



University of
Strathclyde
Glasgow

Deconstructing carbon

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These slides are available from jannikgiesekam.co.uk

Nations Unies

Conférence sur les Changements Climatiques 2015

COP21/CMP11

Paris France



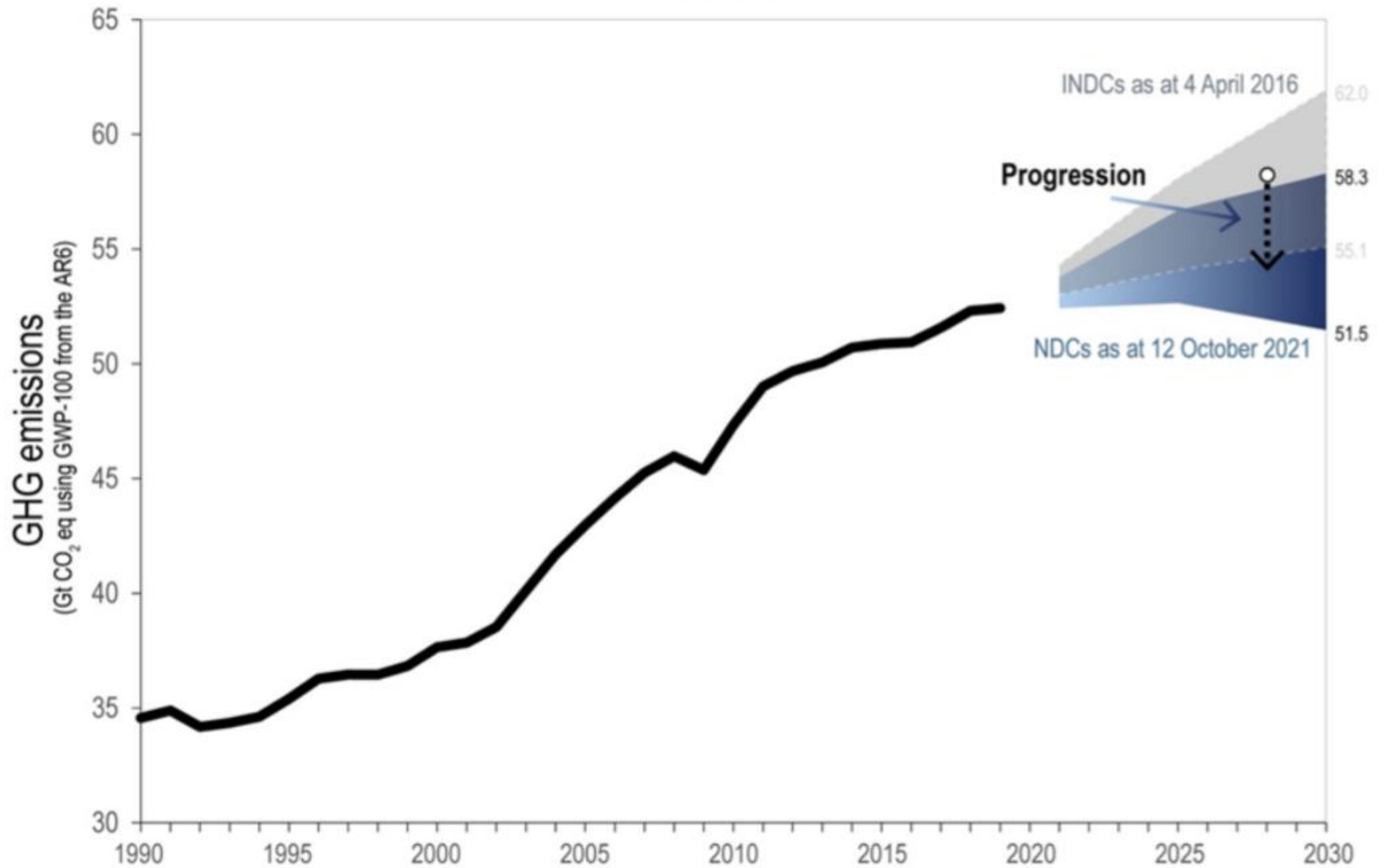


Figure 2 from UNFCCC (2021) Nationally determined contributions under the Paris Agreement. Revised synthesis report by the secretariat

