UK Net Zero Carbon Buildings Standard

Webinar: Technical Update & Consultation

10 July 2023

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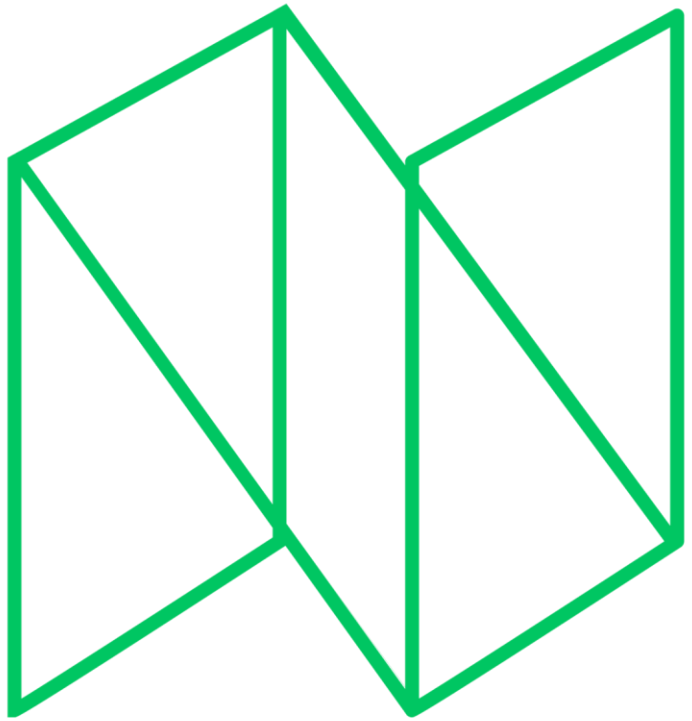
Chair of the Technical Steering Group

UK Net Zero Carbon Buildings Standard

Agenda

1. Introduction
2. The Technical Update
    a. Structure
    b. Fundamentals
    c. Requirements
    d. Performance Levels
    e. Top-Down Pathways
3. The Consultation
4. Next steps
5. Q&A



