UK Net Zero Carbon Buildings Standard

Technical Update & Consultation

14 June 2023

Hello!

Through the determination and hard work of members of our task groups, sectors groups, and data providers we have been able to meet our next important milestone. On behalf of the team, I am delighted to report that we are now at the stage where we can provide you with a Technical Update & Consultation, which forms our second Quarterly Update.

This consultation document describes the technical fundamentals behind the Standard, sharing the metrics that buildings will be assessed against to demonstrate that they are aligned with what is required for the UK built environment to achieve Net Zero Carbon.

It then describes the work that has been undertaken to gain an understanding of the current operational energy and embodied carbon performance levels that will provide the context of technical feasibility for various sectors. This is the main focus of the consultation.

Finally, the consultation outlines the approach being taken to determine relevant budgets for carbon and energy, which inform the limits that will follow in later stages of work.

I also wanted to take the time to thank you for being involved in our consultation – and helping to shape the future definition of a Net Zero Carbon building.

This is an extremely important initiative that I am hugely passionate about. We have a lot of people giving up their time on this and I am grateful for all their hard work.

By completing our questionnaire, you can make a real difference to sustainability across the built environment, so I ask that you take the time to do so.

Thank you again for being a part of our consultation and I hope you find our Technical Update useful.

Clara Bagenal George

Chair, Technical Steering Group

UK Net Zero Carbon Buildings Standard

Purpose of this Technical Update & Consultation

We want your views on:

- **The overall technical proposals for the Standard**
- **The achievability of the new build performance levels**
  - These levels will be used to inform the final NZC limits

Aims

The team developing the Standard have spent the last 9 months developing its **technical basis**, and establishing **new build performance levels** for a wide range of sectors.

We are sharing this Technical Update & Consultation document to allow the wider industry to review the proposals and performance levels, and provide us with feedback.

The performance levels do not represent the energy and embodied carbon limits that buildings would have to meet. They provide the context of technical feasibility for the various sectors and provide a summary of the data received in the call for evidence.

Who should respond?

We are interested in the views from across all built environment stakeholders, and interested we have broken the consultation into various themes.

Glossary: *Performance levels: These levels provide the technical evidence on what can be achieved by the individual sectors, based on benchmarking, case studies and modelling. They are not limits or targets, but will be used to inform the NZC limits and targets in the next stage of work.*

How to engage with the consultation

Responding to the consultation

There are a series of talking points raised within this document which are posed as questions in our **online survey**. Please submit your responses to these for our consultation.

Given the technical nature of certain sections of the consultation document, it is expected that not all stakeholders will want to respond to all sections.

We are expecting a high volume of responses to this consultation. Please ensure you use the online survey for your comments to ensure we are able to process and incorporate your feedback.

The team will also be conducting a webinar at **12pm on Monday 10 July 2023** to provide industry with answers to pertinent issues raised throughout the consultation. You can sign up **here**.

Consultation period

Please submit your views on the consultation between

Wednesday 14 June - Thursday 31 August 2023.

Data and performance levels

We are particularly interested to get your feedback on the performance levels which have been provided in answer to our Call for Evidence, for both operational energy and embodied carbon, and we encourage responses from those who have an understanding of technical achievability for these levels.

Please also note that we are collecting more embodied carbon data – please refer to **6. New Build Embodied Carbon Performance Levels** for more information.

These levels provide technical evidence for what is currently being achieved by individual sectors within the built environment, based on benchmarking, case studies and modelling.

They are not intended to be limits or targets, but will be used to inform the NZC limits and targets in the next stage of our work.

8. Top-down Pathways

Current workstream and developments driven by climate science

UK Net Zero Carbon Buildings Standard

Overview

Top Down – What this means:

Task Group 1c is tasked with developing the science based methods and principles of how the UK National Carbon Budget is allocated to the built environment, so that each sector and asset is doing their fair share to ensure the UK achieves net zero by 2050.

Key Roles and Responsibilities

- Establishing the nationally derived carbon ‘budget allocations’ for each of the built environment sectors so that they are aligned with science-based trajectories needed to achieve net zero by 2050 and 78% by 2035 in the UK.