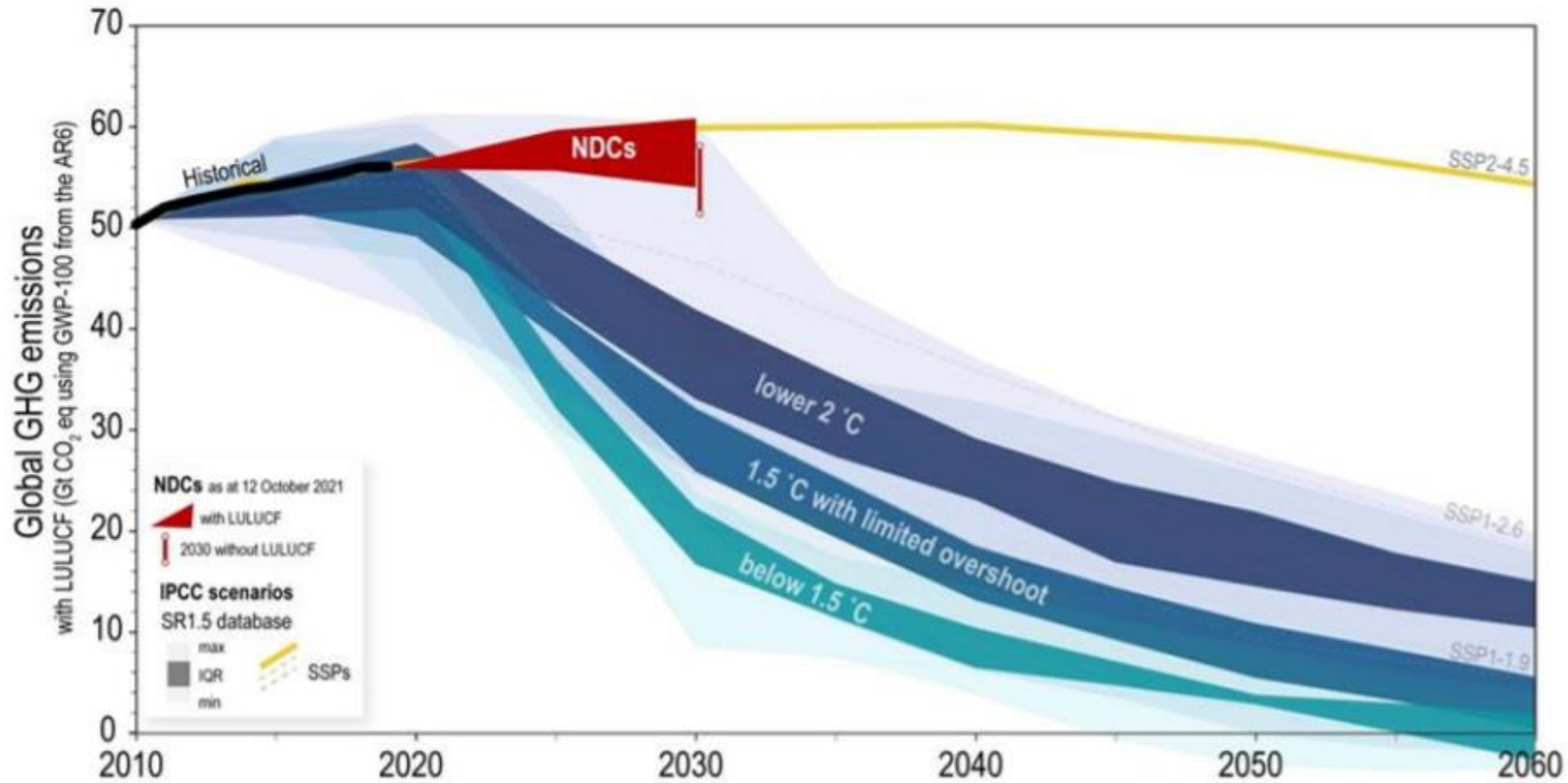


Figure 9 from UNFCCC (2021) Nationally determined contributions under the Paris Agreement. Revised synthesis report by the secretariat