Introduction

UK Net Zero Carbon
Buildings Standard

Introduction

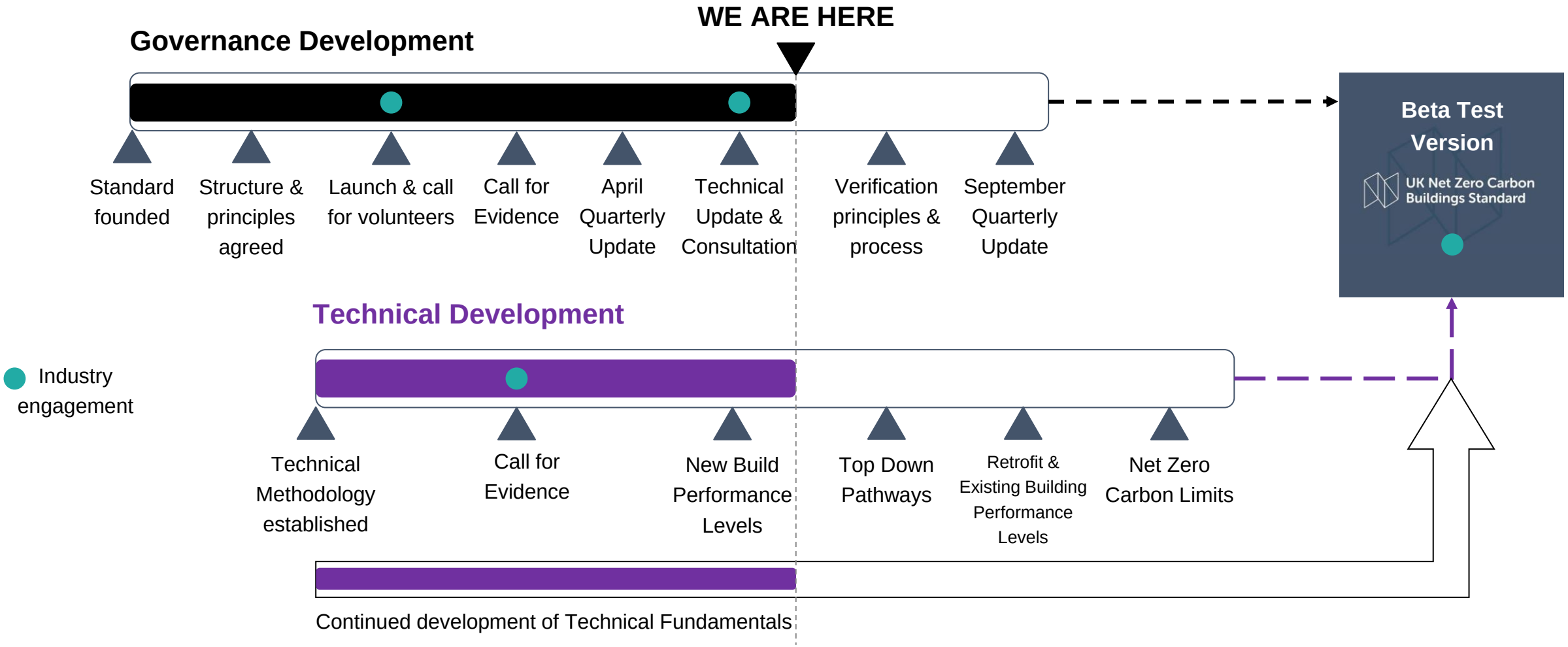
Technical Update

- Fundamentals & Requirements
- Performance Levels

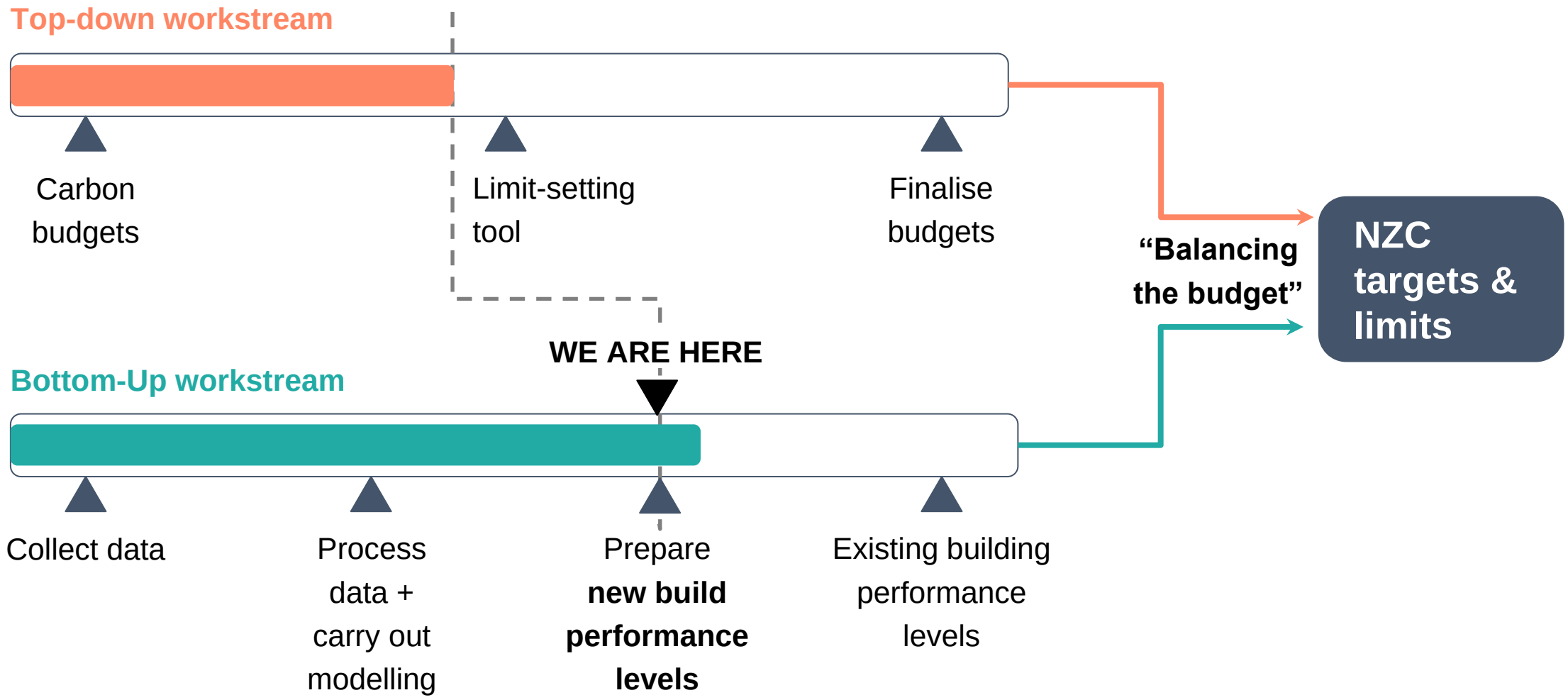
Consultation

- Seeking views from across the built environment

Progress towards the Standard



Progress towards NZC Limits



To all of our contributors - Thank You!

- Sector Groups
- Modellers
- Task Groups
- Data Providers
- Project Managers
- Administrators
- Comms & Engagement
- Stakeholders
- Early Consultation Responders

140+
Task Group members

190+
Sector Group members

Your support is essential to the Standard

800
Projects embodied carbon data

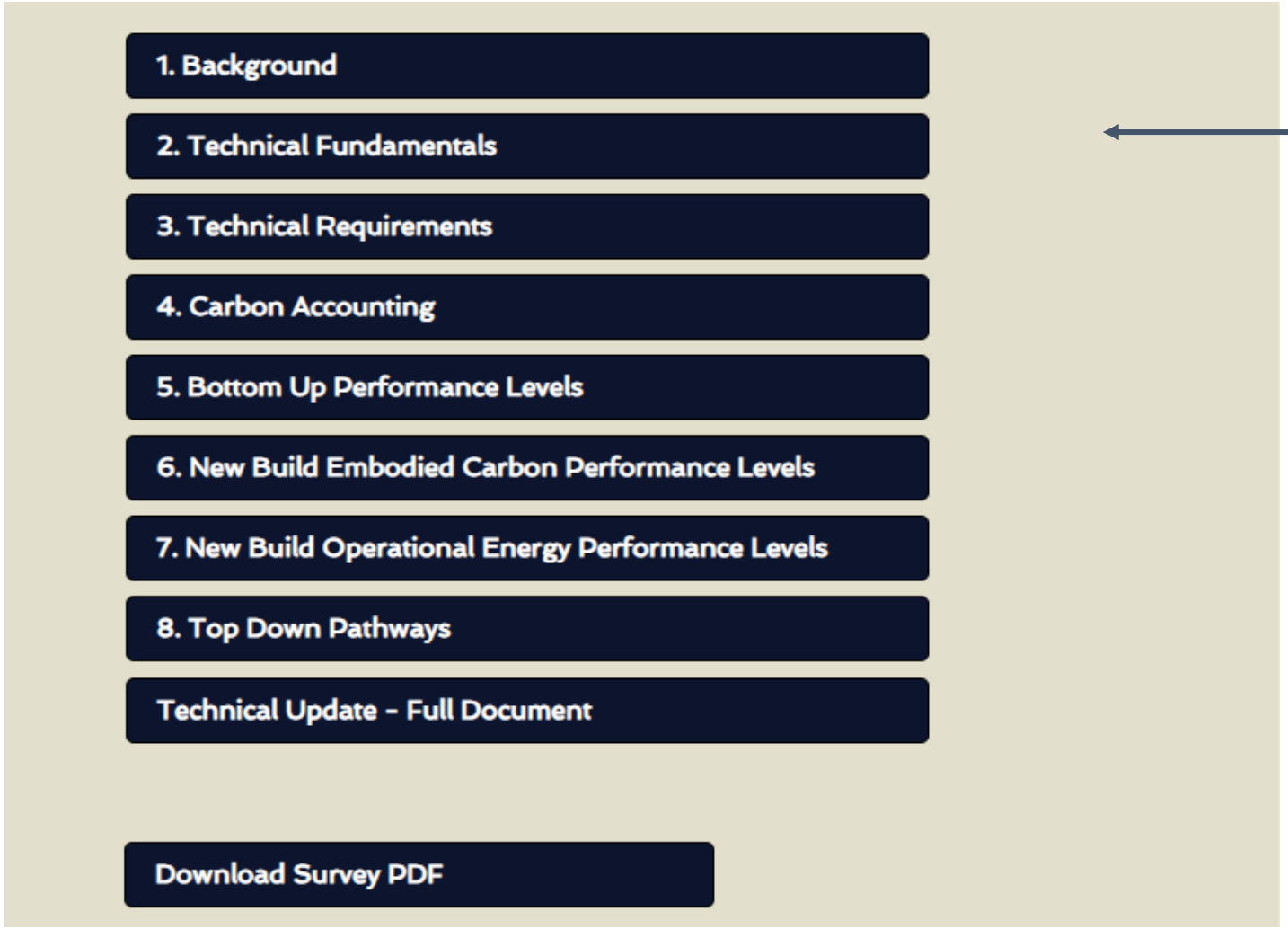
3200
Projects metered operational energy (large datasets)

