UK Net Zero Carbon Buildings Standard

Call for evidence guide

V1.0 Nov 22

UK Net Zero Carbon Buildings Standard

Call for evidence guide

Version 1.0 - November 2022

Contents

1.0 Project Background and Structure

1.1 Document Purpose

The purpose of this document is to provide details of a 'call for evidence' as part of the development of the UK Net Zero Carbon Building Standard.

Section 1 provides background on the project and delivery structure.

Section 2 outlines what is being requested as part of the call for evidence, the format in which this will be collected, and the timelines.

Section 3 provides an overview of how the data and information collected will be used in the project.

1.2 Background

A cross-industry steering group, representing stakeholders across the built environment, have joined together to develop a standard for verifying UK buildings as net zero carbon.[1]

The **UK Net Zero Carbon Buildings Standard (NZCBS)** will enable industry to robustly prove their built assets are net zero carbon and in line with our nation's climate targets. Leading industry organisations the Better Buildings Partnership (BBP), Building Research Establishment (BRE), the Carbon Trust, Chartered Institution of Building Services Engineers (CIBSE), IStructE, London Energy Transformation Initiative (LETI), Royal Institute of British Architects (RIBA), Royal Institute of Chartered Surveyors (RICS), and UK Green Building Council (UKGBC).

1.2.1 What will it cover?

The Standard will set out metrics by which net zero carbon performance is evaluated, as well as performance targets and limits that need to be met. These are likely to include energy use, upfront embodied carbon, and lifecycle embodied carbon, with other metrics – such as space heating/cooling demand and peak load – also to be considered. It will also cover the approach to carbon accounting, procuring renewable energy, and the treatment of residual emissions, including carbon 'offsetting.' However, the scope and output of the Standard may evolve throughout the development process.

[1] While the Task Groups and Sector Groups detailed below will agree the Standard's definition of net zero carbon, the current working definition is taken from the Whole Life Carbon Network: "*A 'Net Zero (whole life) Carbon' Asset is one where the sum total of all asset related GHG emissions, both operational and embodied, over an asset's life cycle (Modules A0-A5, B1-B8, C1-C4) are minimised, meet local carbon, energy and water targets or limits, and with residual 'offsets', equals zero.*"

The Standard will also set rules for how claims will be verified. It is expected that claims will be required to be validated based on in-use measured data and interim verification of an asset at design stage or once the asset is built but not yet operating may also be considered.

1.1.2 Who is it for?

The output will be for developers, contractors, asset owners and managers, occupiers, investors, financiers and funders, consultants, building industry professionals, building managers and product/material manufacturers, suppliers, and distributors. It is for anyone who wants to either fund, procure, design, or specify a Net Zero Carbon Building and anyone wanting to demonstrate that their building is 'Net Zero'-aligned with an industry-agreed Standard.

1.2.3 Will it be science-based?

Performance targets will align with the decarbonisation trajectories set out in the UK's Sixth Carbon Budget[2] - with the aim of achieving net zero by 2050 and a 78% reduction by 2035 in the UK, i.e., what is known to be required to stand a reasonable chance of mitigating global warming to 1.5°C. It will also align with the energy demand reductions projected to be required to enable a net zero carbon energy supply sector.