2100 WARMING PROJECTIONS

Emissions and expected warming based on pledges and current policies



May 2021 update

Warming projected by 2100

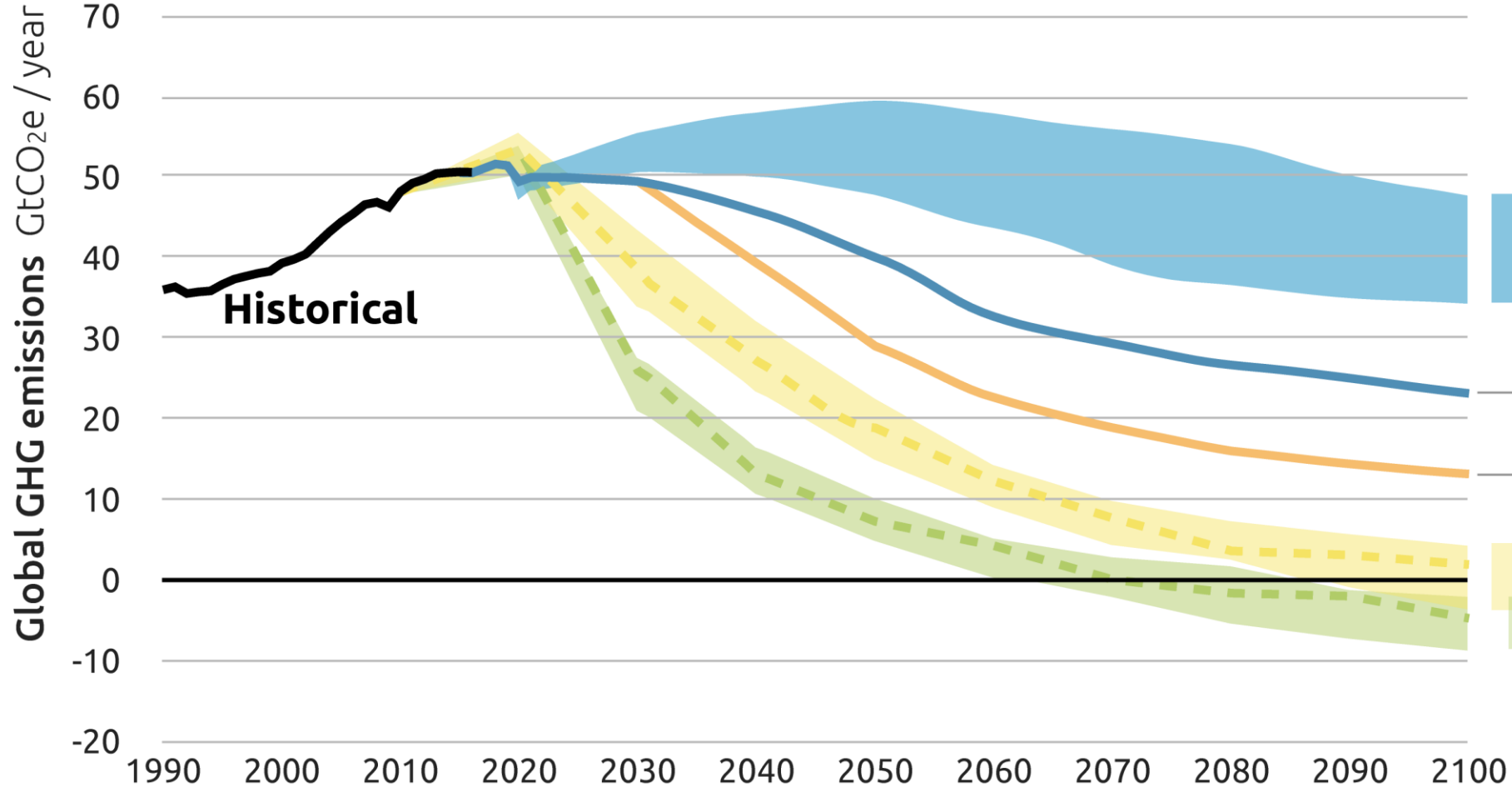
Current policies
2.7 – 3.1°C

Pledges & Targets
2.4°C

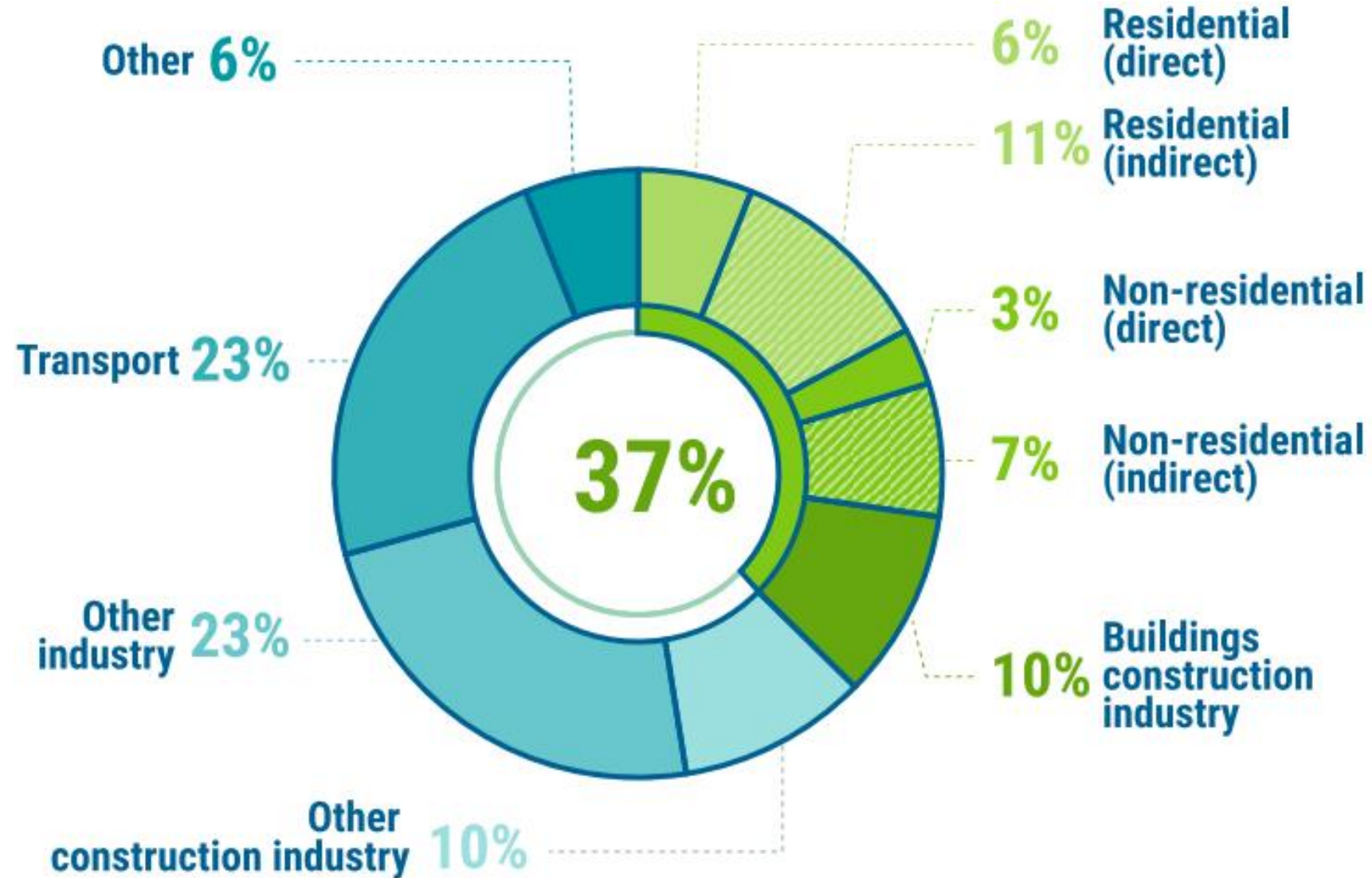
Optimistic net zero targets