200+
Projects metered operational energy (individual projects)

The Technical Update

UK Net Zero Carbon
Buildings Standard

Structure of the Technical Update



Accessible via our website:
www.nzcbuildings.co.uk

Technical Fundamentals

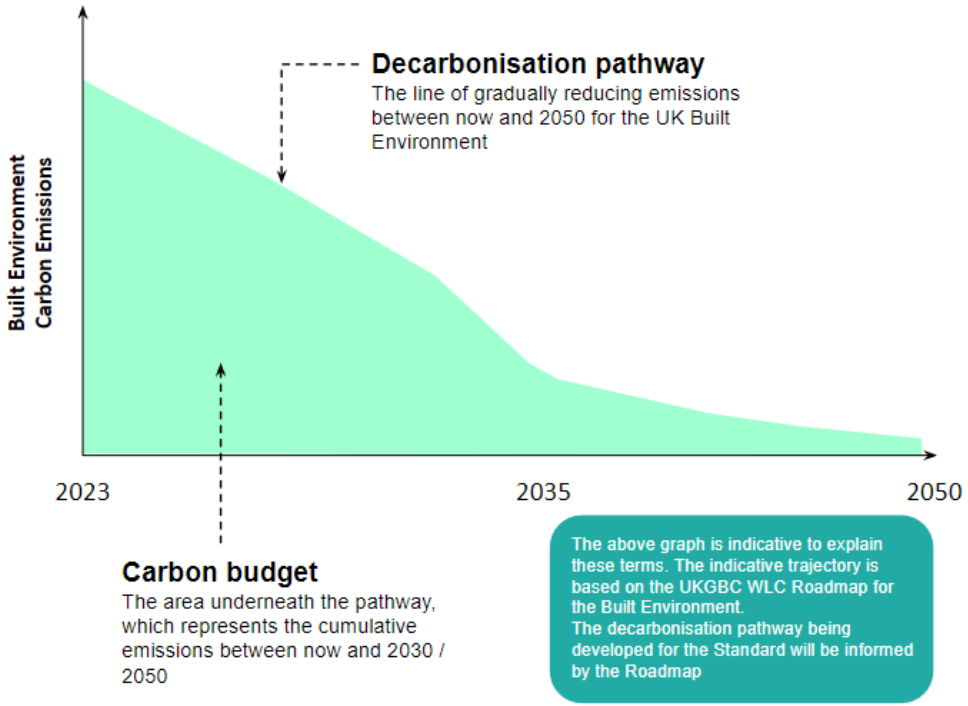
UK Net Zero Carbon
Buildings Standard

Technical Fundamentals

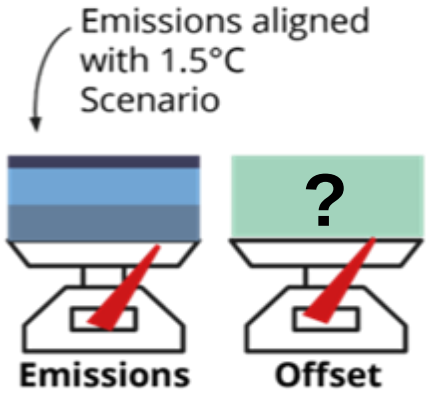
Net Zero Carbon - what do we mean?

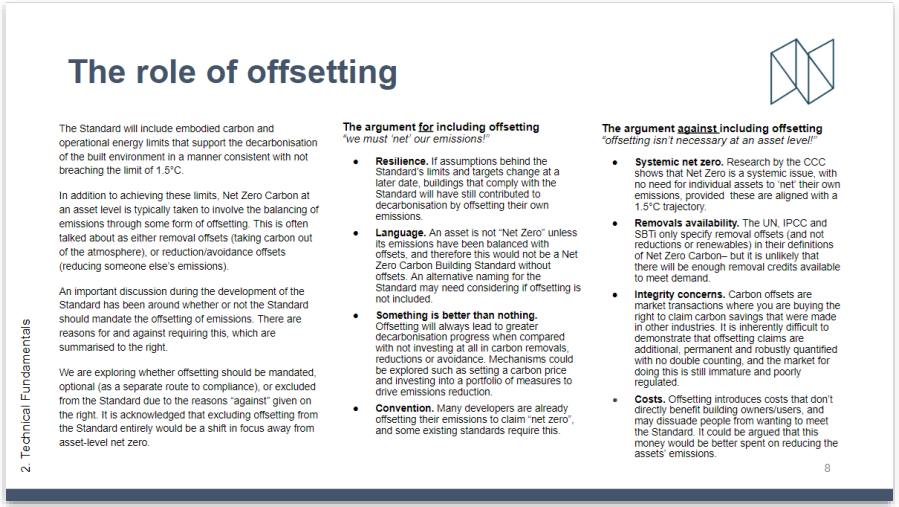
The role of offsetting

Whole Building approach



The Role of Offsetting





The role of offsetting

The Standard will include embodied carbon and operational energy limits that support the decarbonisation of the built environment in a manner consistent with not breaching the limit of 1.5°C.

In addition to achieving these limits, Net Zero Carbon at an asset level is typically taken to involve the balancing of emissions through some form of offsetting. This is often talked about as either removal offsets (taking carbon out of the atmosphere), or reduction/avoidance offsets (reducing someone else's emissions).

An important discussion during the development of the Standard has been around whether or not the Standard should mandate the offsetting of emissions. There are reasons for and against requiring this, which are summarised to the right.

We are exploring whether offsetting should be mandated, optional (as a separate route to compliance), or excluded from the Standard due to the reasons "against" given on the right. It is acknowledged that excluding offsetting from the Standard entirely would be a shift in focus away from asset-level net zero.

The argument for including offsetting
"we must 'net' our emissions!"

- **Resilience.** If assumptions behind the Standard's limits and targets change at a later date, buildings that comply with the Standard will have still contributed to decarbonisation by offsetting their own emissions.
- **Language.** An asset is not "Net Zero" unless its emissions have been balanced with offsets, and therefore this would not be a Net Zero Carbon Building Standard without offsets. An alternative naming for the Standard may need considering if offsetting is not included.
- **Something is better than nothing.** Offsetting will always lead to greater decarbonisation progress when compared with not investing at all in carbon removals, reductions or avoidance. Mechanisms could be explored such as setting a carbon price and investing into a portfolio of measures to drive emissions reduction.
- **Convention.** Many developers are already offsetting their emissions to claim "net zero", and some existing standards require this.