1.2.4 What building types will it apply to?

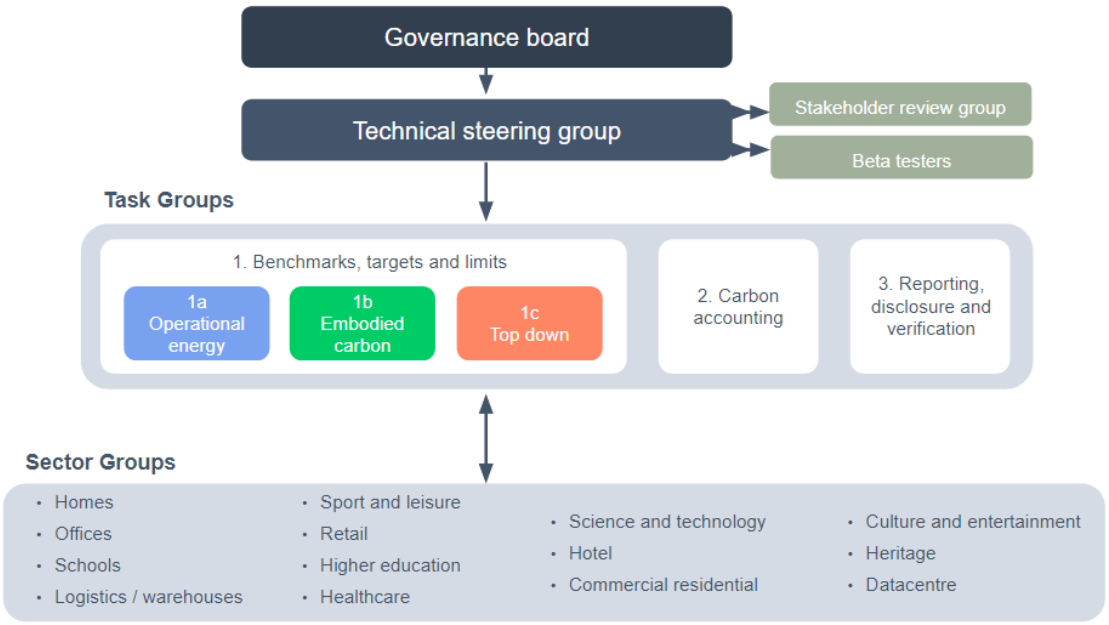
The approach will be applicable to both existing and new buildings. To start, the focus will be on the most common building typologies, especially those for which industry stakeholders have already robust performance data available to inform the setting of performance targets. The Standard will not apply to infrastructure. We are seeking to develop performance targets and limits for the following typologies.

• Homes • Offices • Schools • Logistics / warehouses	• Sport and leisure • Retail • Higher education • Healthcare • Science and technology	• Hotel • Commercial residential • Culture and entertainment • Heritage • Datacentre

[2] https://www.gov.uk/government/news/uk-enshrines-new-target-in-law-to-slash-emissions-by-78-by-2035

1.3 Structure of UK NZCBS project

Figure 1: UKNZCBS organogram



The NZCBS will be delivered by the parties shown in Figure 1.

- The Operational Energy Task Group (TG1a) is responsible for defining the operational energy benchmarks, and inputting into the setting of operational energy limits in conjunction with TG1c (see below). The benchmarks will form the starting point for the decarbonisation trajectory of each sector.

- The Embodied Carbon Task Group (TG1b) is responsible for defining the embodied carbon benchmarks, and inputting into the setting of embodied carbon limits in conjunction with TG1c. The benchmarks will form the starting point for the decarbonisation trajectory of each sector.

- The Top-Down Task Group (TG1c) will be responsible for developing a methodology for aligning the benchmarks provided for OE and EC with our national carbon budget to produce a complete suite of budget-aligned and science-based net zero carbon (NZC) performance targets.

- Sector groups (SGs) have also been convened to bring together experts in different sectors. These groups will facilitate the collection of embodied carbon data for TG1b and operational carbon data for TG1a for their sector, and to provide advice around the decarbonisation of that sector.

- The Carbon Accounting Task Group (TG2) is responsible for setting out the rules for measuring embodied and operational carbon, and for identifying acceptable external options for mitigating the impact of measured carbon.

- The Reporting, Disclosure and Verification Task Group (TG3) is responsible for defining the terminology, scope, and boundary of any net zero carbon claims. It will also agree the approach to, and requirements for verifying net zero carbon claims in line with these definitions. It will also develop guidance for reporting and disclosure in support of the verification of such net zero claims.

1.4 How the targets / limits will be developed

Operational energy and embodied carbon performance levels determined from the evidence will be reconciled with the top-down carbon and energy budgets for the UK to develop targets and limits for various sectors for new and existing buildings for operational energy and embodied carbon. Figure 2 illustrates at a high level how the Standard's target and limits will be developed.

Figure 2: How the targets / limits will be developed

The bullet points below outline this process in further detail; the purpose of this call is to contribute to the evidence to define the performance levels:

- The top-down task group will establish the relevant national carbon 'budgets' related to the built environment that is aligned with science-based trajectories needed to achieve net zero by 2050 and a 78% reduction by 2035 in the UK, i.e., what is known to be required to stand a reasonable chance of mitigating global warming to 1.5°C. It will also align with the energy demand reductions projected to be required to enable a net zero carbon energy supply sector.

