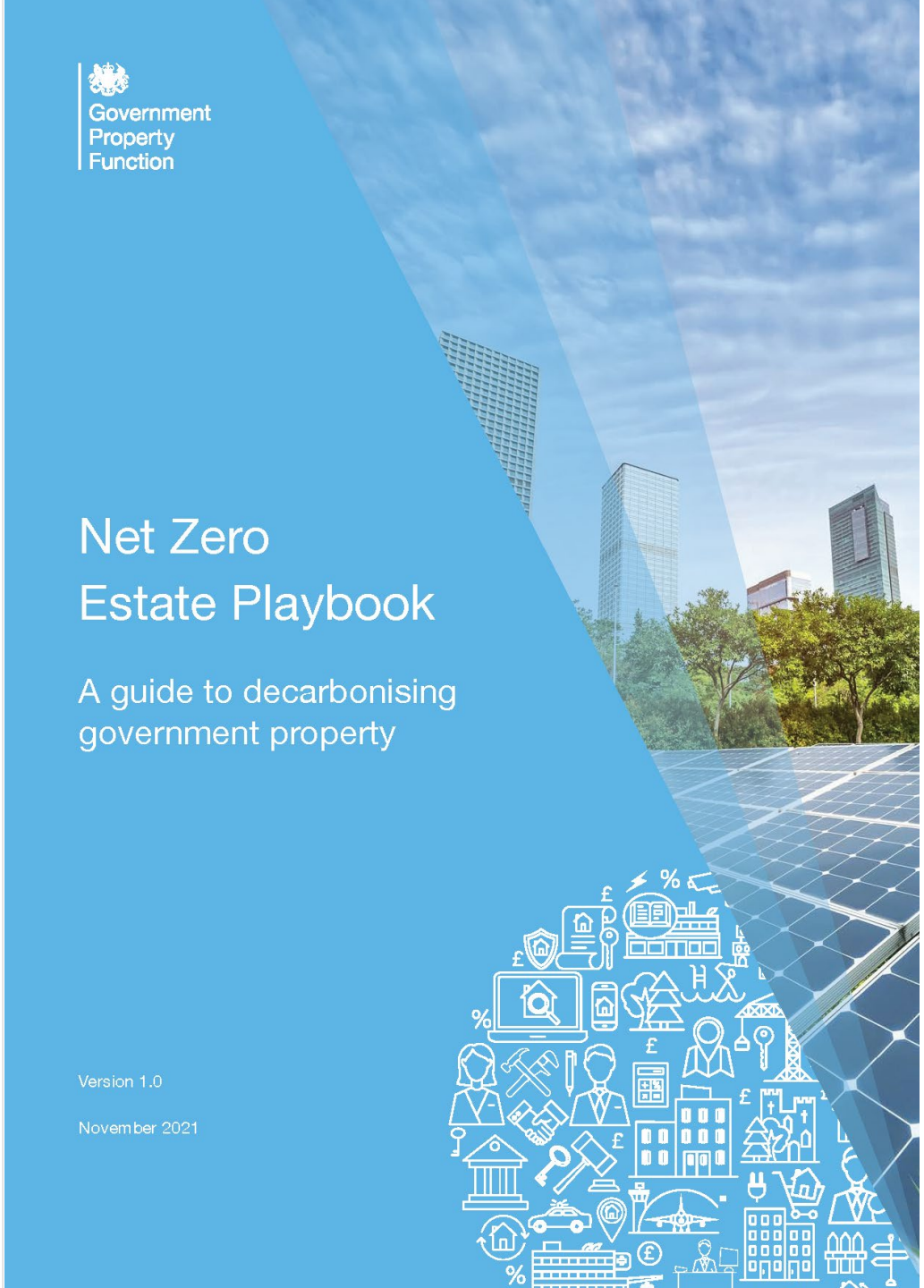


Objective 2: Construction Embodied Carbon

“

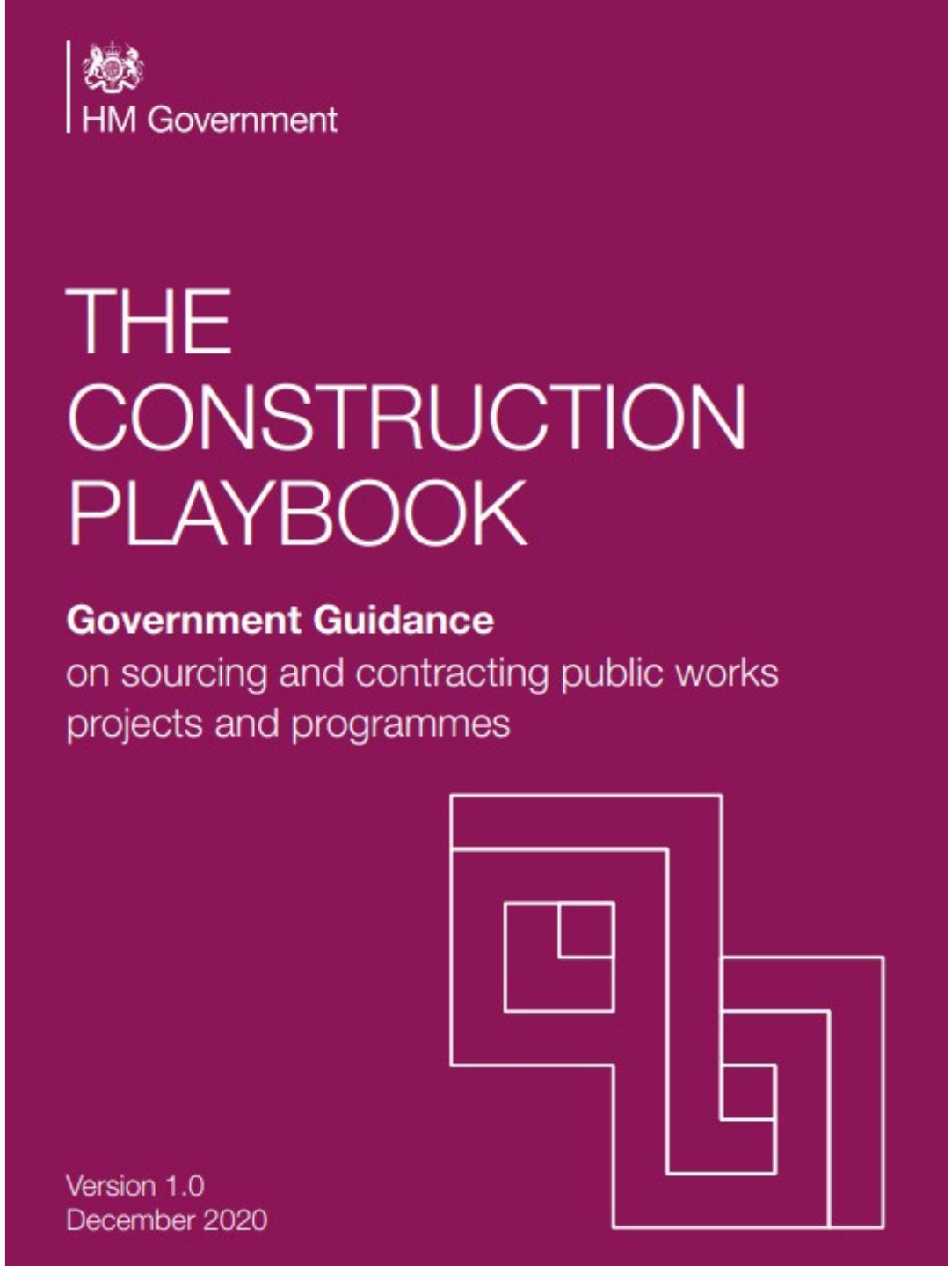
The majority of projects should target no more than 600 $kgCO_2e/m^2$”

Appendix B sets outs detailed guidance



Net Zero Estate Playbook

“As Net Zero Whole Life is still a developing and challenging area, further work will be needed to define the scope and requirements for this approach in a future version of this guidance. At present, organisations should follow the guidance set out in the Construction Playbook regarding the use of Whole Life Carbon assessments to inform decisions at early stages of project definition and option assessments”



Contracting authorities should adopt the use of whole life carbon assessments to understand and minimise the GHG emissions footprint of projects and programmes throughout their lifecycle... Contracting authorities should require that solutions put forward by potential suppliers are accompanied by a whole life carbon assessment."

NHS

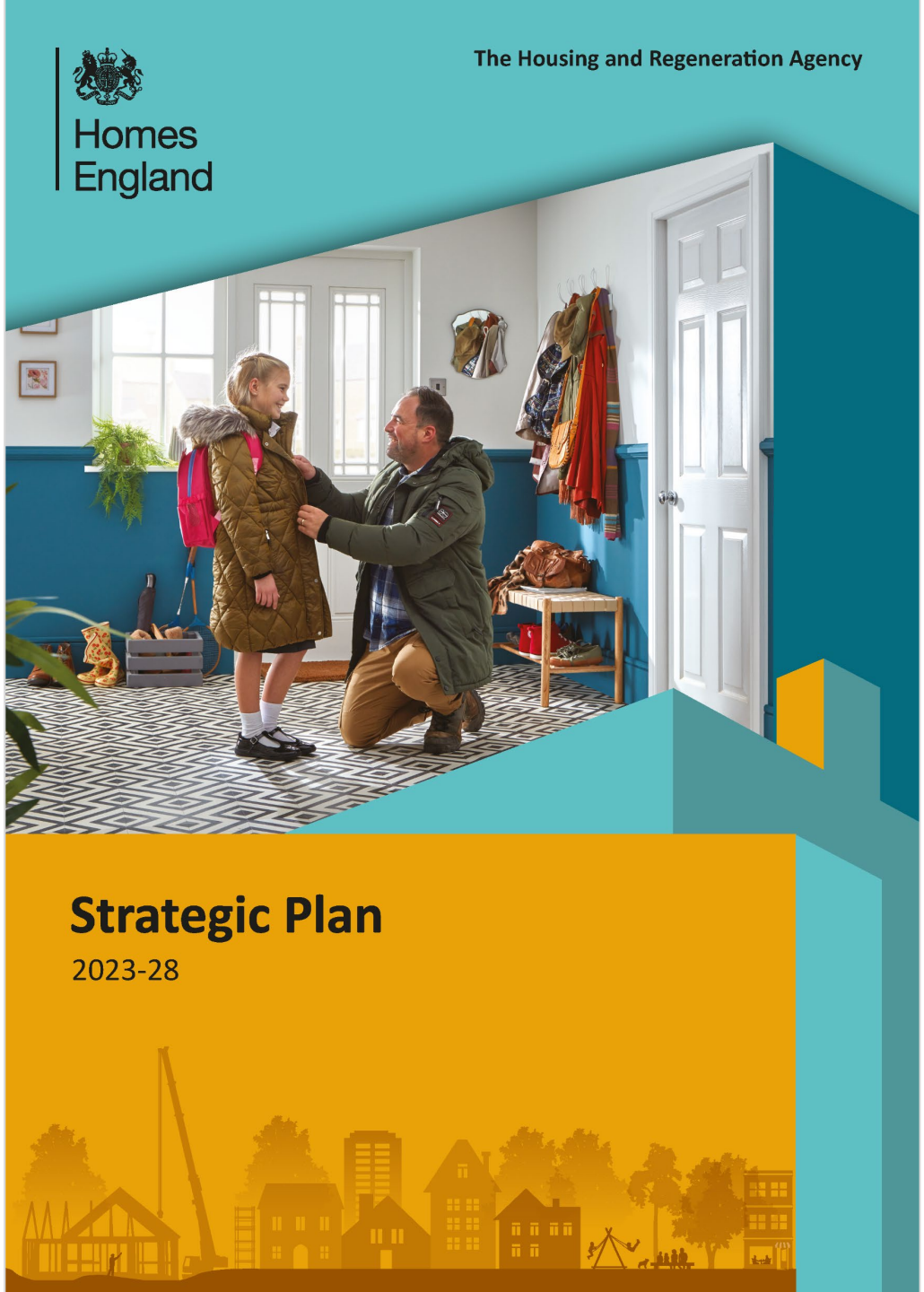
NHS Net Zero Building Standard

NHS Net Zero Standard

Requirement to “Ensure a WLC assessment is undertaken at each design stage, and used to inform design decisions, with data assessed, captured, and reported for all materials”