The argument against including offsetting
"offsetting isn't necessary at an asset level!"

- **Systemic net zero.** Research by the CCC shows that Net Zero is a systemic issue, with no need for individual assets to 'net' their own emissions, provided these are aligned with a 1.5°C trajectory.
- **Removals availability.** The UN, IPCC and SBTi only specify removal offsets (and not reductions or renewables) in their definitions of Net Zero Carbon– but it is unlikely that there will be enough removal credits available to meet demand.
- **Integrity concerns.** Carbon offsets are market transactions where you are buying the right to claim carbon savings that were made in other industries. It is inherently difficult to demonstrate that offsetting claims are additional, permanent and robustly quantified with no double counting, and the market for doing this is still immature and poorly regulated.
- **Costs.** Offsetting introduces costs that don't directly benefit building owners/users, and may dissuade people from wanting to meet the Standard. It could be argued that this money would be better spent on reducing the assets' emissions.

2. Technical Fundamentals

8

Should NZC be attainable:

A. Only with offsetting?

A. For two different levels of recognition, one with and one without offsetting?

A. Only without offsetting?

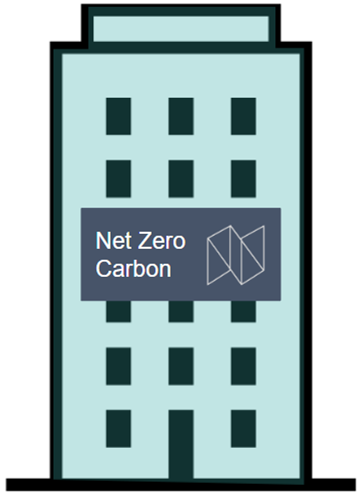
Whole Building Approach

We are proposing that the Standard adopts a ‘whole building’ approach;

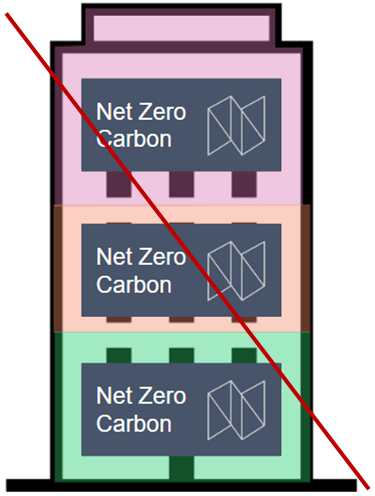
- To support emissions reductions across scope 1, 2 and 3;
- To align with investor reporting tools/mechanisms;
- And to drive owner-occupier engagement.

Do you agree with the working assumption that the Standard will apply only to a whole building?

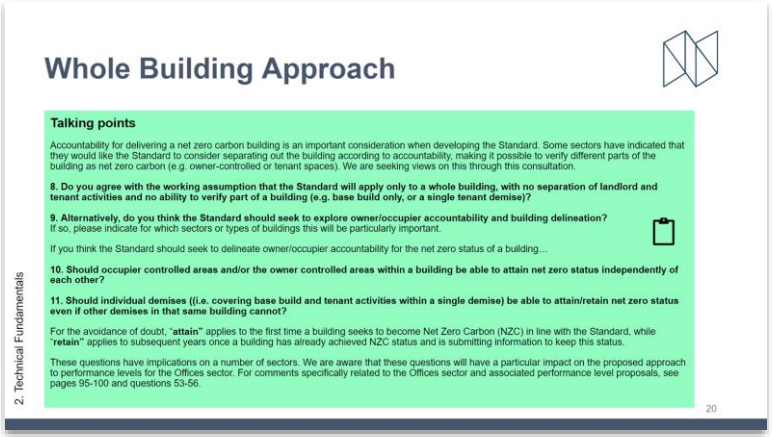
We are aware that some sectors would favour a demise-based approach. Please make your views heard in the consultation!



Whole Building approach: **proposed**



Demise-based approach: **not currently proposed**



Whole Building Approach

Talking points

Accountability for delivering a net zero carbon building is an important consideration when developing the Standard. Some sectors have indicated that they would like the Standard to consider separating out the building according to accountability, making it possible to verify different parts of the building as net zero carbon (e.g. owner-controlled or tenant spaces). We are seeking views on this through this consultation.

8. Do you agree with the working assumption that the Standard will apply only to a whole building, with no separation of landlord and tenant activities and no ability to verify part of a building (e.g. base build only, or a single tenant demise)?

9. Alternatively, do you think the Standard should seek to explore owner/occupier accountability and building delineation? If so, please indicate for which sectors or types of buildings this will be particularly important.

If you think the Standard should seek to delineate owner/occupier accountability for the net zero status of a building…

10. Should occupier controlled areas and/or the owner controlled areas within a building be able to attain net zero status independently of each other?

11. Should individual demises ((i.e. covering base build and tenant activities within a single demise) be able to attain/retain net zero status even if other demises in that same building cannot?

For the avoidance of doubt, "**attain**" applies to the first time a building seeks to become Net Zero Carbon (NZC) in line with the Standard, while "**retain**" applies to subsequent years once a building has already achieved NZC status and is submitting information to keep this status.

These questions have implications on a number of sectors. We are aware that these questions will have a particular impact on the proposed approach to performance levels for the Offices sector. For comments specifically related to the Offices sector and associated performance level proposals, see pages 95-100 and questions 53-56.

2. Technical Fundamentals

20

Technical requirements

UK Net Zero Carbon
Buildings Standard

Technical Requirements and Metrics

Embodied Carbon Limits

Embodied Carbon Retrofit Limits

Refit Embodied Carbon

Operational Energy Limits

Fossil Fuel Free

Demand Management / Flexibility

Onsite renewables

Refrigerant & leakage

District Heating & Cooling Networks

Do you agree with the proposals put forward for the metrics?

Do you have any comments about the proposed approach?

Application to Retrofits and Existing Buildings

Operational Energy (OE): Proposing same limits for existing buildings and for retrofits
(= could achieve the same outcome in different ways and extents of works)

But existing buildings already verified as NZC New Build: the limits remain those of a new building.

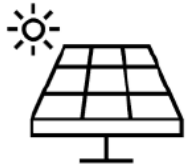
Should the end point (2050) OE limits be the same for new and existing buildings & retrofits?

Should the OE limits for existing buildings & retrofits tighten over time?