2.0°C

2°C consistent
1.6 – 1.7°C

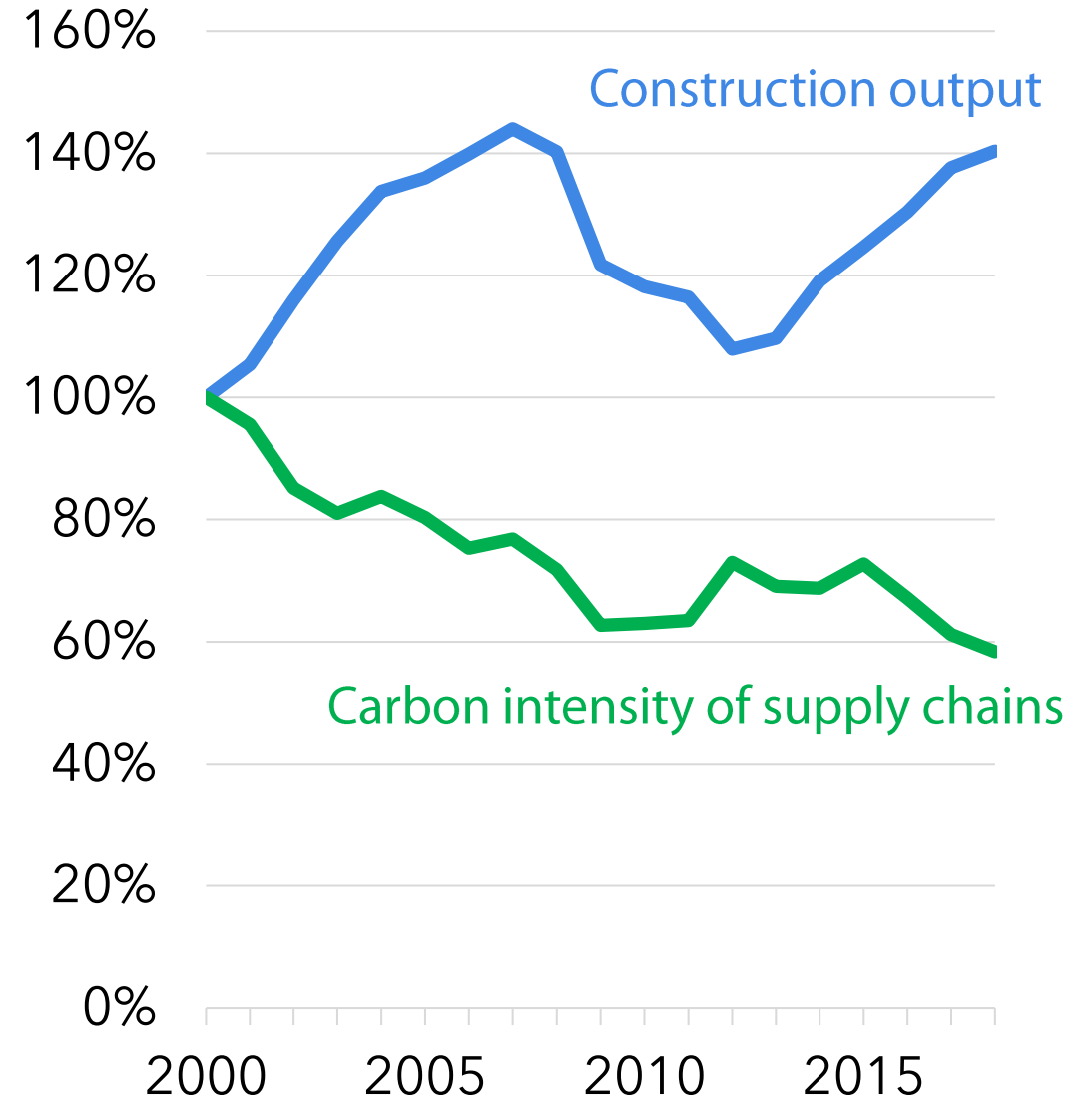
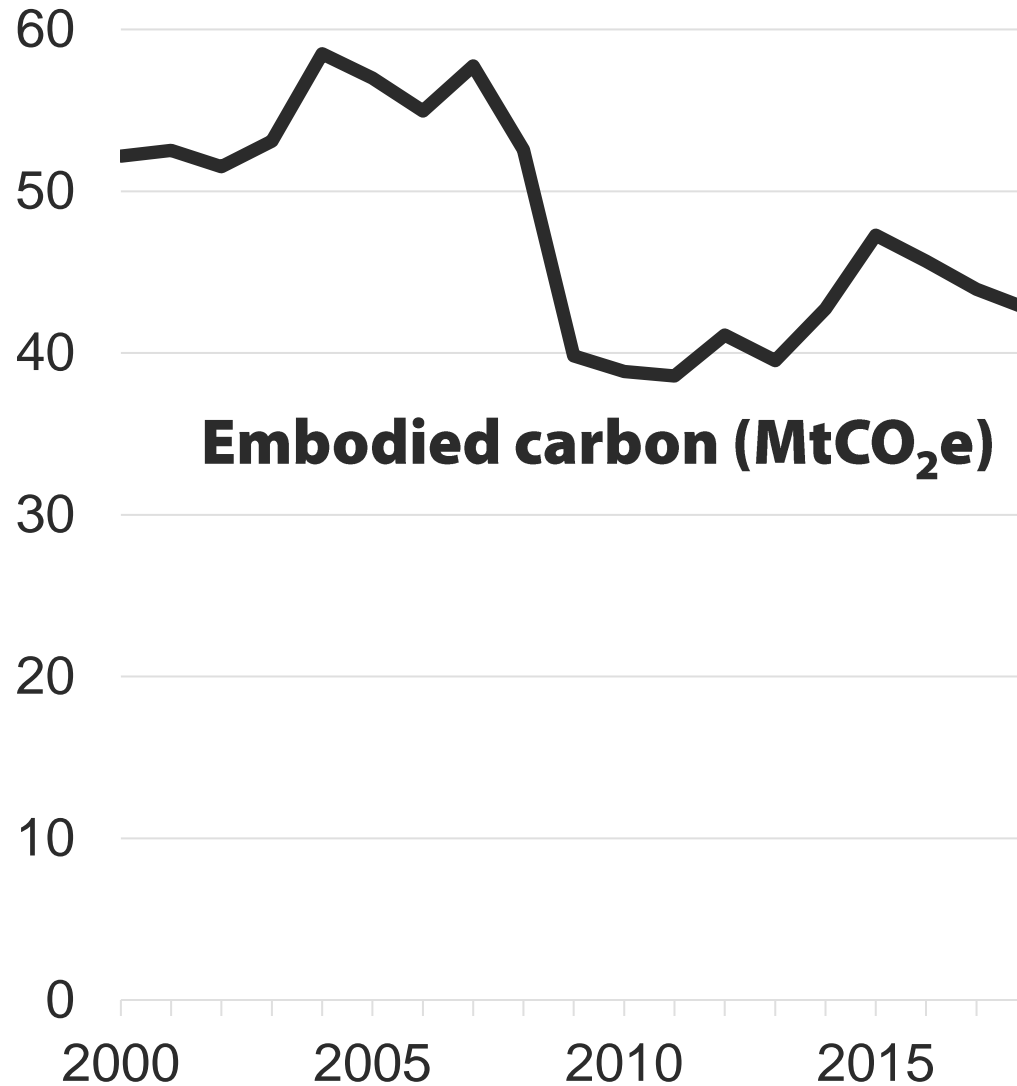
1.5°C consistent
1.3°C