“Project bespoke Upfront Carbon Limits must be established by the client and project team...for sub-structure, super structure and facade…all other building components and lifecycle stages must be assessed and reported”

See Chapters 3-4 & Whole Life Carbon Compliance Tool for further detail



Homes England KPI15

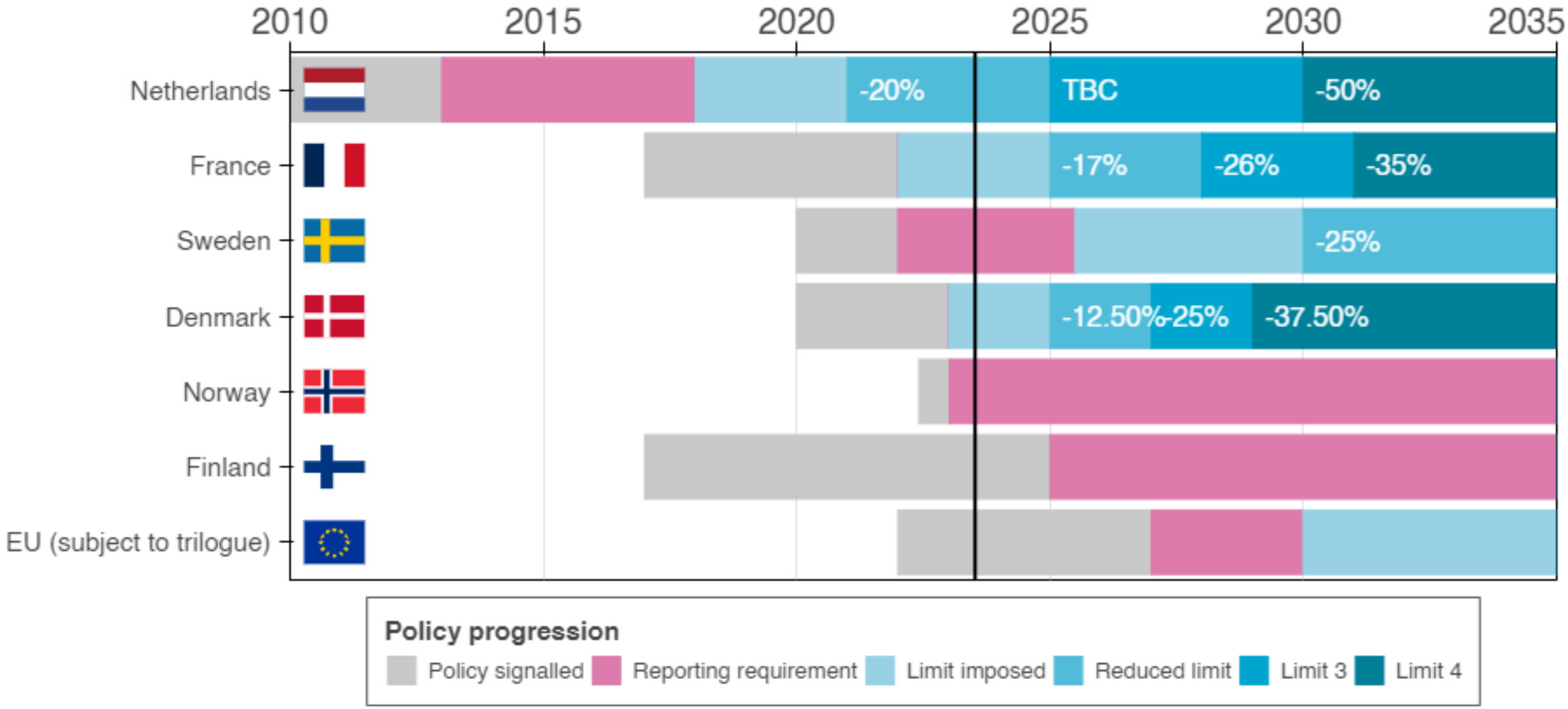
“

Indicator to be developed on embodied carbon of Homes England supported development”

Recent developments

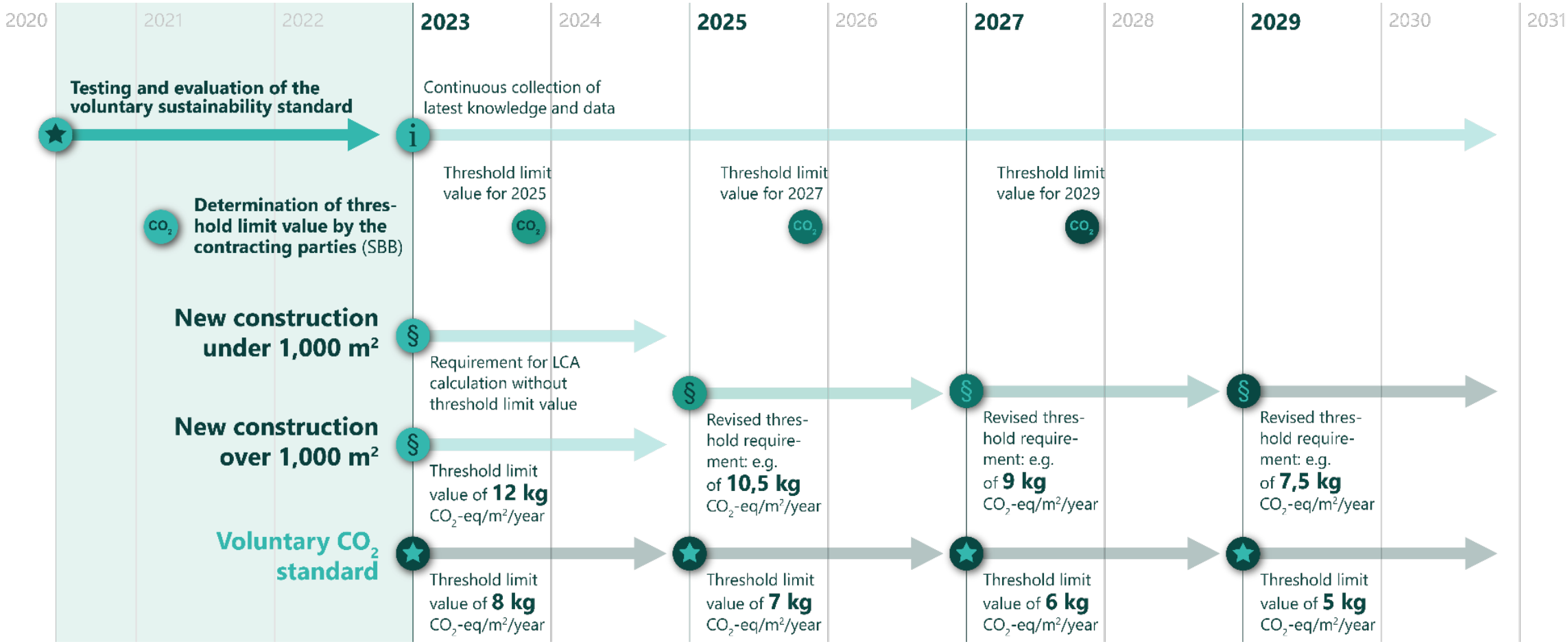
1. Data availability
2. Standards & guidance
3. Benchmarking & grading
4. Planning
5. Public procurement
6. Regulations

International regulatory trend



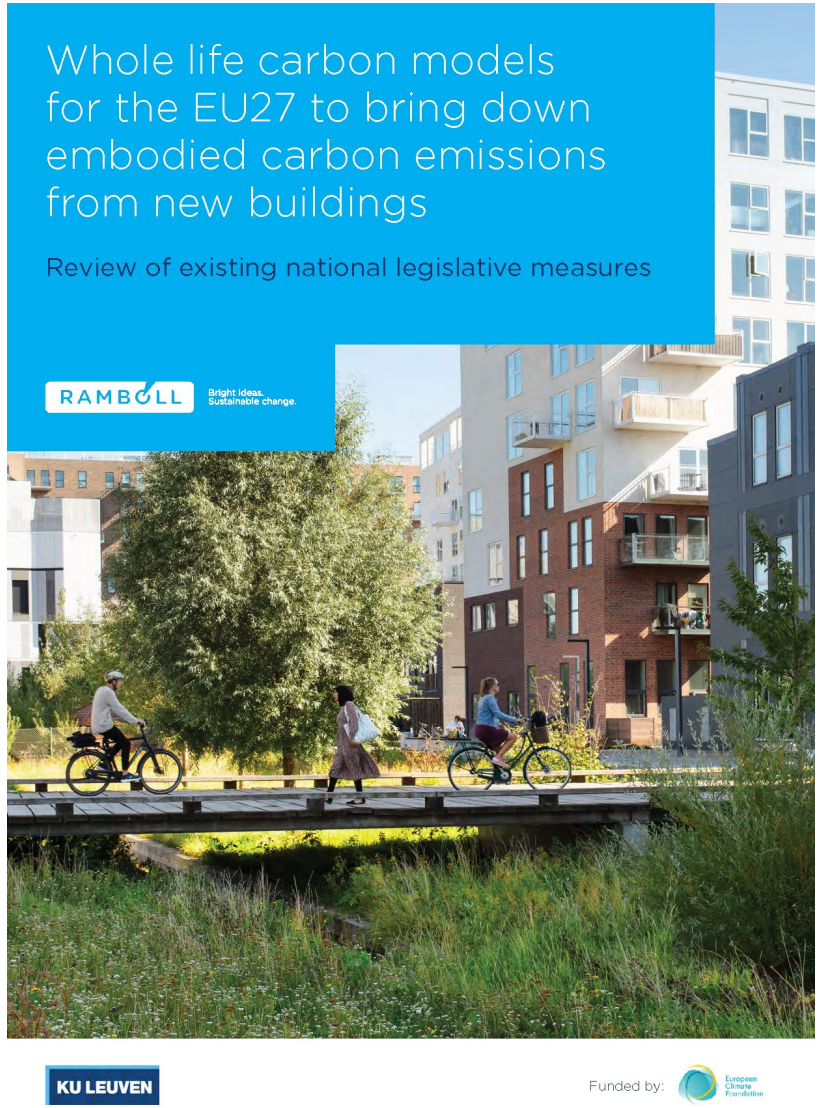
For interactive summary with links to regulations see jannikgiesekam.co.uk/embodiedcarbon/

Example approach - Denmark



Example phasing and tightening of criteria from Denmark bolig og planstyrelsen (2022)