Embodied Carbon (EC): discussed in section on EC performance levels.

Heritage buildings: not detailed in this TUC - specific process to be developed by the Heritage Group.

Onsite renewables



Rationale

Renewable electricity generation needs to be encouraged in order to support grid decarbonisation and ensure a sufficient supply of nationwide zero carbon electricity. However, the embodied carbon of creating such electricity must be considered, and so the standard must set embodied carbon limits on such electricity-generating equipment.

We propose their should there be a **requirement** for onsite renewables for **new builds**?

Is **kWh/sqm building footprint/ yr** the right metric?

Are the proposed **target ranges** for onsite renewable generation broadly right i.e. ambitious but reasonable?

Do you have comments on the proposed **flexibility conditions** for onsite renewable generation, where the target would not have to be met?

Performance levels

UK Net Zero Carbon
Buildings Standard

‘Bottom Up’ Performance Levels

“Top-down”

Carbon **budgets**

+

“Bottom-up”

Operational energy **performance levels**

Embodied carbon **performance levels**

=

Net Zero Carbon **targets** and **limits**

What the performance levels represent

Operational Energy

- Assessment of **what can be achieved at the asset level** in individual sectors and sub sectors.
- Based on **benchmarking** of the existing stock (median and best practice),
  metered data from case studies, and energy **performance modelling**.
- Performance levels given as both **best practice today** and **future exemplar**.

Embodied Carbon

- Assessment of **what can be achieved at the asset level** in individual sectors and sub sectors.
- Based on **submitted data** - assumed to be somewhere between mean and best practice.
- Performance levels therefore articulated in terms of the data received: **range, percentiles and average**.

Performance levels

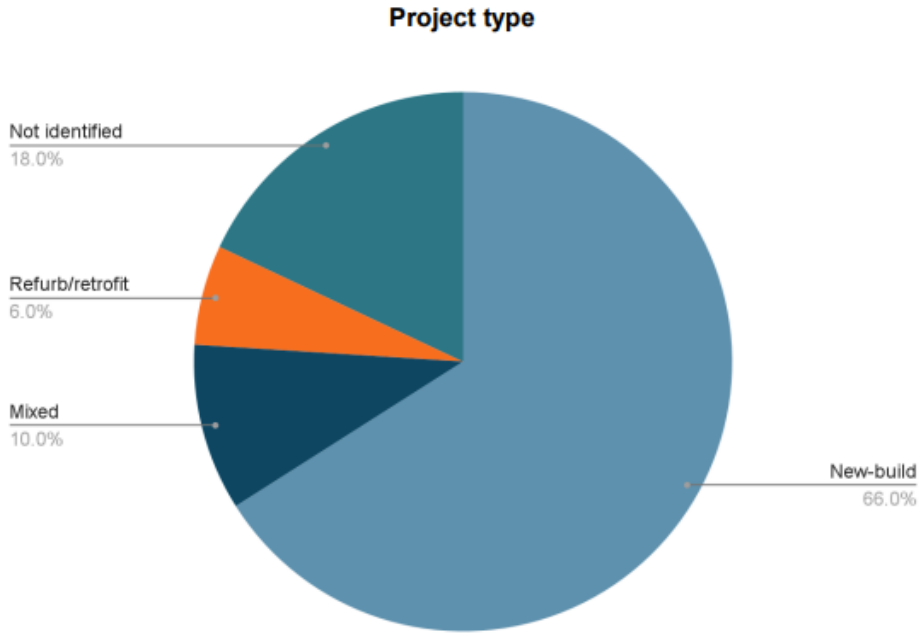
Embodied Carbon

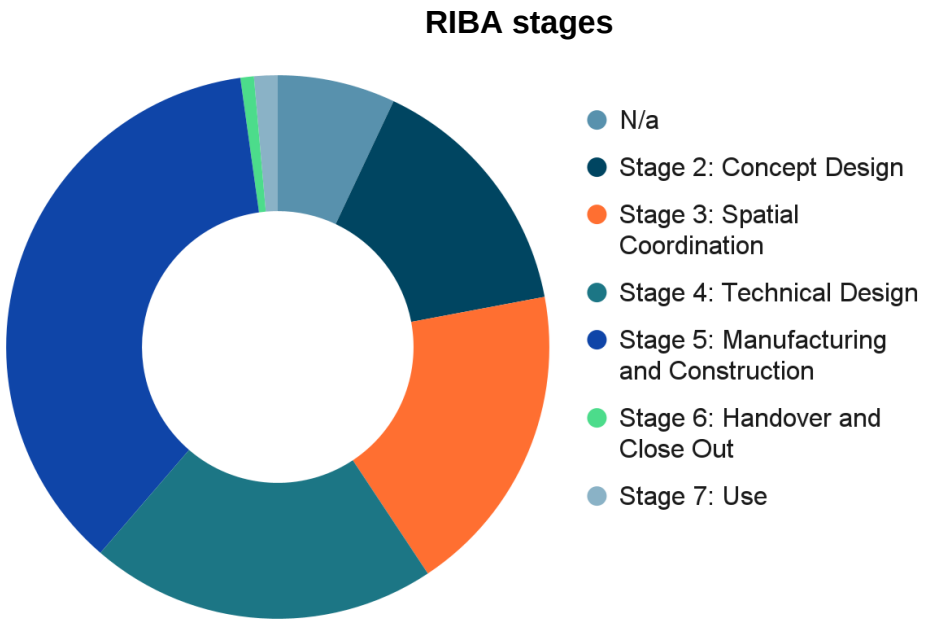
UK Net Zero Carbon Buildings Standard

Embodied carbon data collection

499

Total number of projects used to determine **new-build** performance levels





Embodied carbon data collection

Key issues:

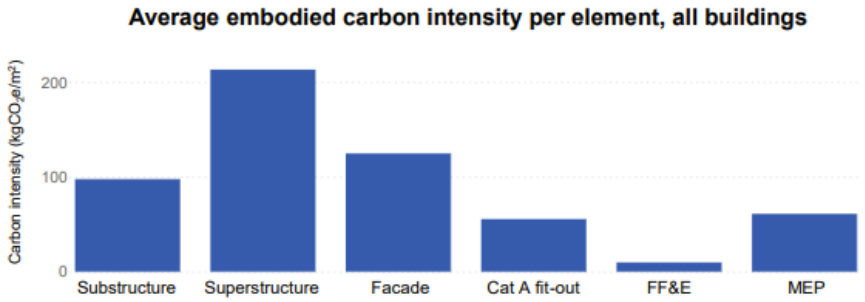
- Most data is buildings-only (no infrastructure)
- Mostly structures-only projects
- Insufficient in-use and end-of-life embodied carbon data
- Insufficient upfront carbon data for some sectors (**retail, hotels, data centres, sports & leisure**)