- The operational energy task group, embodied carbon task group, and the sector groups will use a “bottom up” approach to define various performance levels using benchmarking, case studies and modelling, to provide the technical evidence on what can be achieved by the individual sectors.
- Ideally, the “bottom up” evidence will show that the “top down” targets generated by TG1c (top down) can already be met; otherwise, in some sectors this may mean that net-zero compatible targets are only considered achievable subject to future improvements (e.g., future improvements in plant efficiency, future decarbonisation of the steel or cement industries beyond current plans).
- In cases where there is a gap between what is considered achievable and what the carbon budgets demand, the Operational Energy, Embodied Carbon, and Top-Down Task Groups will consider whether the carbon budget distribution or decarbonisation assumptions are required to be revisited, with assistance from the Technical Steering Group and Governance Board where necessary.

2.0 Call for Evidence

To develop the Standard, *benchmarks* will be agreed for the *operational energy usage*[3] and *embodied carbon*[4] performance levels today, and *limits and targets* will be set out for future years based on the industry's required decarbonisation trajectory.[5] **To do this, the project is now seeking case study data from the real estate and built environment industry.** This data will be critical to ensure that the Standard is reflective of the best available evidence, and that the Standard development process is as inclusive as possible.

In addition, the Standard development team are seeking those able to support operational energy and embodied carbon modelling in January 2023, as detailed below.

The purpose of this note is to outline the purpose, format, and process of this call for evidence for prospective data providers and modelling support providers.

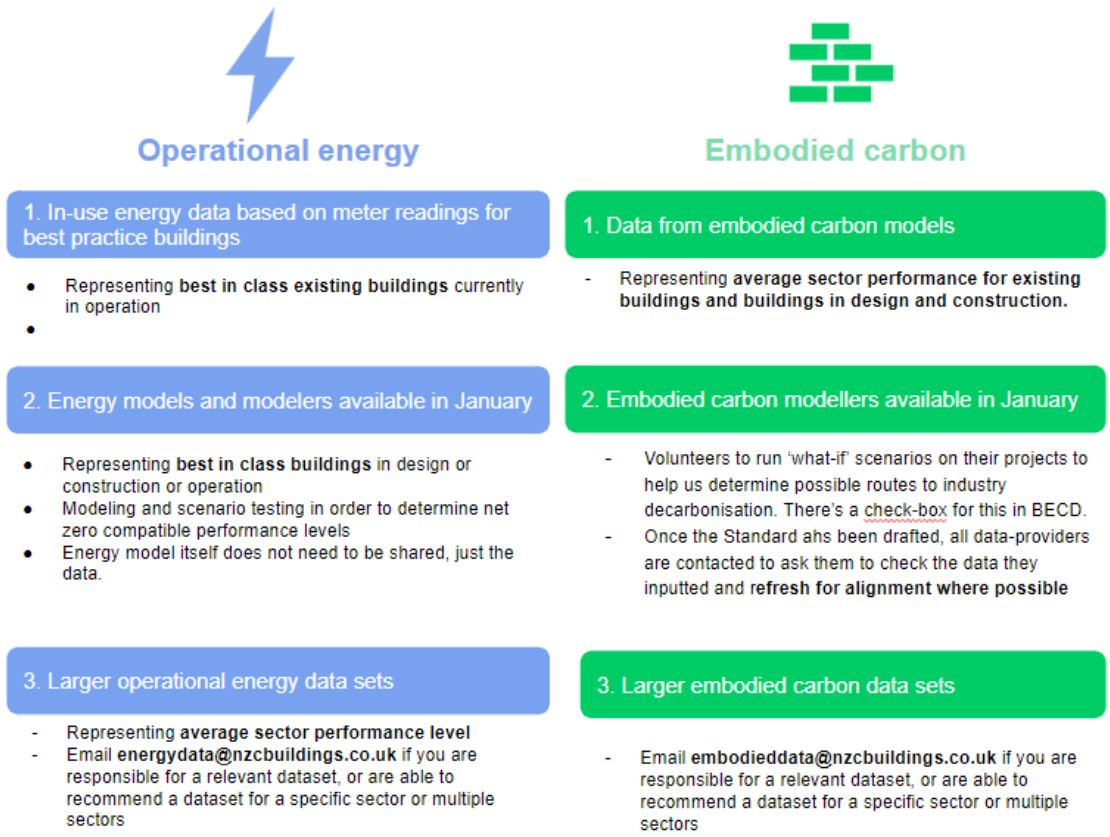
Figure 3 summarises the evidence requested as part of this call. The following sections outline the process, format, and timescales for this call for evidence in further detail.