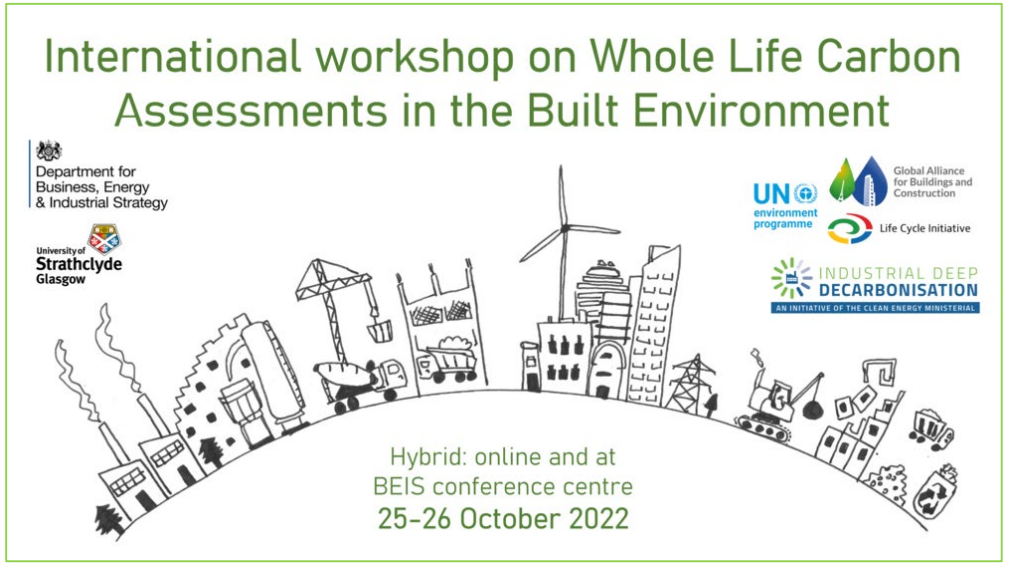
Recent international policy reviews



2022 reports from Ramboll & OneClickLCA

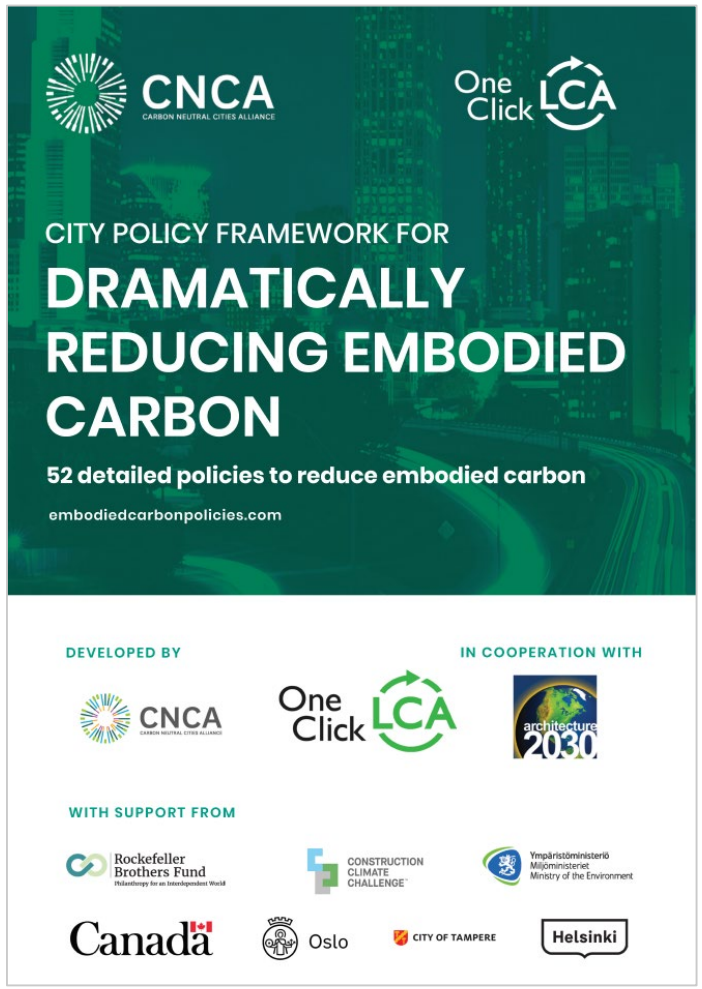
International workshop

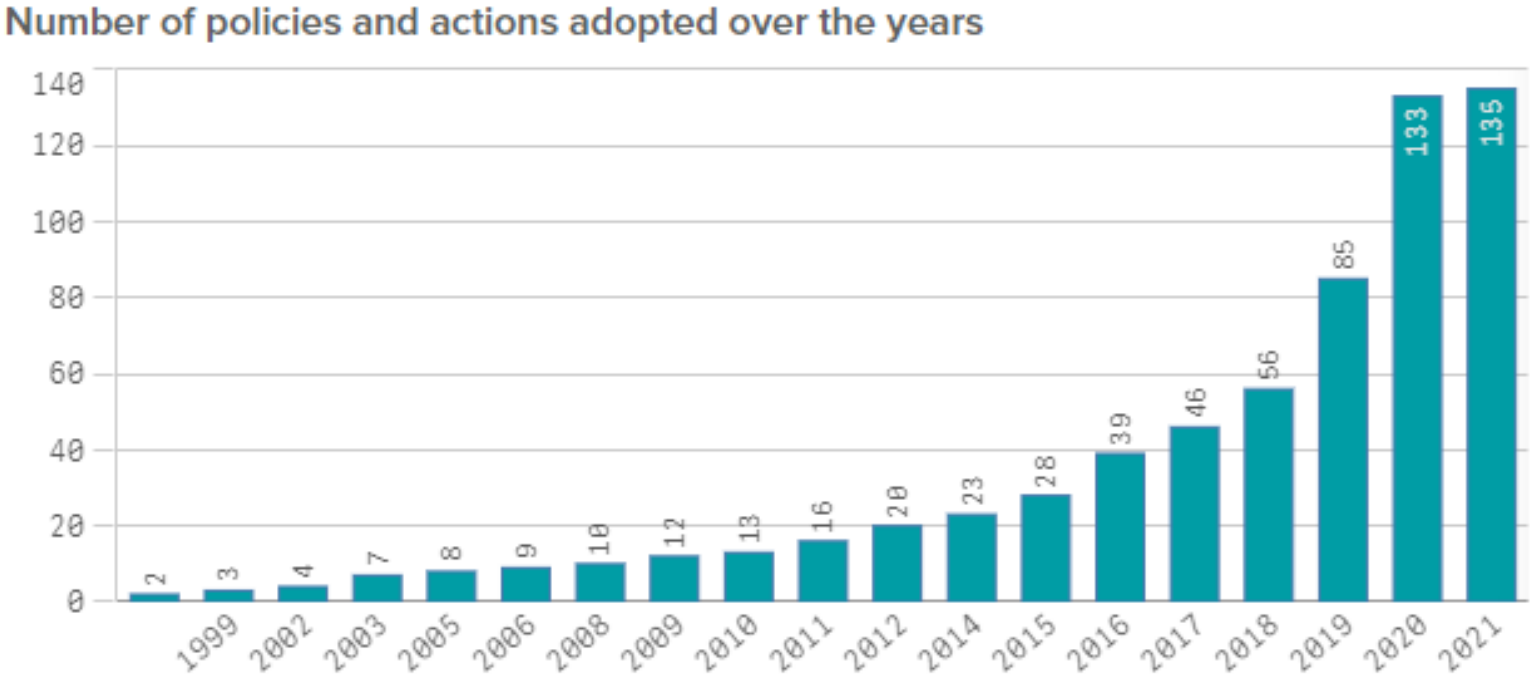
- Organised by BEIS, IDDI, GABC, UNEP LCI, Uni. of Strathclyde
- Hybrid event for 300 policy makers & influencers from 41 countries sharing international best practice on whole life carbon policy development
- 10 sessions with 40 speakers from 20 countries



For further information see event website

Local policies





Uptake based on C40 Clean Construction Policy Explorer

CNCA & One Click LCA (2020) City Policy Framework for Dramatically Reducing Embodied Carbon
C40 (2020) Clean Construction Policy Explorer

June 2022

Progress in reducing emissions

2022 Report to Parliament

Climate Change Committee

CCC recommendation since 2018

Set out a plan to make an assessment of whole-life carbon and material use of public and private construction projects mandatory by 2025, to enable minimum standards to be set. The whole life carbon assessment should be sought at the planning stage to enable efforts to reduce embodied carbon and materials."

June 2023

Progress in reducing emissions

2023 Report to Parliament

2023 Progress Report

"Overdue" with "some but insufficient progress"

R2022-252	Industry; Buildings; Surface transport	Set out a plan to make an assessment of whole-life carbon and material use of public and private construction projects mandatory by 2025, to enable minimum standards to be set. The whole-life carbon assessment should be sought at the planning stage to enable efforts to reduce embodied carbon and materials. **Primary responsibility: DLUHC** Supporting actors: DfT; DESNZ	2022 Overdue

Climate Change Committee

House of Commons
Environmental Audit Committee

Building to net zero: costing carbon in construction

First Report of Session 2022–23

Report, together with formal minutes relating to the report

Ordered by the House of Commons to be printed 11 May 2022

HC 103
Published on 26 May 2022
by authority of the House of Commons

EAC recommendation

“the single most significant policy the Government could introduce is a mandatory requirement to undertake whole-life carbon assessments for buildings. This requirement should be set within building regulations and the planning system. Following introduction of whole-life carbon assessments, the Government should develop progressively ratcheting carbon targets for buildings, to match the pathway to net zero. A clear timeline for introducing this should be set by the end of 2022.”

House of Commons
Environmental Audit Committee

Building to net zero: costing carbon in construction: Government Response to the Committee's First Report