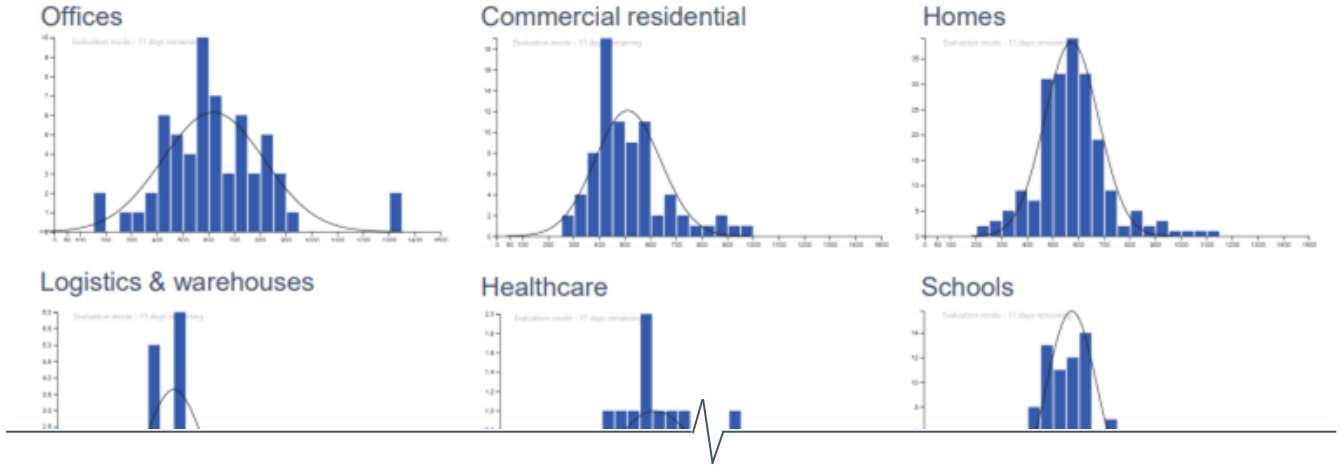
Embodied carbon data processing

Partial datasets

	Sub-structure	Super-structure	Facade	MEP	Finishes	FF&E
Project 1	X	X		X	X	
Project 2			X		X	X
Project 3	X	X		X		

Embodied carbon performance levels





Sector	All	Offices	Homes*	Commercial residential	Logistics / warehouses	Healthcare	Schools	Higher education	Culture and entertainment	Science and technology
Number of projects	***499***	*61*	*204*	*78*	*20*	*9*	*80*	*10*	*21*	*16*
Min	**179**	179	226	295	332	409	353	409	335	446
25th %ile	**468**	481	493	419	371	512	480	520	517	491
50th %ile (median)	**561**	592	566	464	460	589	579	616	600	569
Mean	**568**	618	574*	511	455	611	574	594	627	582
75th %ile	**639**	732	632	580	491	687	633	674	760	642
Max	**1344**	1344	1101	972	652	927	865	739	965	866

Right order of magnitude?

Evidence to support?

Share data via the BECD
https://beta.becd.co.uk

Other important stuff

Retrofit

A **new methodology** has been devised for the approach to setting embodied carbon limits on retrofit projects. Refer to page 28.

Renewables

Renewable electricity generation **needs to be encouraged** in order to support grid decarbonisation, however this **cannot come at the expense of excessive embodied carbon** emissions. Refer to page 37.

Refit

We are **considering** developing **targets for refit** (repeated fit-out) works of **office, retail and hotel** buildings, due to the high cumulative embodied carbon impact of these refits. Refer to page 30.

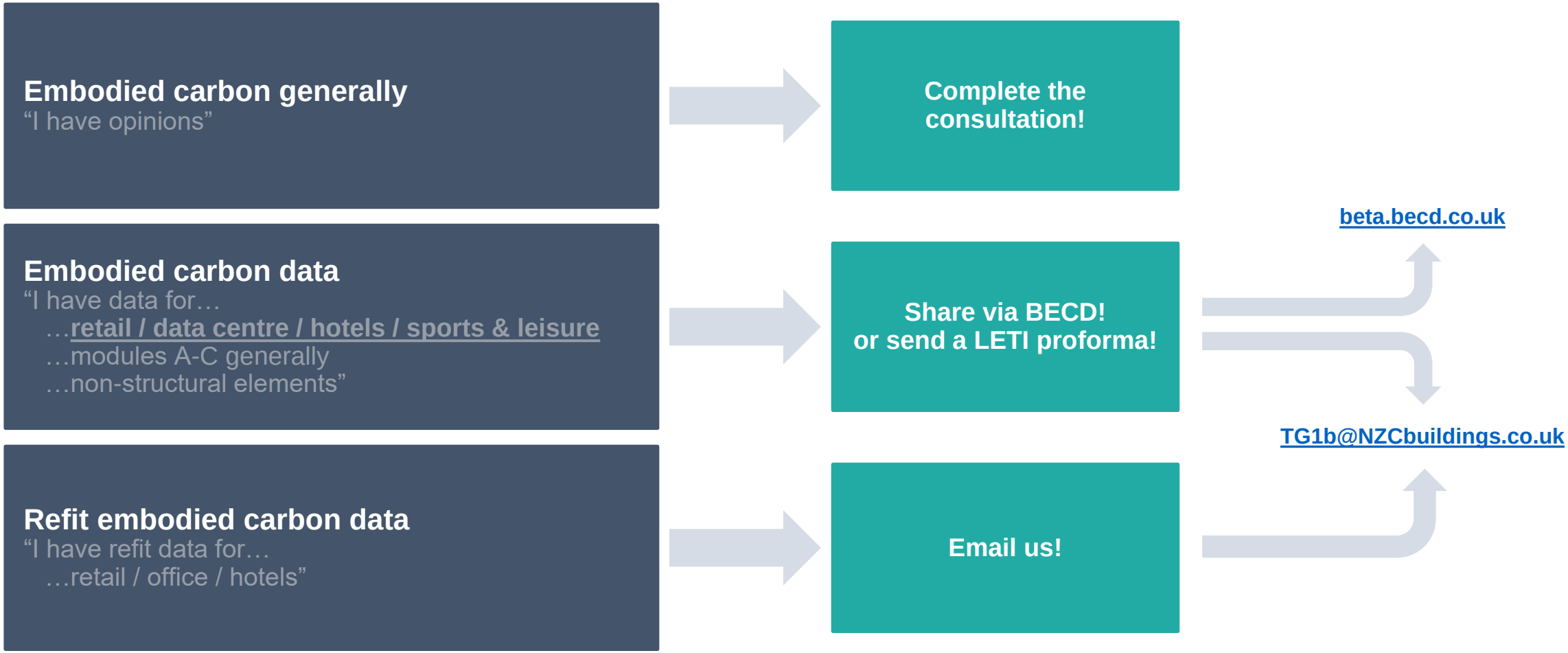
Refrigerants

Poorly managed refrigerant-based systems can produce greater emissions than gas-based systems, and so **limits on the embodied carbon due to refrigerant leakage** will be set. Refer to page 40.