[3] 'Operational Carbon – Energy' (Module B6) are the GHG emissions arising from all energy consumed by an asset in-use, over its life cycle.

[4] 'Embodied Carbon' emissions of an asset are the total GHG emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset (Modules A0-A5, B1-B5, C1-C4, with A0 assumed to be zero for buildings).

[5] This project employs the following definitions for the terms benchmark, limit, and target:
Benchmark – The current sector average for buildings today (for embodied carbon these are buildings completed in 2022, for operational energy this is buildings of any age with operational data today).
Limit – A maximum performance level that must not be exceeded, if a building is to comply with the Standard (e.g., maximum embodied carbon)
Target – A minimum performance level that must be met or exceeded, if a building is to comply with the standard (e.g., minimum renewable energy generation)
The term **performance level** is used to encompass all three terms

Figure 3: UKNZCBS – Call for evidence summary



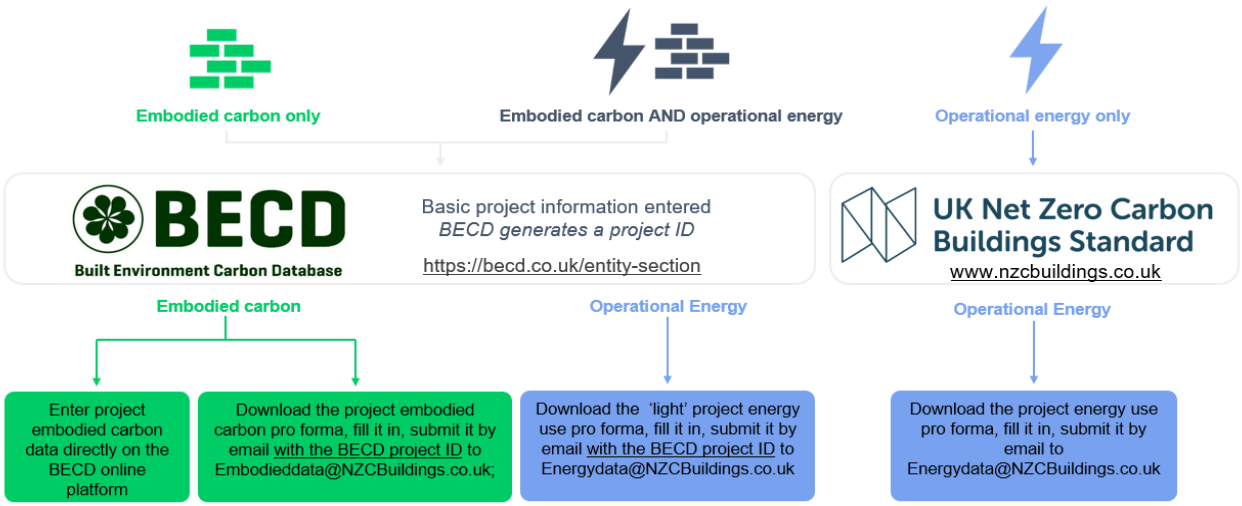
2.1 Data Collection Process

The project's Sector Groups will facilitate the collection of data. Key data collection activities will include:

- A coordinated call for data from all parts of the NZCBS team on 3rd November 2022
- An online event facilitated by the project's Technical Steering Group on the 17th of November
- Direct emails to those who have previously offered to share relevant data
- Sector Groups following up across industry
- **Deadline for data submission is the 16th of December 2022**

We welcome data from those wishing to provide operational energy data, embodied carbon data, or both for the same project. **The flowchart in Figure 4 illustrates the process in each scenario, with the following sections going into further detail.**

Figure 4: UKNZCBS data collection process flowchart



Two options are available – to support efficient data analysis, where possible please enter directly into the BECD

2.1.1 Embodied carbon data collection process

Data will be collected via the consultation version of the *Built Environment Carbon Database* (https://becd.co.uk/entity-section). Note that on setting up a new project in BECD, users must mark their project as suitable for use in the UKNZCBS.