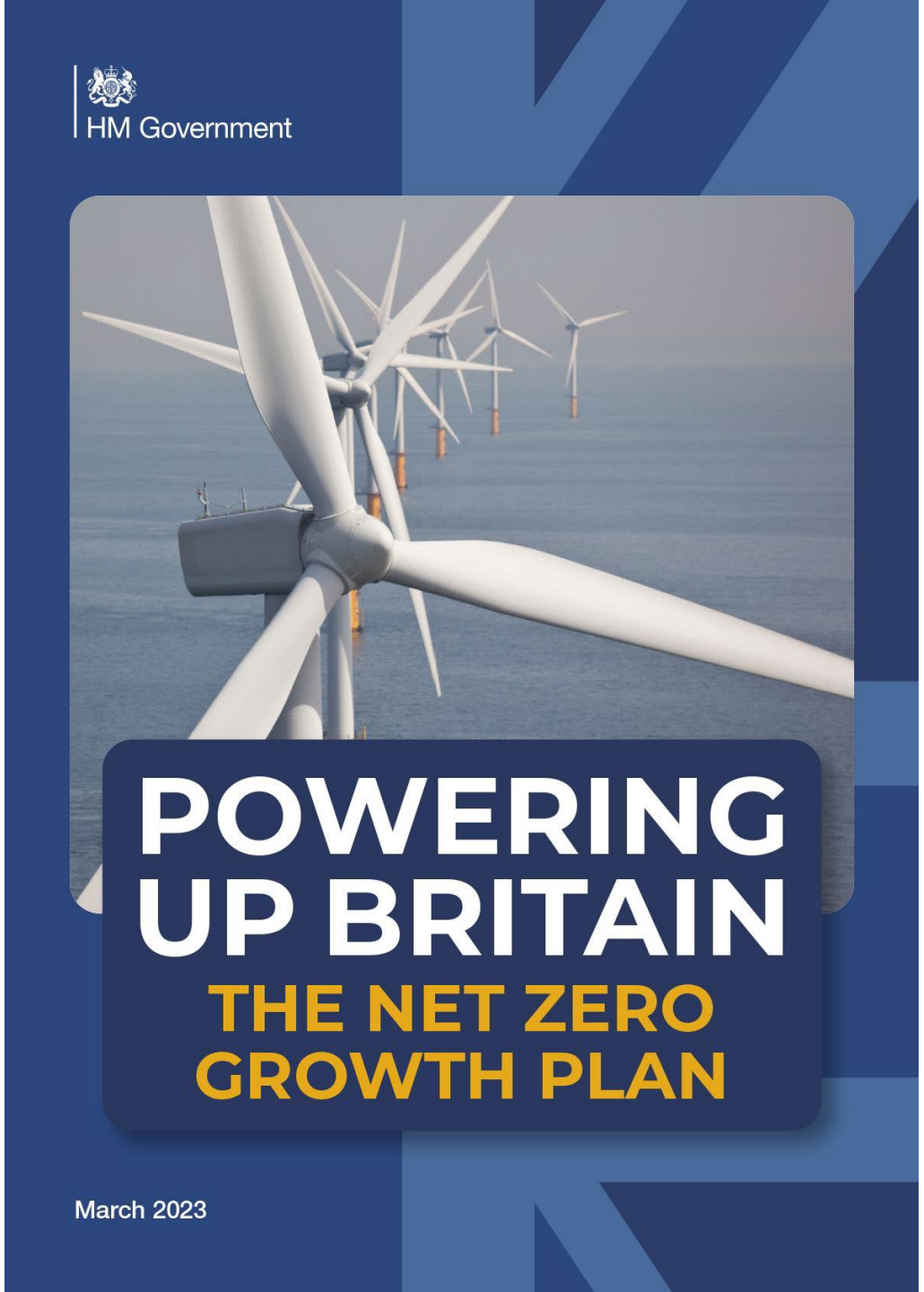
Third Special Report of Session 2022–23

Ordered by the House of Commons to be printed 7 September 2022

HC 643
Published on 30 September 2022
by authority of the House of Commons

UK Govt response

We agree with the Committee that whole-life carbon assessments are likely to have a significant role to play in delivering decarbonisation across the sector… Government intends to consult in 2023 on our approach and interventions to mainstream the measurement and reduction of embodied carbon in the built environment."



UK Govt Net Zero Plan

Responded to the Environmental Audit Committee's report on Building to Net Zero, outlining our intention to consult this year on our approach to the measurement and reduction of embodied carbon in new buildings"

Department for Levelling Up,
Housing & Communities

Statement of Requirements (Draft)

Measurement and Reduction of Embodied Carbon in New Buildings (CPD4124072)

Future Opportunities Notice

1. SCOPE OF REQUIREMENT

1.1 Through the contracted work, The Authority is seeking to establish detailed baselines on matters regarding WLCAs and reduction of embodied carbon in new buildings to inform policy development. The work has been divided into the below six in-scope areas:

1) The robustness of WLCAs, uncertainties in data used and their results and the challenges that creates for decision-making.
2) The impacts to business of carrying out WLCAs.
3) The supporting structure and data needed for WLCAs.
4) The design and construction choices that are made following WLCAs.
5) The appropriate and cost-effective areas for carbon savings and the relative savings available.
6) The design and material choices that would be encouraged by embodied carbon reduction and the impacts of those choices.

1.2 Across these six areas, the work will need data gathering and analysis, technical and practical modelling, and economic analysis in line with Green Book and related methodology and requirements. Also in scope are the possibilities of support for a public consultation and production of impact assessments.

1.3 Given the range work required, especially the inclusion of economic analysis, the Authority expects that many bidders will need the support of external contractors or consortium partners to ensure relevant expertise.

1.4 As this is a developing area of policy the Authority intends for the contract to have a call-off element to allow additional (or changed) work. This could be influenced either by results from earlier work under the contract or policy development by the Authority.

2. BUDGET AND TIMELINE

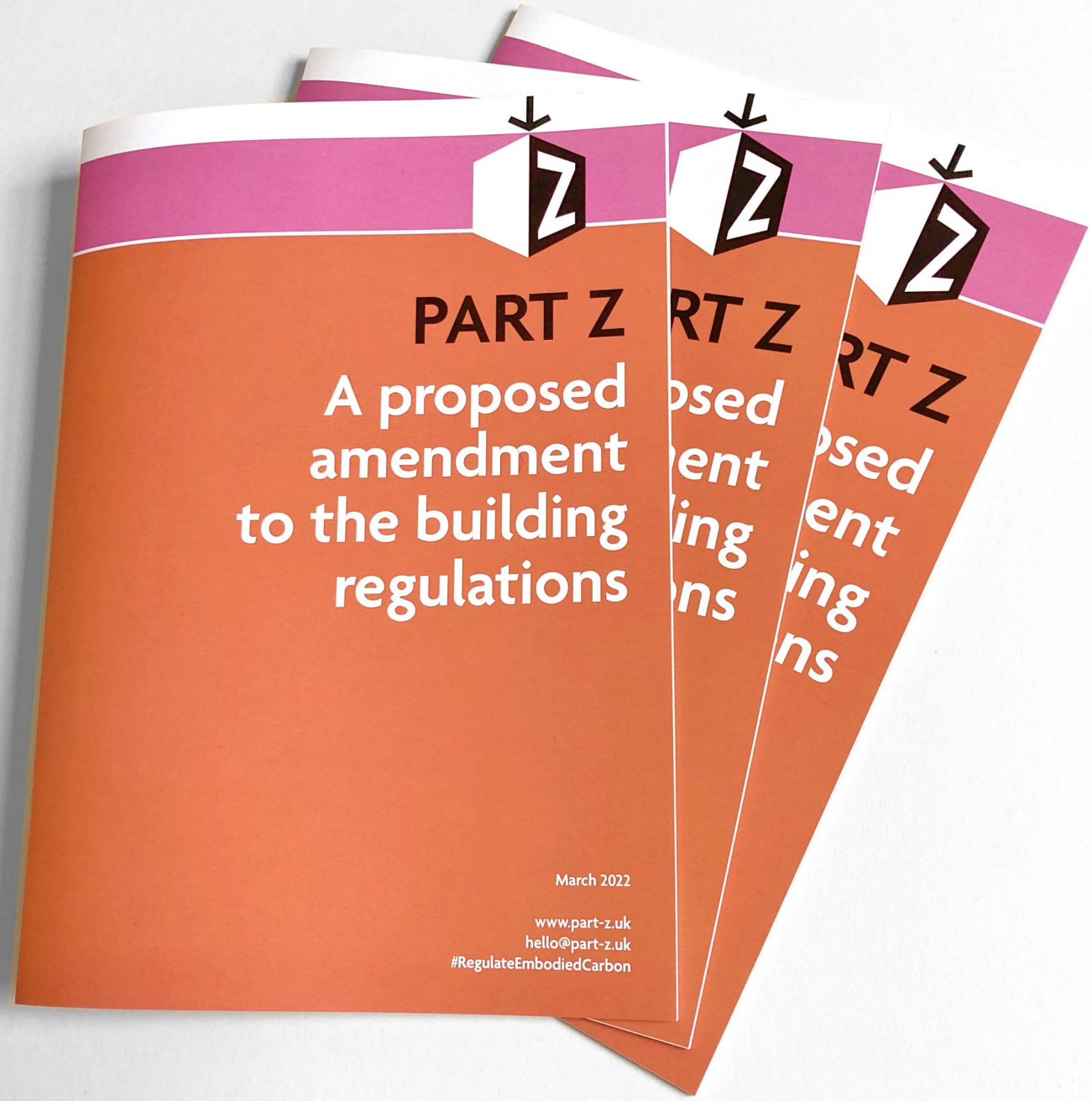
2.1 The maximum budget for the contract will be £250,000 (exc. VAT). Within that budget, the Authority intends that up to £50,000 (exc. VAT) will fund the call-off elements (see para 1.4).

2.2 The contract is likely to begin in March 2023 and run until March 2024.

Ongoing DLUHC research

Recruited consultants to deliver 6 outputs staged across FY23/24 Q1-Q4

AECOM



Part Z

Industry led proposed amendment to Building Regulations in England & Wales and suggested document for approval

Shortlisted for AJ 100 2023

Available from part-z.uk

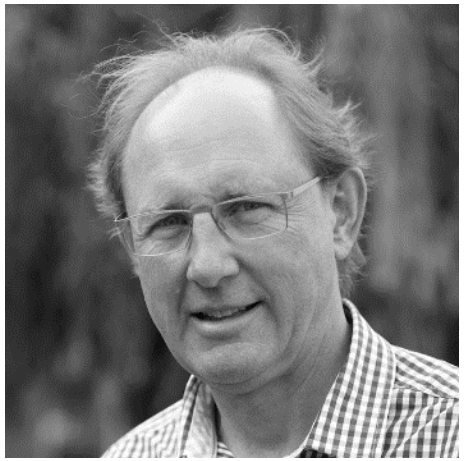
The Part Z authors

Will Arnold
Low-carbon structures

Tim den Dekker
Net zero architecture

Dr Jannik Giesekam
International policy

Dr Julie Godefroy
Environmental design



Simon Sturgis
Whole life carbon

IStructE

Feilden Clegg Bradley Studios

University of Strathclyde

CIBSE

targeting zero

Further support

Tom Bunn
Low-carbon structures
Website

ARUP

Jenny Stephens
Comms

Feilden Clegg Bradley Studios

Ludovica Pototschnig
Low-carbon structures
Website, blog

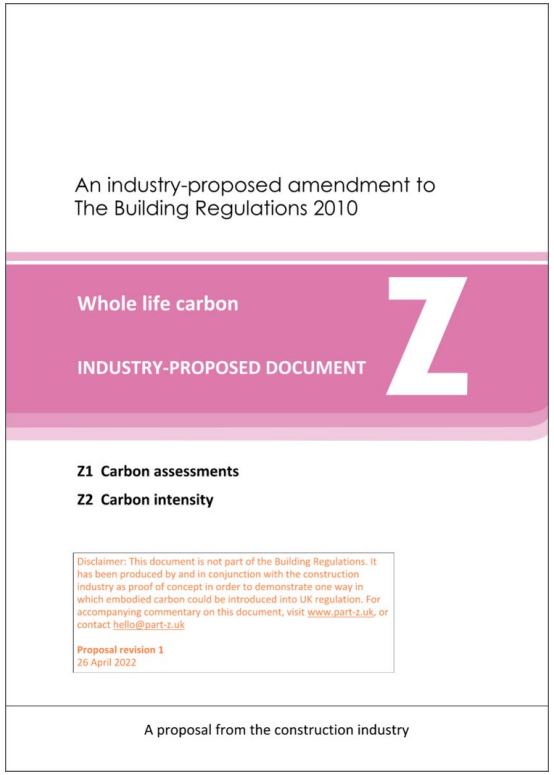
ARUP

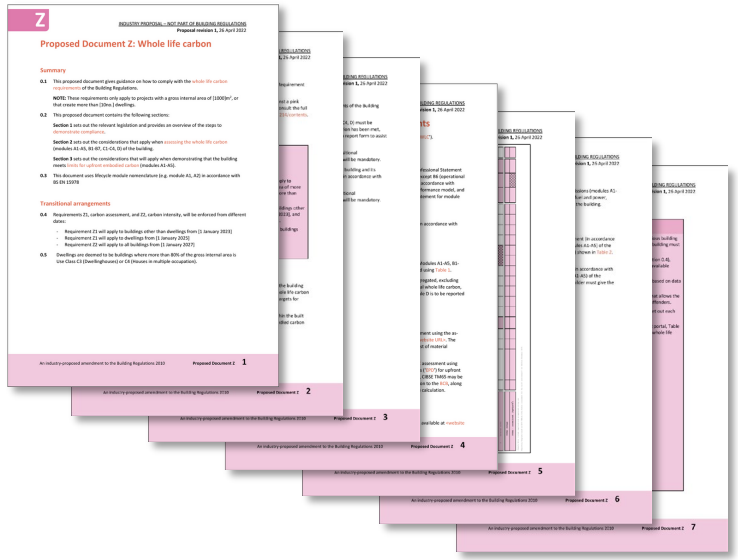
Amendment to Schedule 1 of the Building Regulations (2010)