- Developing a suite of asset level budget-aligned, science based net zero carbon characteristics, limits and targets.

Introduction

The Top-down Task Group has been developing the methods and principles behind the national budget allocation process. This includes establishing the relevant national carbon 'budgets' for each sector and aligning these with science-based trajectories needed to achieve net zero by 2050 and 78% by 2035 in the UK (see p. x).As well as establishing the carbon budget, a stock model and a downscaling methodology have been developed, which is described overleaf.

Approach

All industries on 1.5C pathway

The work has sought to understand what the carbon budget for the built environment would be if all industries were on track to meet a 1.5°C pathway, recognising that this is not the case. This approach should result in targets that are highly ambitious, without requiring the built environment to compensate for underperformance in other industries.

Background:
According to the UN Environment Programme, there is "no credible pathway to 1.5°C in place", and recent reports indicate that the world is going to exceed that temperature limit within the next few years.

On that basis, the remaining carbon budget that complies with a 1.5°C pathway – not just for the built environment, but for all economic industries– is essentially zero.

However, there is an unavoidable practical need for some types of construction, maintenance and refurbishment to proceed. Therefore approach assumes equity across industries making similar ambitious progress.

Stock Model

A stock model is being developed which will help to inform the net zero carbon asset level energy and carbon limits.

Through extensive literature review and engagement with a broad range of prospective data partners, a series of preferred data sources have been identified which are documented in this report.

Stock Model Characteristics

- Total floor area (m²),
- Number of properties
- Energy performance (EUI and heating fuel/fuel mix) of the residential and non-residential building stock across the UK, disaggregated into building sub-sectors (6 residential, 38+ non-residential).

- Projections of the change in floor area of the stock between now & 2050 for each sector, capturing overall growth, demolition rates, new build and retrofit projection, with a range of growth scenarios to be explored (low, medium and high growth)

Stock Model

Two stock modelling are being developed the residential and non-residential stock models, respectively.

Residential

Country	Floorspace Dataset(s)
England and Wales	EHCS (2020) & WHCS (2017-18)
Scotland	SHCS (2019)
Northern Ireland	NIHCS (2016)

Notes

The primary stock dataset will be validated against relevant comparator datasets as the model is developed (e.g. national housing statistics, EST home analytics datasets, domestic energy consumption statistics at national level).

Non - Residential

Country	Floorspace Dataset(s)
England and Wales	BEIS BEES Dataset
Scotland	Derived from Scotland's ND-NEED Baseline, mapped to BEES sub-sectors
Northern Ireland	Extrapolated from BEIS BEES Dataset, with average floor area to be derived based on population.

Notes

There has been engagement with DESNZ and UCL to clarify the timelines for a forthcoming update of the BEES study. Whilst the publication timeline does not align with the first issue of the standard, opportunities to future proof the structure of the stock model to facilitate an efficient future update are being pursued.

Carbon Budgets

Following review of the available literature and existing precedents for deriving industry/built environment-specific carbon budgets and scenarios, we have developed a set of **fourteen criteria** by which to review and assess existing budgets.

Preferred Criteria

- Future scenarios
- End user allocation
- Consumption based
- Sector definition alignment
- UK budget compatible
- Paris-aligned (1.5°C)
- Realistic
- Relevant trends
- Disaggregated (trends)
- Disaggregated (sectors)
- All GHGs
- Single dataset
- Single scenario
- Energy and carbon

Budgets Assessed

- UK GHG Inventory
- DEFRA Carbon Footprint
- CCC Carbon Budget
- BEIS EEP
- National Grid FES
- UKGBC Roadmap
- Tyndall Centre Budget

Carbon Budgets

- To date, no single data source reviewed has met all assessment criteria and no precedent for a formal carbon budget being adopted at a industry level has been identified in the UK or internationally.
- Although the Climate change committee has set out indicative decarbonisation pathways for different industries to inform decision-making, it does not prescribe sector-specific targets.
- Establishing a carbon and energy budget will therefore require further analytical work to adapt one or more of these data sources. The adjusted budgets will then be downscaled to different sub-sectors and building types to enable targets and limits to be derived.

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)*.