2020 global energy-related CO₂ emissions



Scale – UK total built environment



Scale – buildings

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



4x brick pallets

~1 tCO₂

At 232 kgCO₂e/t brick
(A1-A5) from UK clay
brick EPD



King's Cross Sports Hall

709 tCO₂e

2000m² facility, LETI B-rated for embodied
carbon & sequesters 638 tCO₂



5 Broadgate

46,324 tCO₂e

13 storeys, 65,300m² of office
space to practical completion

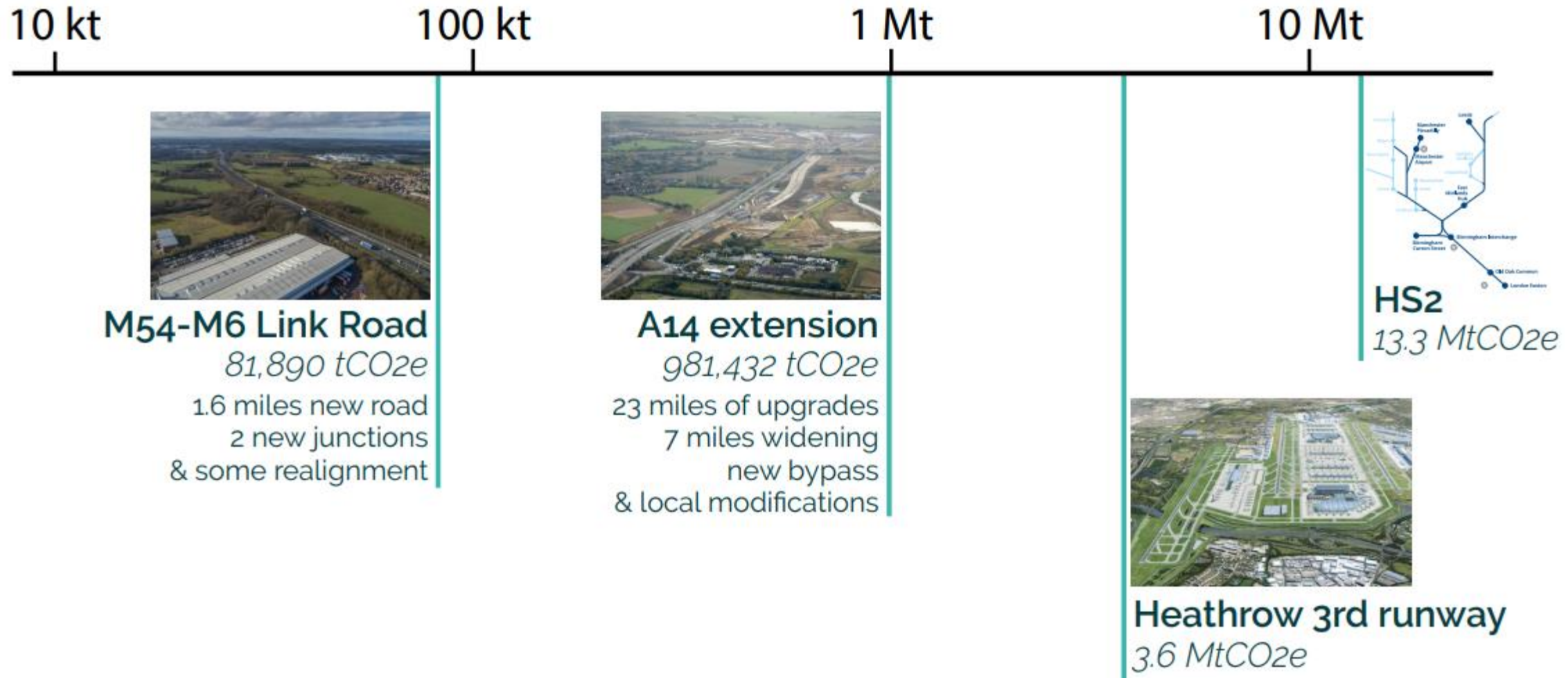


**Development
Pipeline**







209,051 tCO₂e

Forecasted total
embodied carbon in
2021 Sustainability
Report

Scale – infrastructure



European policy response

Location		Instrument	Policy owner	Brief description	Status
Netherlands		Bouwbesluit (Building Act) 2012 Building Decree + subsequent amendments	Ministerie van Binnenlandse Zaken en Koninkrijksrelaties (Ministry of the Interior and Kingdom Relations)	Mandatory Life Cycle Assessment (LCA) calculation using national assessment method , database and approved tools. The combined monetised impacts of 11 LCA impact categories are capped.	Reporting in force since 2013. Cap in place since Jan 2018.
Finland		Reform of the Land Use and Building Act	Ministry of the Environment	Assessment of building footprint and handprint in accordance with national methodology using national database will be required for building permit.	First limits to be introduced for public projects with limits for most buildings to be introduced by 2025
Sweden		New Act on climate declarations for new buildings is under development	Boverket (National Board of Housing, Building & Planning)	Will require a 'climate declaration' using common database and methodology with results deposited in a climate register for buildings. Limits will be introduced after an initial period of data gathering following a proposed roadmap .	Reporting requirements intended from 01/01/22. Limit values (and additional reporting modules) proposed from 2027 and subsequently ratcheted down.
France		RE2020 (Environmental Regulations 2020) + decrees	Ministry of Ecological Transition	Introduces whole life dynamic LCA requirements followed by limits. Supported by national database (with its own associated requirements driven by regulations).	Requirements relating to buildings for residential, office, primary and secondary education were published in July 2021 and apply from 2022/23
Denmark		National Strategy for Sustainable Construction + building regulations	Ministry of Transport and Housing	Mandatory LCA calculation for new buildings, with impact limits for buildings over 1000m ²	Political agreement in March 2021 plans introduction from 2023. Overview in English here . Ratcheting down of limits proposed in 2025, 2027 and 2029.
EU		Level(s)	European Commission	Framework launched in October 2020 after 5 years of testing, including set of indicators intended to harmonise metrics and language on sustainability performance of buildings across the EU. Just starting process of integration into requirements.	EC has proposed green public procurement criteria using Level(s) for offices & schools from June 2022 and integrated Level(s) into the EU taxonomy for sustainable activities