	Requirement	*Limits on application:*
	PART Z WHOLE LIFE CARBON	
Z1	**Carbon assessment** **Z1.** Whole life carbon emissions shall be assessed and reported for the building and any other parts of the project where Building Regulations apply.	Requirements Z1 and Z2 only apply to projects with a gross internal area of more than [1000]m2, or that create more than [10no.] dwellings. Requirement Z1 will apply to buildings other than dwellings from [1 January 2023], and dwellings from [1 January 2025].
Z2	**Carbon efficiency** **Z2.** Reasonable provision shall be made for the minimisation of whole life carbon emissions by: (a) Minimising upfront embodied carbon; and (b) Where an item provides whole life carbon benefit, this is taken into account.	Requirement Z2 will apply to all buildings from [1 January 2027].

+

Proposed Document Z





Full proposals and commentary at part-z.uk/proposal

Industry support for the regulation of embodied carbon

We are grateful to the following companies for sharing the statements below so far:

abrdn Investments | AESG | Allford Hall Monaghan Morris | Allies & Morrison | Arcadis | Arup | Atelier Ten | Atkins Limited | Baily Garner | BAM Construct UK | BakerHicks | Barratt Developments | BDP | Bennetts Associates | B&K Structures Ltd | Black & White Engineering | Bouygues UK | British Land | Bruntwood | Buro Happold | Chartered Institute of Building | The Chartered Institution of Building Services Engineers | Civic Engineers | The Concrete Centre | Construction Industry Council | Cundall | dRMM Architects | Elliott Wood | Elmhurst Energy | Expedition Engineering | Feilden Clegg Bradley Studios | FMDC Ltd | Goss Structural Ltd | Greencore Construction | Grosvenor Great Britain & Ireland | Hawkins\Brown | Haworth Tompkins | Heyne Tillett Steel | Hoare Lea | Hopkins Architects | Hydrock Consultants Ltd | Igloo | JLL | The Institution of Civil Engineers | The Institution of Structural Engineers | ISG | Laing O'Rourke | Landsec | Lendlease | Levitt Bernstein | The London Energy Transformation Initiative | Mace Group | Max Fordham LLP | Morgan Sindall Group | Mott Macdonald | Multiplex Europe | The National Building Specification (NBS) | Natwest | Off Site Homes Alliance (OSHA) | Perkins & Will | Price & Myers | Ramboll | Ridge and Partners LLP | The Royal Institute of British Architects | Royal London Asset Management | The Royal Town Planning Institute | RPS Group PLC | Sheppard Robson | Sir Robert McAlpine | Skidmore, Owings & Merrill (SOM) | Stanhope PLC | Stanton Williams | The Steel Construction Institute | Stora Enso | The Structural Timber Association | Sweco | Thakeham Group | Thornton Tomasetti | Timber Development UK | tp bennett LLP | University College of Estate Management | Urban&Civic | Urban Splash | UKGBC | Walsh | Waugh Thistleton Architects | White Arkitekter | WilkinsonEyre | Willmott Dixon | WSP-UK ...and 98 more!

See full statements of support for regulation of embodied carbon at part-z.uk/industry-support

Barratt Developments "welcome regulation to mandate the reporting of whole life carbon, leading to the eventual introduction of embodied carbon limits in construction"

"**JLL** supports amendments to Building Regulations requiring assessment of whole life carbon emissions and limitation of embodied carbon emissions"

"**abrdn** Investments are supportive of the regulation of embodied carbon."

"**Royal London Asset Management** endorses the concept of regulation that mandates the reporting of – and sets limits on – embodied carbon emissions in the built environment."

"**Stanhope** fully supports the principle of regulating upfront embodied carbon in construction."

"**Landsec** […] fully supports these assessments becoming a legal requirement as part of Building Regulations."

See more at part-z.uk/industry-support

Inform, educate & debate

Why Part Z references the RICS Professional Statement

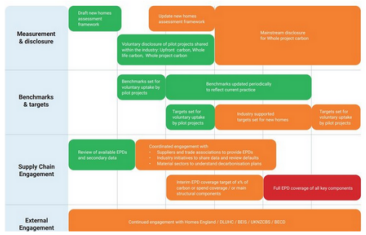
The RICS PS (2017) is the only UK-based WLCA guidance available for the interpretation and implementation of the framework put forward by EN 15978 and is widely used by industry professionals. The Part Z authors recommend that the UK Government standardise the use of the PS and identify key areas of development for its next revision.

Read More

Future Homes Hub releases implementation plan for WLC reduction in homes

The Future Homes Hub have launched their report "Embodied and Whole Life Carbon: 2023-2025 Implementation plan for the homebuilding industry". Amongst other measures, the report sets out the need for the homebuilding sector to implement a series of embodied carbon related actions over the next three years. The report calls for mainstream or regulated disclosure of whole life carbon on housing projects from 2025 – which is aligned with the regulation that the Part Z proposals have been calling for.

Read More



Housebuilders and the proposed Part Z

The Part Z authors have over the past few months spoken with housebuilders of all sizes to discuss the Part Z proposals. All of the housebuilders we met were supportive of the proposed Part Z, calling for the level playing field that will benefit all in the industry. This blog is a summary of our conversations around concerns raised by housebuilders.

Read More

Future Homes Hub

Department for Levelling Up, Housing & Communities

RTPI
Royal Town Planning Institute

Planning for Part Z

The Part Z authors have been in conversation with Richard Blyth, Head of Policy at the Royal Town Planning Institute (RTPI), to better understand what role planners and the planning process could play in relation to Part Z and whole life carbon.

Read More

AJ100 Panel Discussion: Getting Started with Embodied Carbon

UK Construction Week

futurebuild
the future of the built environment

Guerrilla Tactics
RIBA's creative business conference for small and medium sized architectural practices

SUPPLY CHAIN SUSTAINABILITY SCHOOL

FOOT PRINT +

TIMBER DEVELOPMENT UK

SCAPE

meshwork
together for a better built environment

Press coverage

Read more at part-z.uk/press

Engaging with Parliament

Environmental Audit Committee

Wednesday 17 November 2021 Meeting started at 1.17pm, ended 3.29pm

Environmental Audit Committee

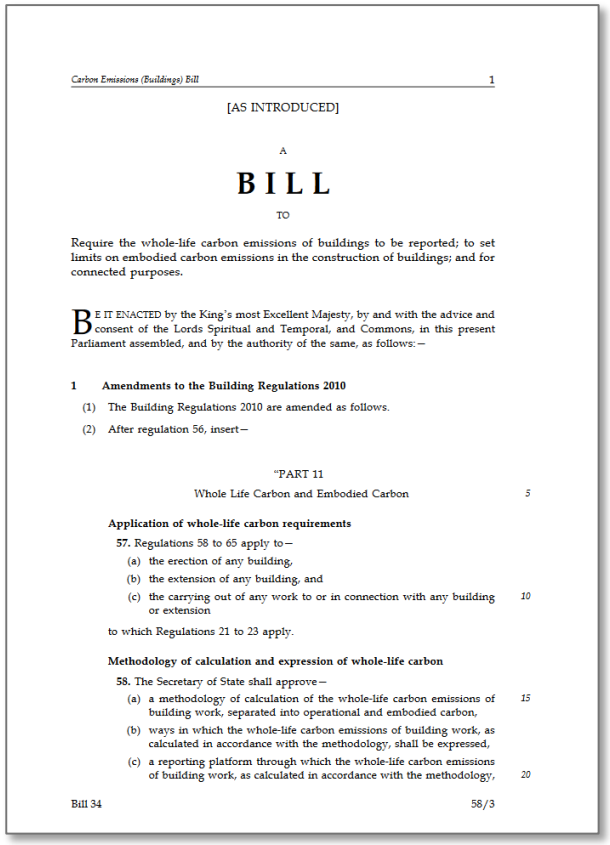
Wednesday 20 October 2021 Meeting started at 2.26pm, ended 4.29pm

Carbon Emissions (Buildings) Bill

- UK Parliament Private Members' Bill *"to require the whole-life carbon emissions of buildings to be reported; to set limits on embodied carbon emissions in the construction of buildings; and for connected purposes."*
- Private members bill with support from 4 parties introduced following Part Z proposals
- 2022 bill withdrawn before 2nd reading due to promotion of lead sponsor in DLUHC

Carbon Emissions (Buildings) Bill – take 2

- Second take sponsored by Jerome Mayhew (Conservative)
- 2nd reading on 25/11/22



Carbon Emissions (Buildings) Bill 1

[AS INTRODUCED]

A

BILL

TO

Require the whole-life carbon emissions of buildings to be reported; to set limits on embodied carbon emissions in the construction of buildings; and for connected purposes.

BE IT ENACTED by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present Parliament assembled, and by the authority of the same, as follows:—

1 Amendments to the Building Regulations 2010

(1) The Building Regulations 2010 are amended as follows.

(2) After regulation 56, insert—

"PART 11

Whole Life Carbon and Embodied Carbon

Application of whole-life carbon requirements

57. Regulations 58 to 65 apply to—

(a) the erection of any building,

(b) the extension of any building, and

(c) the carrying out of any work to or in connection with any building or extension

to which Regulations 21 to 23 apply.