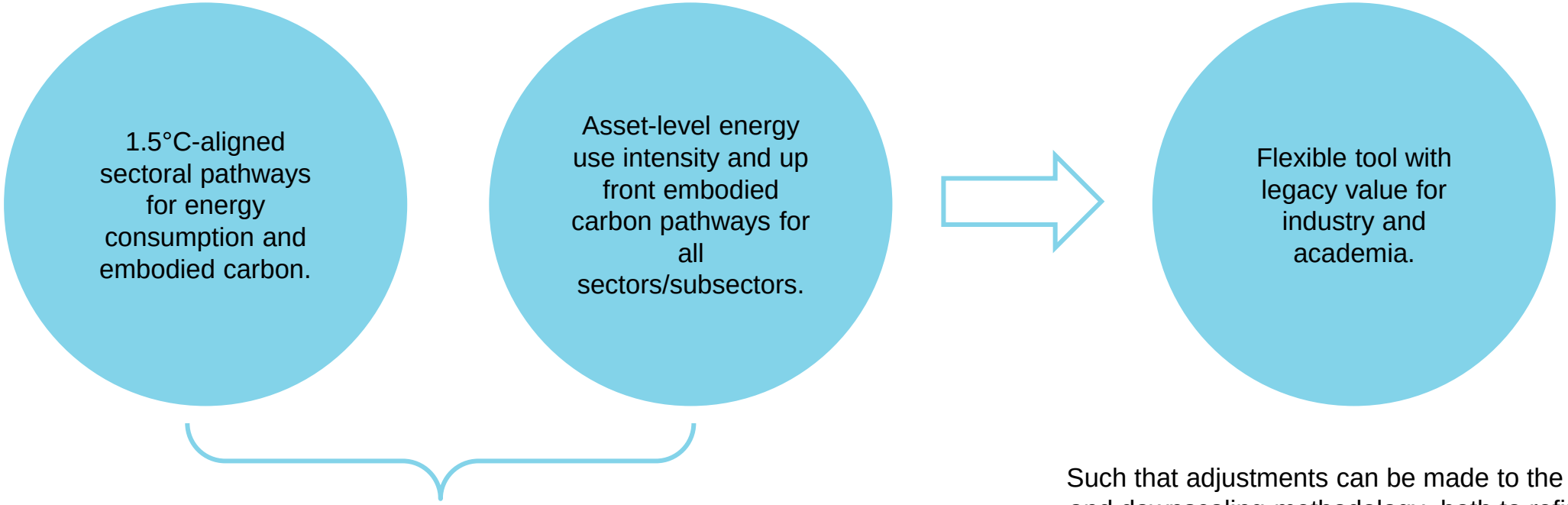
** Territorial emissions are those that occur within the geographic boundary of the UK. This approach excludes consumption-based emissions, i.e. emissions from imported goods, if these occur outside of the UK. Many construction materials are produced in other countries, which means that a territorial carbon budget would not fully account for the embodied carbon of the built environment. The process for upscaling the budget in this way is still being discussed and confirmed.*

Downscaling

- The aim of the Downscaling work was to set out a broad methodology for aligning top-down budgets with bottom-up performance data, by undertaking background research and preparation to inform the development of the Science Based Sectoral Limit Setting (SBSLS) Tool.
- The aim of the Science Based Sectoral Limit Setting Tool is to provide a functional data model 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, by drawing together outputs including:
    - Energy and carbon budgets, baseline floorspace, energy use, fuel mix, and growth projections accounting for new build, refurbishment and demolition rates.
    - Embodied carbon and operational energy asset-level performance data from the Call for Evidence

Downscaling

Key outputs of the Science Based Sectoral Limits Setting Tool (SBSLS) tool are summarised below.



Taking into account not only reductions in emissions but also any consequent increases due to the actions required to deliver the net zero transition (e.g. embodied impact of retrofit).

Such that adjustments can be made to the inputs and downscaling methodology, both to refine the first iteration of the limits and to enable future use.

Top Down Elements

Talking Points

58. Do you have any comments on the proposed approach to developing the stock model?

59. Do you have any comments on the proposed approach to developing the budgets?

60. Do you have any comments on the proposed approach to developing the downscaling?