BECD
Built Environment Carbon Database

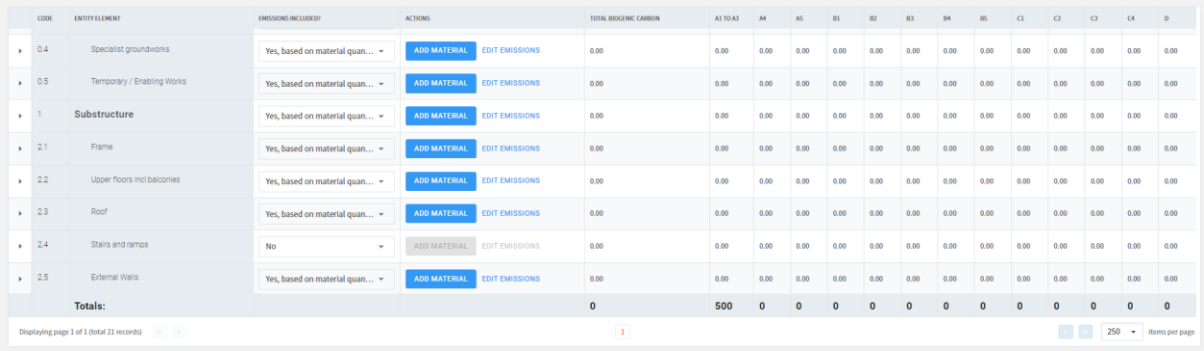
Users have two options for submitting data. Firstly, they can enter project embodied carbon data directly on the BECD online platform; it will then be added to BECD database and has the option of being passed onto the BECD online platform if desired. Alternatively, users can download the project embodied carbon data form from the BECD platform once they have added general entity information, complete it, and submit it by email with the BECD project ID to Embodieddata@NZCBuildings.co.uk. It will then be processed by the NZCBS team and has the option of being passed onto the BECD online platform if desired. **Data-providers are encouraged to enter data directly into the BECD as far as possible to assist with data analysis by the Sector Groups and the Embodied Carbon Task Group (TG1b).**

Data providers are requested to submit via the BECD portal before the 16th of December 2022. The RICS and BCIS have provided a brief 'how to' guide for entering data into the BECD, available at the URL above.

The Sector Groups will check for compliance with reporting requirements and highlight to the Embodied Carbon Task Group (TG1b) where any outliers or data 'oddities' are identified. The

Embodied Carbon Task Group (TG1b) will then use the data gathered to set the benchmarks for each sector. This may be done in conjunction with volunteers from the Sector Groups, to be confirmed. A later section describes this process in more detail.

Partial data sets will be accepted (e.g., superstructure-only, A1-A5, or just shell and core), data-providers will be asked to confirm which modules and building components are included in their assessment for each entry (see screenshot below).



	CODE	ENTITY ELEMENT	EMISSIONS INCLUDED?	ACTIONS	TOTAL BIOGENIC CARBON	A1 TO A3	A4	A5	B1	B2	B3	B4	B5	C1	C2	C3	C4	D
▸	0.4	Specialist groundworks	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	0.5	Temporary / Enabling Works	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	1	**Substructure**	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	2.1	Frame	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	2.2	Upper floors incl balconies	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	2.3	Roof	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	2.4	Stairs and ramps	No	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
▸	2.5	External Walls	Yes, based on material quan...	ADD MATERIAL EDIT EMISSIONS	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Totals:			0	500	0	0	0	0	0	0	0	0	0	0	0	0

Displaying page 1 of 1 (total 21 records) 1 250 items per page

We welcome embodied carbon data on both retrofit and new-built projects. When entering refurbishment projects, the data-provider is asked to add in some basic information about the level of retrofit - from a light-touch refurbishment to a complete remodelling and extension. It also asks for the GIA of both the existing and new-build aspects of the work.