Methodology of calculation and expression of whole-life carbon

58. The Secretary of State shall approve—

(a) a methodology of calculation of the whole-life carbon emissions of building work, separated into operational and embodied carbon,

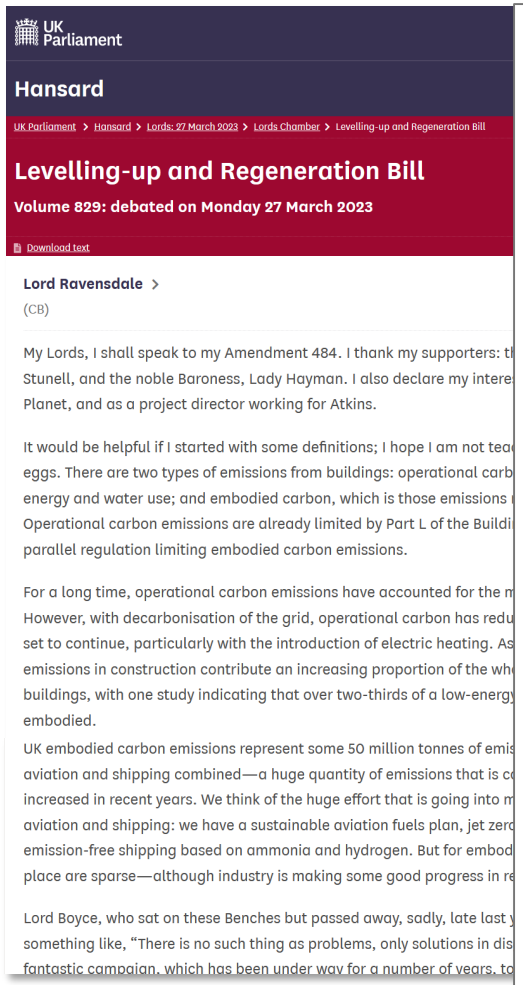
(b) ways in which the whole-life carbon emissions of building work, as calculated in accordance with the methodology, shall be expressed,

(c) a reporting platform through which the whole-life carbon emissions of building work, as calculated in accordance with the methodology,

Bill 34 58/3

https://bills.parliament.uk/bills/3211

Amendment 484 to the Levelling-up and Regeneration Bill


UK Parliament

Hansard

UK Parliament > Hansard > Lords: 27 March 2023 > Lords Chamber > Levelling-up and Regeneration Bill

Levelling-up and Regeneration Bill

Volume 829: debated on Monday 27 March 2023

Download text

Lord Ravensdale >

(CB)

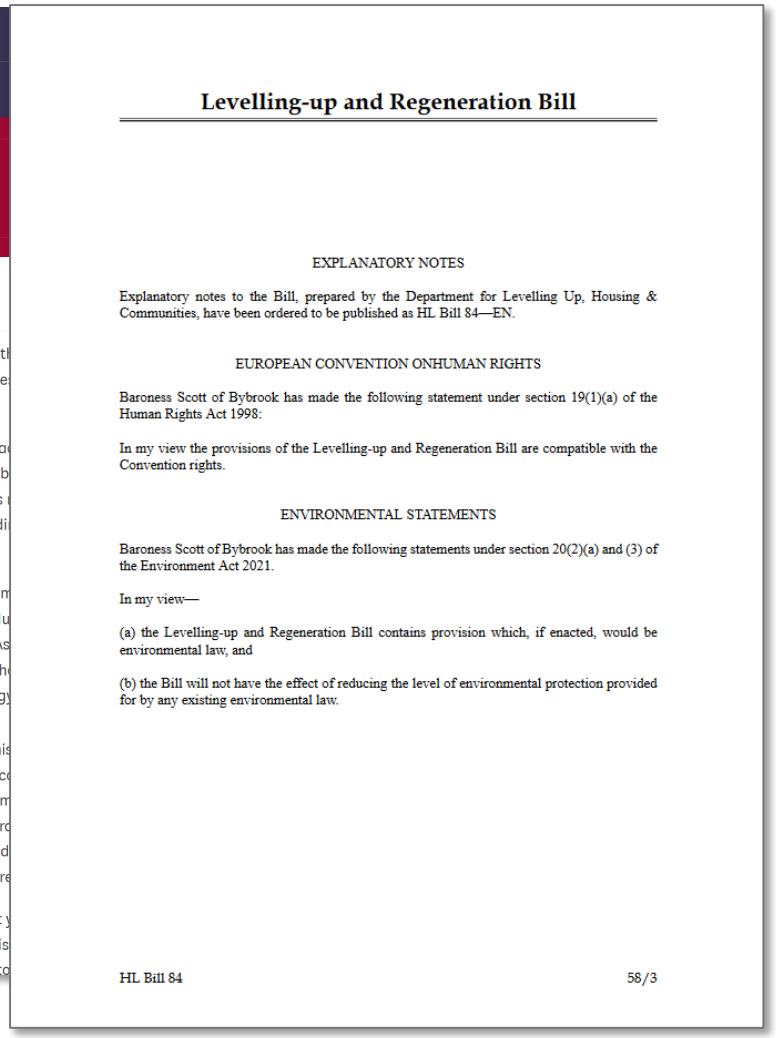
My Lords, I shall speak to my Amendment 484. I thank my supporters: t
Stunell, and the noble Baroness, Lady Hayman. I also declare my intere
Planet, and as a project director working for Atkins.

It would be helpful if I started with some definitions; I hope I am not tea
eggs. There are two types of emissions from buildings: operational carb
energy and water use; and embodied carbon, which is those emissions
Operational carbon emissions are already limited by Part L of the Buildi
parallel regulation limiting embodied carbon emissions.

For a long time, operational carbon emissions have accounted for the m
However, with decarbonisation of the grid, operational carbon has redu
set to continue, particularly with the introduction of electric heating. As
emissions in construction contribute an increasing proportion of the wh
buildings, with one study indicating that over two-thirds of a low-energy
embodied.

UK embodied carbon emissions represent some 50 million tonnes of emis
aviation and shipping combined—a huge quantity of emissions that is c
increased in recent years. We think of the huge effort that is going into m
aviation and shipping: we have a sustainable aviation fuels plan, jet zero
emission-free shipping based on ammonia and hydrogen. But for embod
place are sparse—although industry is making some good progress in re

Lord Boyce, who sat on these Benches but passed away, sadly, late last y
something like, "There is no such thing as problems, only solutions in dis
fantastic campaign, which has been under way for a number of years, to


Levelling-up and Regeneration Bill

EXPLANATORY NOTES

Explanatory notes to the Bill, prepared by the Department for Levelling Up, Housing & Communities, have been ordered to be published as HL Bill 84—EN.

EUROPEAN CONVENTION ONHUMAN RIGHTS

Baroness Scott of Bybrook has made the following statement under section 19(1)(a) of the Human Rights Act 1998:

In my view the provisions of the Levelling-up and Regeneration Bill are compatible with the Convention rights.

ENVIRONMENTAL STATEMENTS

Baroness Scott of Bybrook has made the following statements under section 20(2)(a) and (3) of the Environment Act 2021.

In my view—

(a) the Levelling-up and Regeneration Bill contains provision which, if enacted, would be environmental law, and

(b) the Bill will not have the effect of reducing the level of environmental protection provided for by any existing environmental law.

HL Bill 84 58/3

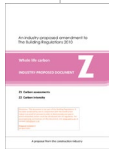
Debated in the House of Lords on 27 March 2023

Follow progress of the amendment

Part Z timeline




2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 | 2030




DLUHC proposed consultation

UK Net Zero Carbon Buildings Standard

BECD
Built Environment Carbon Database

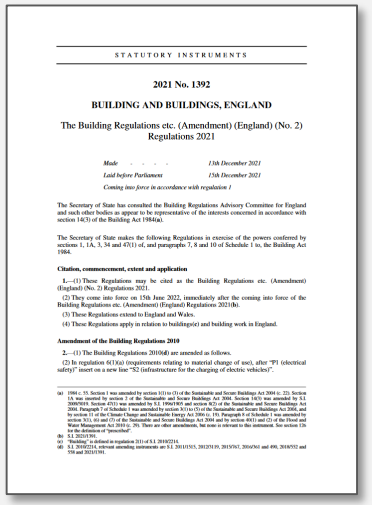
Part Z Proposed mandatory WLC reporting

Part Z Proposed limits on upfront Embodied Carbon

Three (or more!) implementation mechanisms

1
Secretary of State Instruction

to update Building Regulations (Statutory Instrument)



STATUTORY INSTRUMENTS

2021 No. 1392

BUILDING AND BUILDINGS, ENGLAND

The Building Regulations etc. (Amendment) (England) (No. 2) Regulations 2021

Made - - - - *13th December 2021*
Laid before Parliament *15th December 2021*
Coming into force in accordance with regulation 1

The Secretary of State has consulted the Building Regulations Advisory Committee for England and such other bodies as appear to be representative of the interests concerned in accordance with section 14(3) of the Building Act 1984(a).

The Secretary of State makes the following Regulations in exercise of the powers conferred by sections 1, 1A, 3, 34 and 47(1) of, and paragraphs 7, 8 and 10 of Schedule 1 to, the Building Act 1984.

Citation, commencement, extent and application

1.—(1) These Regulations may be cited as the Building Regulations etc. (Amendment) (England) (No. 2) Regulations 2021.

(2) They come into force on 15th June 2022, immediately after the coming into force of the Building Regulations etc. (Amendment) (England) Regulations 2021(b).

(3) These Regulations extend to England and Wales.

(4) These Regulations apply in relation to building(c) and building work in England.

Amendment of the Building Regulations 2010

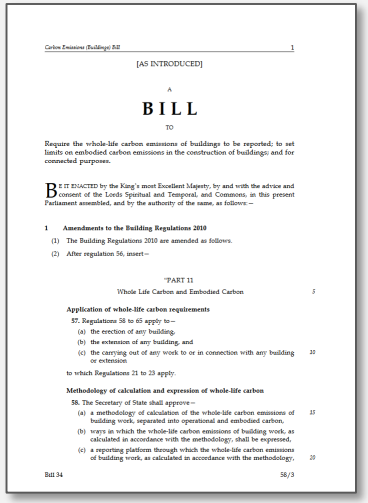
2.—(1) The Building Regulations 2010(d) are amended as follows.

(2) In regulation 6(1)(a) (requirements relating to material change of use), after "P1 (electrical safety)" insert on a new line "S2 (infrastructure for the charging of electric vehicles)".

(a) 1984 c. 55. Section 1 was amended by section 1(1) to (3) of the Sustainable and Secure Buildings Act 2004 (c. 22). Section 1A was inserted by section 3 of the Sustainable and Secure Buildings Act 2004. Section 14(3) was amended by S.I. 2009/3019. Section 47(1) was amended by S.I. 1990/1905 and section 8(2) of the Sustainable and Secure Buildings Act 2004. Paragraph 7 of Schedule 1 was amended by section 3(1) to (5) of the Sustainable and Secure Buildings Act 2004, and by section 31 of the Climate Change and Sustainable Energy Act 2006 (c. 19). Paragraph 8 of Schedule 1 was amended by section 3(6) of the Sustainable and Secure Buildings Act 2004 and by sections 44(1) and (2) of the Flood and Water Management Act 2010 (c. 29). There are other amendments, but none is relevant to this instrument. See section 12(1) for the definition of "prescribed".
(b) S.I. 2021/1391.
(c) "Building" is defined in regulation 2(1) of S.I. 2010/2214.
(d) S.I. 2010/2214. The most recent amending instruments are S.I. 2013/1565, 2012/3118, 2015/767, 2016/361 and 490, 2018/552 and 539 and 2021/1391.

2
Independent legislation

e.g. Private Member's Bill: "Carbon Emissions (Buildings) Bill"



Carbon Emissions (Buildings) Bill 1

[AS INTRODUCED]

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(c) a reporting platform through which the whole-life carbon emissions of building work, as calculated in accordance with the methodology,

Bill 34 58/3

3
Added to other legislation

e.g. Future Homes (and Buildings) Standard

WHERE NEXT?

Trends to watch

1. More science based targets
2. More mainstream disclosure
3. Moves towards regulation

Trends to watch

1. More science based targets
2. More mainstream disclosure
3. Moves towards regulation

What is the Science Based Targets initiative?

"The Science Based Targets initiative (SBTi) is a global body enabling businesses to set ambitious emissions reductions targets in line with the latest climate science."