US policy response

Location	Instrument	Materials included	Description	Status
California	Buy Clean California Act	<ol style="list-style-type: none"> 1. Carbon steel rebar 2. Flat glass 3. Mineral wool board insulation 4. Structural steel 	Public works undertaken by state agencies must submit Environmental Product Declarations (EPD) demonstrating compliance against Global Warming Potential (GWP) limits determined by the Department of General Services.	Bill passed in 2017. June 2021 amendment delayed introduction into 2022. Limits will be revised in 2025 and every 3 years thereafter.
Colorado	HB21-1303 Global Warming Potential For Public Project Materials	<ol style="list-style-type: none"> 1. asphalt and asphalt mixtures; 2. cement and concrete mixtures; 3. glass; 4. post-tension steel; 5. reinforcing steel; 6. structural steel; and 7. wood structural elements 	The office of the state architect and the department of transportation are each required to establish policies regarding the global warming potential for specific categories of eligible materials used to construct certain public projects. The limits are to be based on the industry average for each material.	Bill signed in June 2021. Limits come into effect from 01/01/24. Limits will be reviewed in 2026 and every 4 years thereafter (with a slightly different timeline for transportation projects).
Federal	CLEAN Future Act (Title V Subtitle C Sec 521-524)	<ol style="list-style-type: none"> 1. aluminium; 2. iron; 3. steel; 4. concrete; 5. cement; and if deemed "appropriate" by the Administrator <ol style="list-style-type: none"> (i) flat glass; (ii) insulation; (iii) unit masonry; and (iv) wood products 	As proposed, public works undertaken by federal agencies must submit EPD demonstrating compliance against GWP limits	Bill introduced to house 03/02/21 and referred to house committees. Would come into force 1 year after enactment with a 3 year review cycle.

+7 states have introduced other variations (some material-specific or focused at smaller scales e.g. county/city). See the University of Washington's Carbon Leadership Forum [policy toolkit](#) for an overview.

See [this presentation](#) for more on international regulations

The Institution of
StructuralEngineers

Regulating embodied carbon

—
Dr Jannik Gieseke
Chancellor's Fellow, University of Strathclyde

www.istructe.org

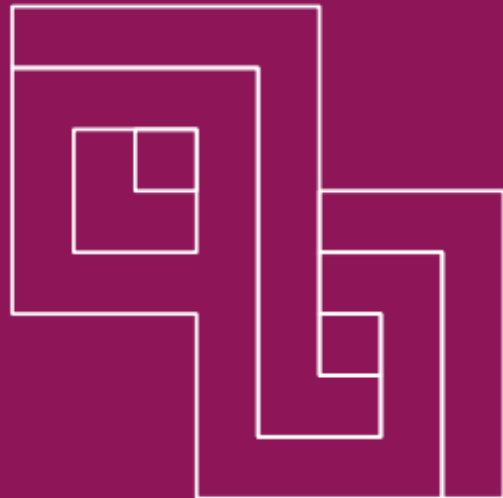


HM Government

THE CONSTRUCTION PLAYBOOK

Government Guidance

on sourcing and contracting public works
projects and programmes



Version 1.0
December 2020



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.”

Net Zero Strategy: Build Back Greener

October 2021

“

Government aims to support action in the construction sector by improving reporting on embodied carbon in buildings and infrastructure with a view to exploring a maximum level for new builds in the future.”

See [Twitter thread](#) for a summary of other mentions

Government Response to the Climate Change Committee

Progress in Reducing Emissions - 2021 Report to Parliament

Presented to Parliament pursuant to
Section 37 of the Climate Change Act 2008



We are working across Government and Industry to develop and test Whole Life Carbon methodologies for major built assets. We intend to carry out some longer-term work to consider the future of energy efficient buildings beyond the Future Homes Standard and the Future Buildings Standard...We expect this work to consider embodied carbon.”