+ Future decarbonisation

Material production
Material consumption
Material efficiency
Material selection

Next Steps (Embodied Carbon)



Performance levels

Operational Energy

UK Net Zero Carbon Buildings Standard

Operational Energy Performance Levels Process and data collection

1 – Sector profile:

- Sub-sectors
- “Core” and “special” end uses

2 –Sector-specific performance metrics

3 – Existing stock benchmarks

- Industry sources, Call for Evidence data, Sector Group expertise
- Median & best practice zone

4 – Analyse projects from the Call for Evidence

5 – Modelling

6 – New build performance levels:

- Accounting for Performance gap
- Current best practice
- Future exemplar

Operational Energy Performance Levels Status: 3 groups of sectors

1 - Reasonably high level of completeness and confidence on performance levels:

Performance levels proposed for most or all of the sub-sectors

Benchmarks, modelling, in-use projects, consideration of performance gap

Available industry references to compare levels with

Homes, schools, offices, healthcare

2 - Medium level of completeness and confidence on performance levels:

Less complete e.g. more limited modelling, less clear accounting of performance gap

Few industry references to compare levels with

Datacentres, Higher Ed, Science & Tech, Logistics & Warehouses, Retail

3 - Sectors at early stage of development of the performance levels:

No performance levels proposed BUT sector analysis: benchmarks, sub-sectors, performance metrics

Typically less well-understood sectors >> the sector analysis is essential first step!

Hotels, Sports & Leisure, Culture & Entertainment, Commercial Resi

Operational Energy Performance Levels Outputs 1/2

Do you agree with sub-sectors & metrics?

Do you agree with benchmarks & levels? Can you provide evidence?

	End uses		Existing stock benchmarking		New build Performance levels (for core end uses)			
					Best Practice today		Future exemplar	
	Core	Additional	Median	Best practice	Annual energy use	Space heating & cooling	Annual energy use	Space heating & cooling
Metrics Sub-sectors			kWh/m^{2}GIA/yr	kWh/m^{2}GIA/yr	EUI, kWh/m^{2}GIA/yr	Peak demand (kW/m^2)	EUI, kWh/m^{2}GIA/yr	Peak demand (kW/m^2)
Sub-sector 1	End uses x & y	End uses z	xx	xx				
Sub-sector 2			xx	xx	xx	xx	xx	xx
…			xx	xx	xx	xx	xx	xx

Operational Energy Performance Levels Outputs 2/2

More background on the rationale,evidence and next steps

Can you help with data or resources?

	End uses		Existing stock benchmarking		New build Performance levels (for core end uses)	
					Best Practice today	Future exemplar
Other schemes			xxx		xxx	xxx
Existing buildings meeting PL?					xxx	xxx
Modelling					xxx	xxx
Performance gap					xxx	xxx
Further development	xxx				xxx	

…. And even more background in Sector Group report, for more sectors: separate online files

Next Steps (Operational energy)

Do you have comments on

- Overall **approach**
- **Sub-sector** categorisation
- Performance **metrics**
- **Benchmarks** for the existing stock (& more data?)
- Proposed **performance levels**:
  - Too ambitious?
  - Not ambitious enough?
  - About right?
  - **Evidence** from in-use projects or performance models?

Could you **help some sectors** with further work ? e.g. modelling

Top down pathways

UK Net Zero Carbon
Buildings Standard

TUC Documentation Structure

2. Technical Fundamentals

3. Technical Requirements

4. Carbon Accounting

6. Embodied Carbon Performance levels

7. Operational Energy Performance levels

8. Top down pathways

- What this means
- Work to date
- Next steps

UK Carbon Budget Allocation

To deliver decarbonisation in line with a 1.5°C pathway

Top Down Pathways driven by Climate Science

The Top-down Task Group has been developing the methods and principles behind the national budget allocation process.

As well as establishing the Carbon Budget, a Stock Model and a Downscaling Methodology have been developed.

Stock Model

Budgets

Downscaling Methodology

Top Down Pathways - Work to date

Stock Model

Total Floor area (m2); no. of properties; EUI & fuel mix disaggregated into building sub-sectors; projections from now to 2050