SCIENCE BASED TARGETS

PARTNER ORGANIZATIONS

CDP
DRIVING SUSTAINABLE ECONOMIES

UN GLOBAL COMPACT

WORLD RESOURCES INSTITUTE

WWF

IN COLLABORATION WITH

WE MEAN BUSINESS

Five step process

COMMIT

Submit a letter establishing your intent to set a science-based target

DEVELOP

Work on an emissions reduction target in line with the SBTi's criteria

SUBMIT

Present your target to the SBTi for official validation

COMMUNICATE

Announce your target and inform your stakeholders

DISCLOSE

Report company-wide emissions and progress against targets on an annual basis

For more on each step of the process see this guide

Uptake of Science Based Targets

SBTi companies taking action (numbers accurate as of 13/07/23)

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

BUILDINGS SECTOR SCIENCE BASED TARGET SETTING GUIDANCE

Version 1.5 - **DRAFT**

May 15, 2023

Current consultation

Draft guidance for sector out for consultation with draft buildings target setting tool until 16th July

You can read more or respond to the consultation

UKNZCBS Consultation

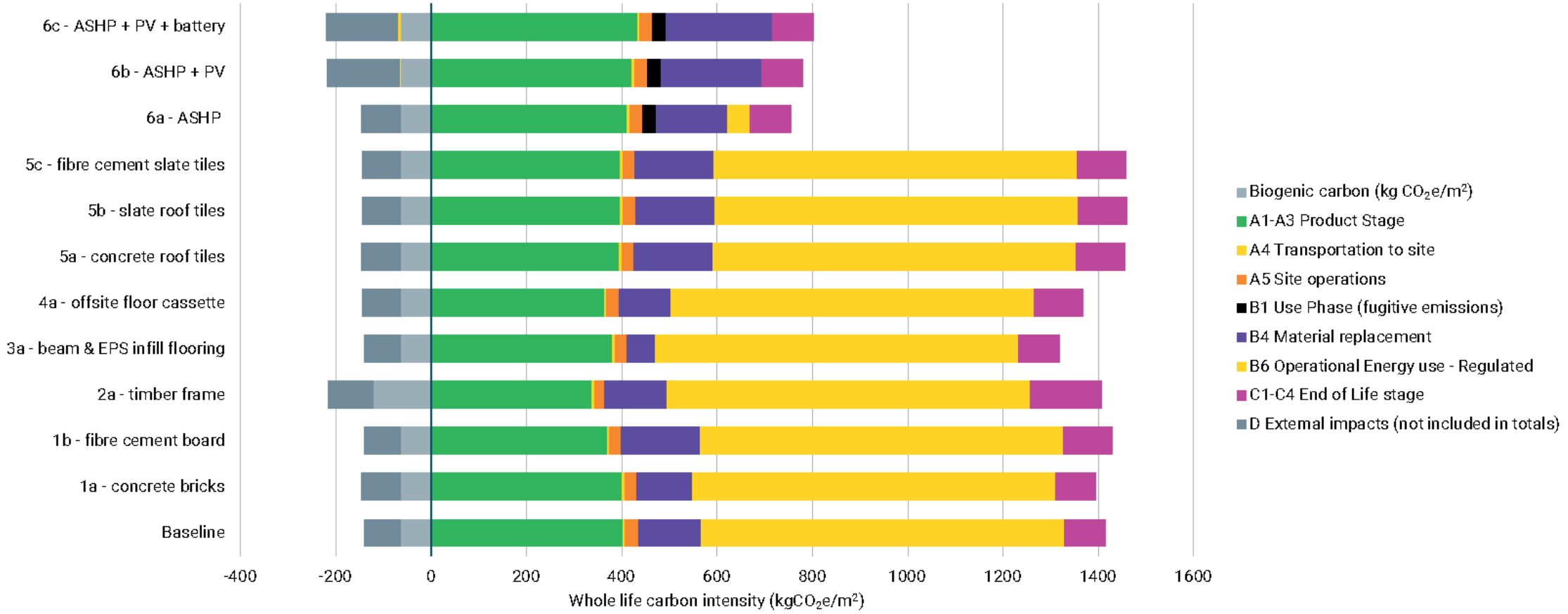
Read and respond here

Trends to watch

1. More science based targets
2. More mainstream disclosure
3. Moves towards regulation

Future Homes Hub plan

Future Homes Hub scenarios



Future Homes Hub (2023)

Future Homes Hub distribution

Figure D4 – Upfront carbon intensity by construction system within the phase 1 dataset

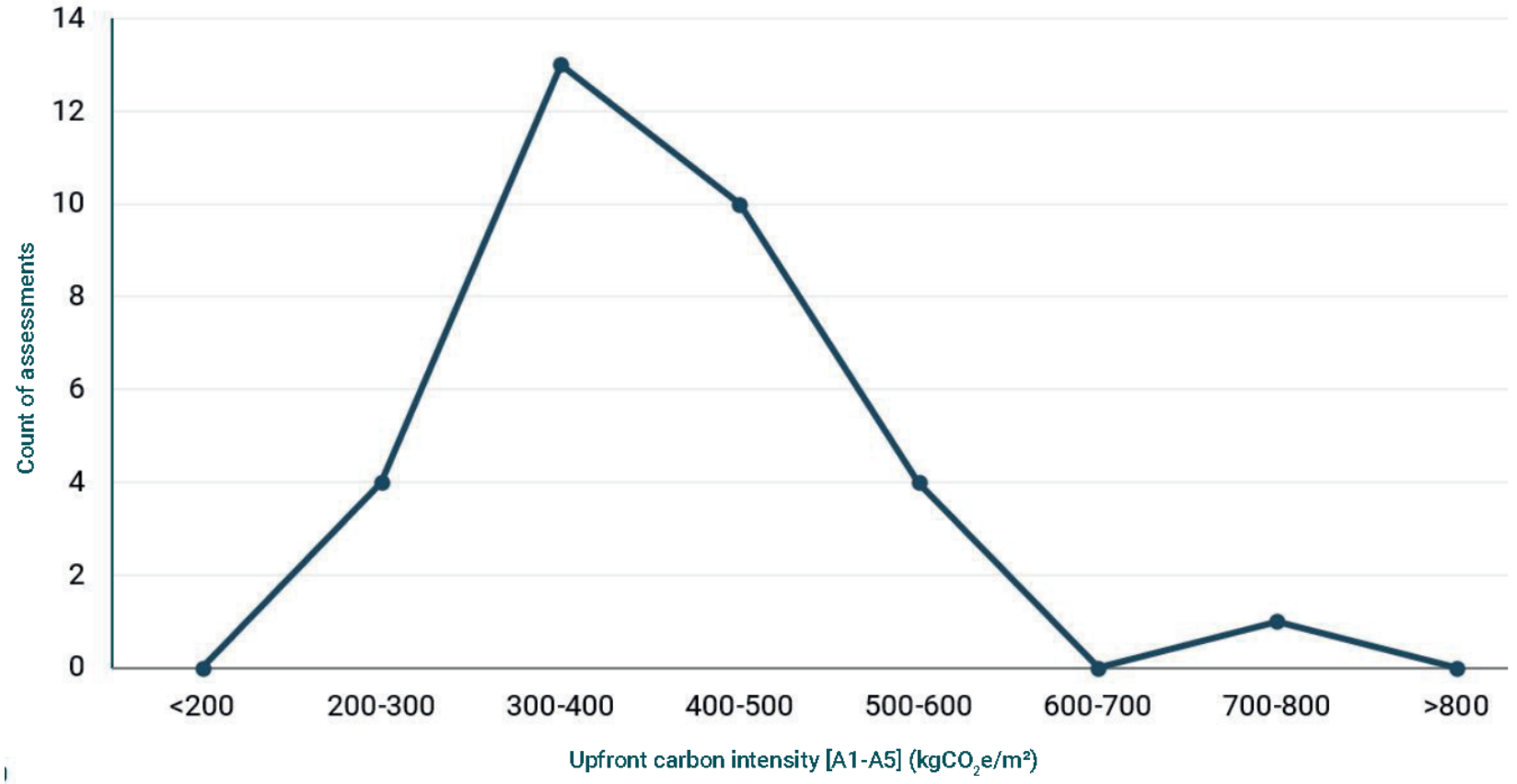


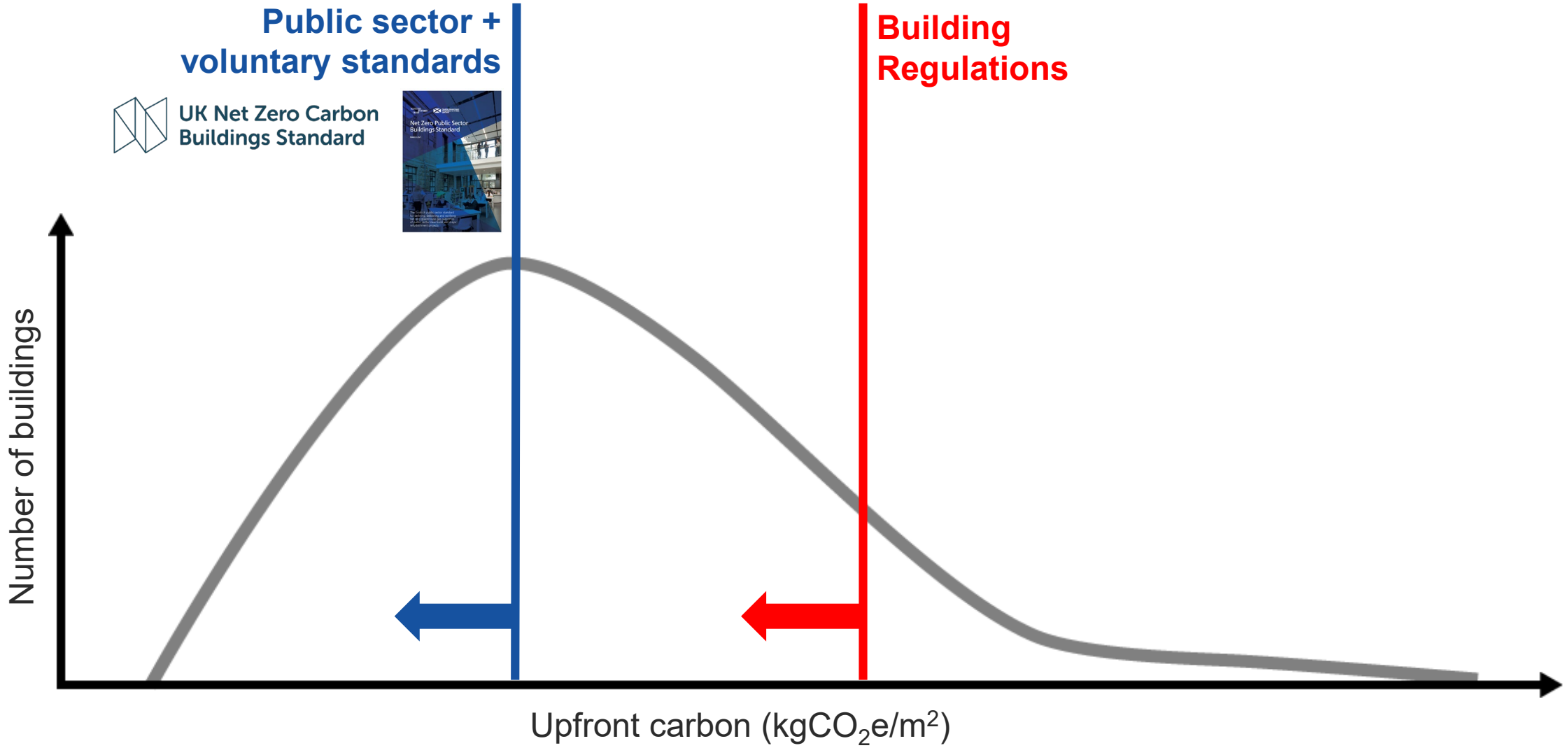
Figure D5 – Distribution of upfront carbon assessment outcomes within the phase 1 dataset