Greening Finance:

A Roadmap to Sustainable Investing

October 2021



HM Government



Strategy to deliver new economy-wide Sustainability Disclosure Requirements...incorporating the UK Green Taxonomy...Technical Screening Criteria will be based on those of the EU Taxonomy...The Government is currently reviewing these and expects to consult on UK draft TSCs in the first quarter of 2022, ahead of legislating by the end of 2022”

See [Twitter thread](#) for a summary



HM Government

Heat and Buildings Strategy

Presented to Parliament by the Secretary of
State for Business, Energy and Industrial
Strategy by Command of Her Majesty

October 2021

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EAC Inquiry

Ongoing [inquiry](#) into the 'Sustainability of the built environment' by the Environmental Audit Committee

[Read 126 written responses](#)

Or watch evidence sessions ➔



Environmental Audit Committee

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



MAYOR OF LONDON

THE LONDON PLAN



THE SPATIAL DEVELOPMENT
STRATEGY FOR GREATER LONDON

MARCH 2021

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](#)

A proposed amendment to
The Building Regulations 2010

Whole life carbon

Z

APPROVED DOCUMENT

Z1 Carbon assessments

Z2 Carbon intensity

Disclaimer: This document is not yet part of the Building Regulations. It has been produced by and in conjunction with the construction industry as a proof of concept in order to demonstrate one way in which embodied carbon could be introduced into UK regulation. For accompanying commentary on this document, visit www.part-z.uk, or contact hello@part-z.uk

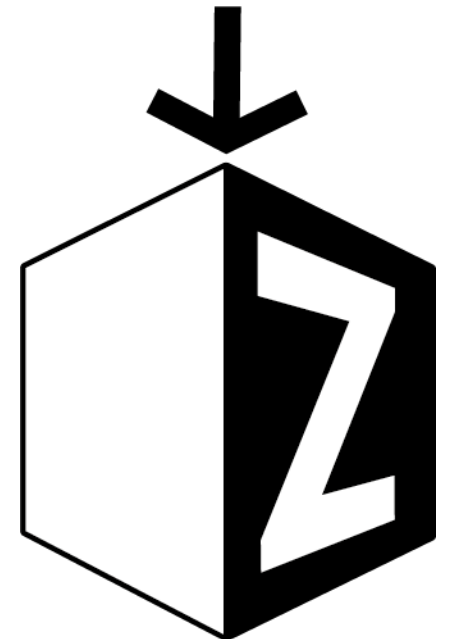
Proposal revision 0
20 July 2021

A proposal from the construction industry

Part Z proposals

Proposed amendment to Building Regulations and corresponding proof of concept approved document.

Visit part-z.uk to read the proposals and [lend your support](#)



[Home](#)[Proposal](#)[Industry Support](#)[Blog](#)[Authors](#)[FAQ](#)[Press](#)[Subscribe](#)

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](#) | [Allies & Morrison](#) | [Arup](#) | [Atelier Ten](#) | [Atkins Limited](#) | [Baily Garner](#) | [BAM Construct UK](#) | [BakerHicks](#) | [Bennetts Associates](#) | [Black & White Engineering](#) | [British Land](#) | [Buro Happold](#) | [The Chartered Institution of Building Services Engineers](#) | [Civic Engineers](#) | [Cundall](#) | [dRMM Architects](#) | [Elliott Wood](#) | [Expedition Engineering](#) | [Feilden Clegg Bradley Studios](#) | [FMDC Ltd](#) | [Goss Structural Ltd](#) | [Grosvenor Great Britain & Ireland](#) | [Hawkins\Brown](#) | [Haworth Tompkins](#) | [Heyne Tillett Steel](#) | [Hoare Lea](#) | [Hopkins Architects](#) | [Hydrock Consultants Ltd](#) | [Igloo](#) | [The Institution of Civil Engineers](#) | [The Institution of Structural Engineers](#) | [Laing O'Rourke](#) | [Landsec](#) | [Lendlease](#) | [Levitt Bernstein](#) | [The London Energy Transformation Initiative](#) | [Max Fordham LLP](#) | [Morgan Sindall Group](#) | [Mott Macdonald](#) | [Multiplex Europe](#) | [Perkins & Will](#) | [Price & Myers](#) | [The Royal Institute of British Architects](#) | [RPS Group PLC](#) | [Skidmore, Owings & Merrill \(SOM\)](#) | [Stanhope PLC](#) | [The Steel Construction Institute](#) | [The Structural Timber Association](#) | [Thornton Tomasetti](#) | [tp bennett LLP](#) | [University College of Estate Management](#) | [Urban Splash](#) | [UKGBC](#) | [Walsh](#) | [Waugh Thistleton Architects](#) | [Willmott Dixon](#) | [WSP-UK](#) | [White Arkitekter](#) ...and 56 more!

EVENT: COP26: Net Zero Whole Life Carbon Roadmap Launch

Official launch of UKGBC's Net Zero Whole Life Carbon Roadmap for the UK Built Environment



WHEN

November 11, 2021
11:30 am - 12:30 pm

WHERE

Blue Zone, UK Government Pavilion.
Event will also be live streamed (details to follow)

SHARE



EVENT: COP26: UKGBC – Scotland launch, Glasgow

Join us in Glasgow for the first launch event for UKGBC - Scotland



WHEN

November 4, 2021
6:00 pm - 8:00 pm

WHERE

JLL, 150 St Vincent Street, Glasgow, G2
5ND
[View map](#)

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Strathclyde
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Thanks

jannik.gieseckam@strath.ac.uk / [@jannikgieseckam](https://twitter.com/jannikgieseckam)

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