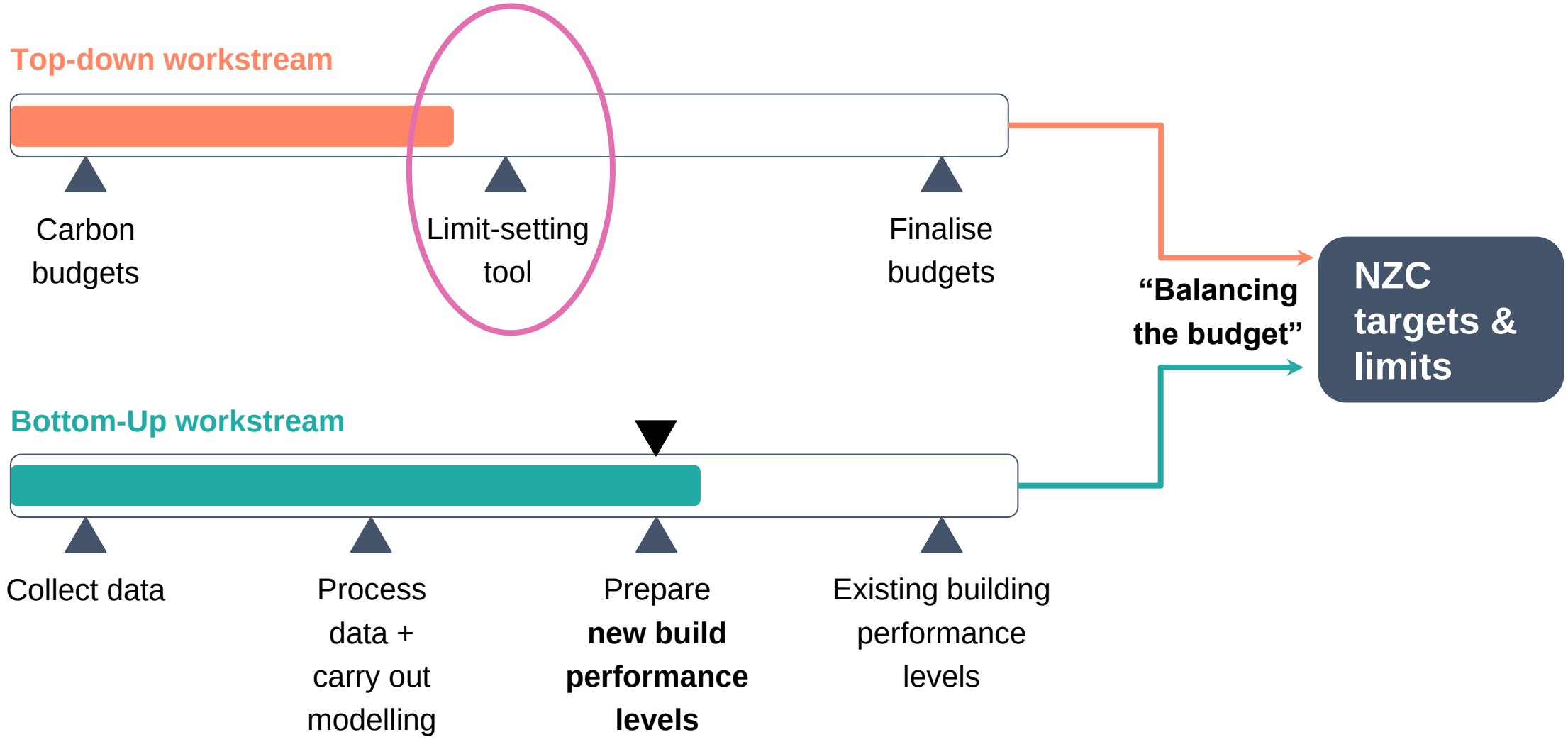
Carbon Budget

Current Recommendation: Carbon and energy budgets derived from the CCC's Sixth Carbon Budget will be used. The carbon budgets will be 'upscaled' to reflect consumption-based emissions, rather than territorial (i.e., including embodied emissions that originate outside of the UK)

Downscaling Methodology

Background research and preparation to inform the development of a functional data tool which is able to 'downscale' the relevant UK national carbon and energy budgets for the built environment to asset level operational and embodied carbon limit pathways.

Progress towards NZC Limits



The Consultation

UK Net Zero Carbon
Buildings Standard

Purpose of the Consultation

We want your views on:

The **overall technical proposals** for the Standard

The **achievability** of the new build performance levels

Who should respond:

Contractors, MEP Consultants, Developers, Property Owners, Housing Associations, Policy Makers (Local/Central Government), Quantity Surveyors, Planning Consultants, Managing Agents, Energy/Sustainability Consultants, Energy Modellers, Life Cycle Assessment Specialists, Structural Engineers Building Services Engineers, Architect, and others.

The Consultation

What are we asking for?

Your **thoughts and comments** on the work that we have undertaken to date and proposed next steps.

We are also seeking to identify **individuals** who are able to contribute to **help us further develop the performance levels**

What is the format?

The technical update summarises **work undertaken to date**, and **proposed next steps**. Within this document specific **talking points** are identified around which we are seeking your thoughts.

You can access the **questionnaire via links embedded in the technical update** or download the survey questionnaire separately from the NZCBS website.

You can skip through the topics and you don't have to answer every question.

The Consultation

What is the timing?

Consultation closes on **31st August 2023**

What will we do with the responses?

We will **analyse the answers** to the questions and the comments and **use your responses** to inform the development of the Standard.

We are not planning to do a comprehensive consultation feedback document, but **we will indicate where consultation responses have influenced decision making** in any future updates and in the documentation that supports the final published version of the Standard.

If you have offered to contribute to further develop the performance levels **we will get in touch.**

Ways to engage with the consultation

- **Run a lunchtime seminar** to gather views from your colleagues
- **Engage with your industry organisation(s)** to find out if a joint response is being prepared
- **Discuss the consultation with your project teams**
- **Share your views** on the consultation in a blog post

Next Steps

UK Net Zero Carbon
Buildings Standard

Next Steps

Summer 2023 → Autumn 2023 → Winter 2023/24 →

This Webinar!

Deadline 31 August

Consultation Period

Launched Technical Update

Quarterly update

Process consultation responses

Create Science Based Limit-Setting tool

Create New Build NZC Limits

Develop Existing/Retrofit Performance Levels

Create Beta Test version of Standard

Beta Test Issue

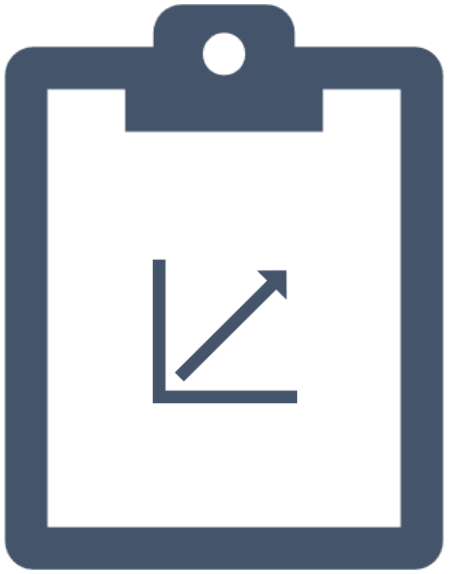
Beta Testing →

Delivery dates subject to funding →

Key

- Industry engagement
- NZCBS Workstreams
- Information Issues

NZCBS Updates



Frequently Asked Questions

www.nzcbuildings.co.uk

So far:

Over 4,500 **Visitors to the website**

Over 135 **responses to the consultation**

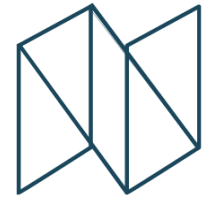
Frequently Asked Questions launched on the website

Keep Sharing!

Q&A (Thank You!)

NZCBStandard
@NZCBStandard

UK NZC Buildings Standard



BBP BETTER BUILDINGS PARTNERSHIP
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The Institution of Structural Engineers
LETI
RIBA Architecture.com
RICS
UK GBC
PIA
RIAS
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