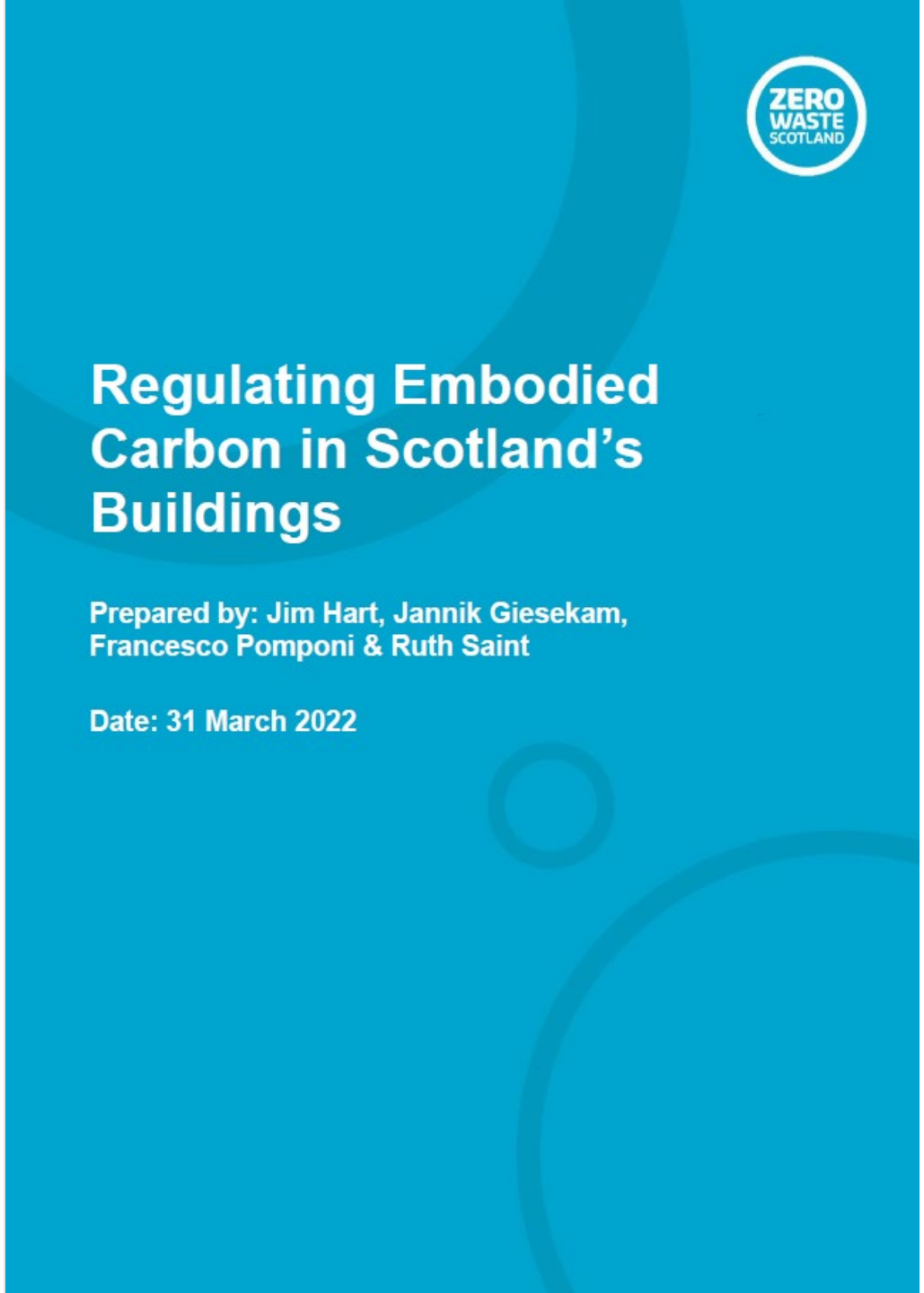
Future Homes Hub (2023)

Trends to watch

1. More science based targets
2. More mainstream disclosure
3. Moves towards regulation

Typical distribution & suggested response

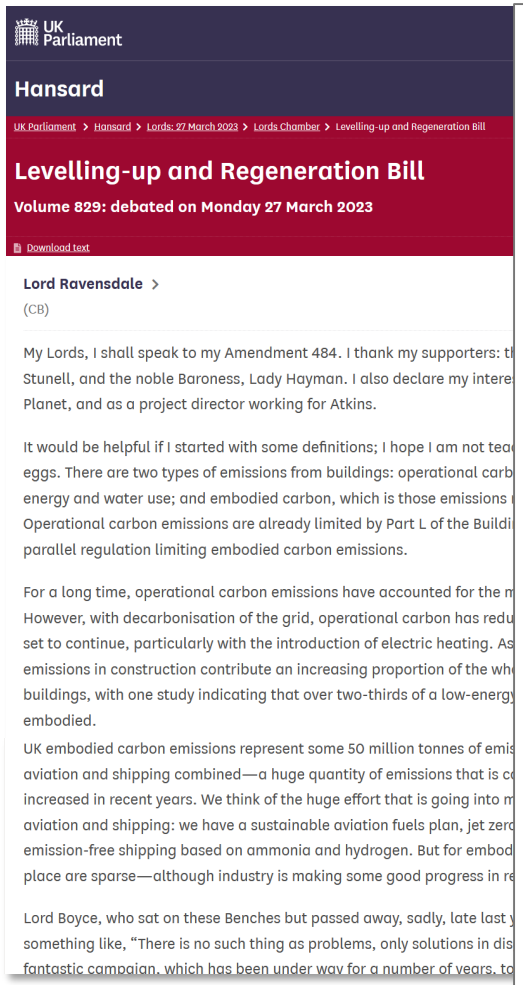




March 2022 report

- Report sets out **proposals for developing regulation of embodied carbon in Scotland's buildings**
- Reviews equivalent policies in other nations
- Considers the who, what, where, why & how of implementing regulations in Scotland
- Includes suggested timeline & programme of work

Amendment 484 to the Levelling Up and Regeneration Bill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UK Parliament > Hansard > Lords: 27 March 2023 > Lords Chamber > Levelling-up and Regeneration Bill

Levelling-up and Regeneration Bill

Volume 829: debated on Monday 27 March 2023

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Lord Ravensdale >

(CB)

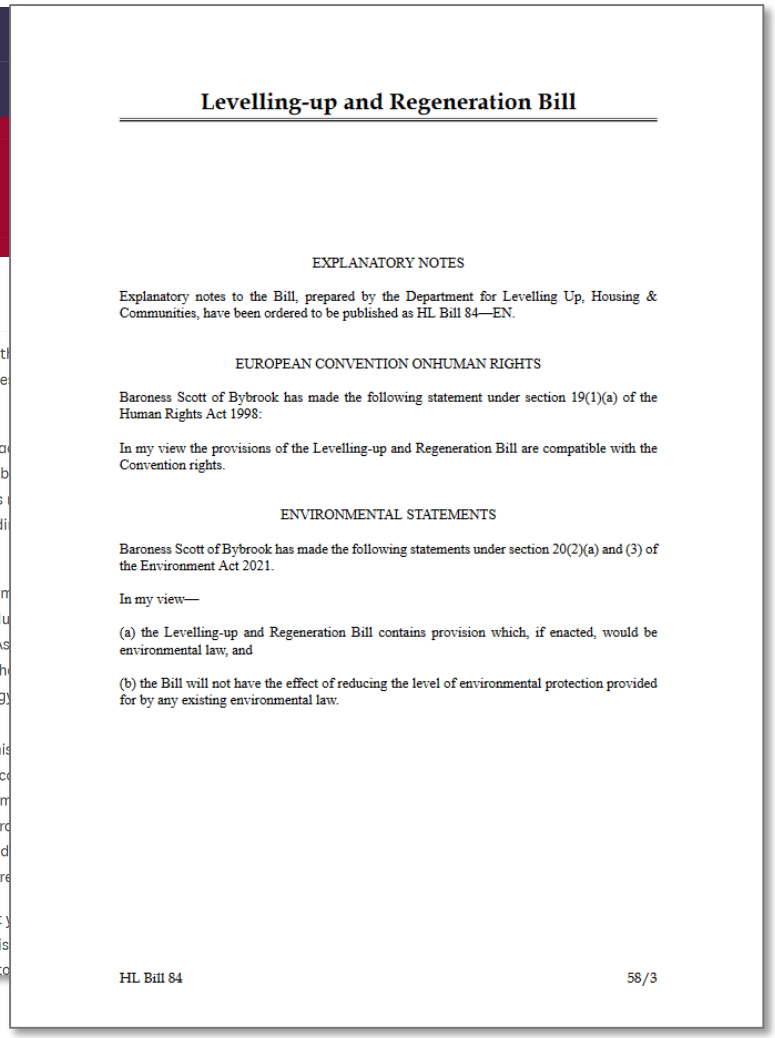
My Lords, I shall speak to my Amendment 484. I thank my supporters: t
Stunell, and the noble Baroness, Lady Hayman. I also declare my intere
Planet, and as a project director working for Atkins.

It would be helpful if I started with some definitions; I hope I am not tea
eggs. There are two types of emissions from buildings: operational carb
energy and water use; and embodied carbon, which is those emissions
Operational carbon emissions are already limited by Part L of the Buildi
parallel regulation limiting embodied carbon emissions.

For a long time, operational carbon emissions have accounted for the m
However, with decarbonisation of the grid, operational carbon has redu
set to continue, particularly with the introduction of electric heating. As
emissions in construction contribute an increasing proportion of the wh
buildings, with one study indicating that over two-thirds of a low-energy
embodied.

UK embodied carbon emissions represent some 50 million tonnes of emis
aviation and shipping combined—a huge quantity of emissions that is c
increased in recent years. We think of the huge effort that is going into m
aviation and shipping: we have a sustainable aviation fuels plan, jet zero
emission-free shipping based on ammonia and hydrogen. But for embod
place are sparse—although industry is making some good progress in re

Lord Boyce, who sat on these Benches but passed away, sadly, late last y
something like, "There is no such thing as problems, only solutions in dis
fantastic campaign, which has been under way for a number of years, to


Levelling-up and Regeneration Bill

EXPLANATORY NOTES

Explanatory notes to the Bill, prepared by the Department for Levelling Up, Housing & Communities, have been ordered to be published as HL Bill 84—EN.

EUROPEAN CONVENTION ONHUMAN RIGHTS

Baroness Scott of Bybrook has made the following statement under section 19(1)(a) of the Human Rights Act 1998:

In my view the provisions of the Levelling-up and Regeneration Bill are compatible with the Convention rights.

ENVIRONMENTAL STATEMENTS

Baroness Scott of Bybrook has made the following statements under section 20(2)(a) and (3) of the Environment Act 2021.

In my view—

(a) the Levelling-up and Regeneration Bill contains provision which, if enacted, would be environmental law, and

(b) the Bill will not have the effect of reducing the level of environmental protection provided for by any existing environmental law.

HL Bill 84 58/3

Debated in the House of Lords on 27 March 2023

Follow progress of the amendment

WHAT SHOULD I BE TEACHING?

Key elements

1. Assessment
2. Familiarity with EPD
3. Management
4. Communication

+ *design options etc…*

ANY QUESTIONS?