The primary focus for data collection (at least for the initial round of data collection in 2022) will be for data on buildings themselves, however site-wide infrastructure can also be entered into the BECD. Where this occurs, the data-provider will be asked to confirm that they are looking at the whole site, to enable the data to be interpreted accordingly.

Those wishing to provide both operational energy data and embodied carbon data for the same project are encouraged to also download the project operational carbon data form, fill it in, and submit it by email with the BECD project ID to Energydata@NZCBuildings.co.uk. with the Subject Line: “BECD embodied carbon data- name of sector.” E.g., BECD embodied carbon data-office. It will then be processed by the UKNZCBS team and there is the option of being passed to the BECD online platform where it will be included in the platform’s next revision in the near future.

How will the data submitted through the BECD be used?

Users can choose either to provide data exclusively for the UKNZCBS by selecting ‘Yes’ to question 1, and ‘No’ to question 2 in the ‘Data use and confidentiality section’ (see screenshot below). If users are happy for the data to be retained by the BECD database, then ‘Yes’ can be selected for both questions.

2.1.2 Operational energy data collection and modelling process

The purpose is to identify best practice projects (new or existing), on the basis of metered energy use.

Operational energy data on individual buildings or projects can be submitted directly to the NZCBS team, or via the BECD if embodied carbon data is also available for that project. For larger operational energy datasets, see next section.

Data will be collected via an Excel pro forma available on the project website or via the BECD (see Figure 4). Data providers are encouraged to download the form, complete it, and submit it by email to Energydata@NZCBuildings.co.uk with the Subject Line: "BECD operational energy data- name of sector", for example 'BECD operational energy data-office'.

It will then be processed by the NZCBS team and there is the option of being passed onto the BECD online platform where it will be included in the platform's next revision in the near future.

The pro forma is structured into three sections.

- The first section requests basic background information on the data provider.
- The second section requests essential data on the building overview, metered energy use and on-site energy generation. One part is common to all sectors, and the other is sector specific.
- The third section requests further information on the themes above. While this data is marked as optional, it is extremely valuable for the project and should be completed where available.

Data providers are requested to return the pro forma before the 16th of December 2022.

The Sector Groups will check for compliance with reporting requirements and highlight to the Operational Energy Task Group where any outliers or data 'oddities' are identified. The Sector Groups will then use the data gathered to develop a proposed operational energy benchmark for each sector. This will be submitted to the Operational Energy Task Group for review and consideration. Please see Appendix 1 for a populated example.

Those wishing to provide embodied carbon data for the same project as operational energy are encouraged to follow the instructions in the previous section on using the BECD to supply data. In this instance, the user will create a new entity in the BECD, add the embodied carbon data as section 2.1.1, and then will be given a reduced version of the

operational energy pro forma (to avoid duplicating information between the pro forma and the BECD) that they will complete and email to Energydata@NZCBuildings.co.uk.

Modelling support

Following the conclusion of the call for evidence in December 2022, the project's Sector Groups will undertake modelling and analysis to explore the energy reduction and decarbonisation potential within each building sector to explore the 'art of the possible'. This will require access to building energy models and support from energy modellers.

In addition to the request for in use operational energy data above, the Standard development team are calling on those with capacity to support with the modelling of operational energy performance to contact us at Energydata@NZCBuildings.co.uk**,** stating the building sector(s) you are able to assist with, a brief description of the performance energy models (e.g. PHPP, NABERs, CIBSE TM54) you have access to and a brief description of your availability to support the project during Q1 2023. Alternatively, if you are providing operational energy and / or embodied carbon data via the BECD, you can indicate this on the data form.

2.1.3 Larger industry datasets

Further to the process outlined above to collect data on individual building records, we are aware that a number of larger relevant datasets of building operational energy data or embodied carbon data, or aggregated statistics based on such datasets, exist in the market. These include the Better Buildings Partnership's Real Estate Environmental Benchmarking database, the CIBSE online energy benchmarks, the UK Government's Building Energy Efficiency Survey – as well as sector-specific databases such as the Cornell Hotels Sustainability Benchmarking Index. This includes individual companies with large numbers of building records, or industry collaborations.

For these datasets it may not be appropriate or feasible to complete the pro forma or populate the BECD. We would however like to ensure that these datasets are included in the project's evidence base, if appropriate.

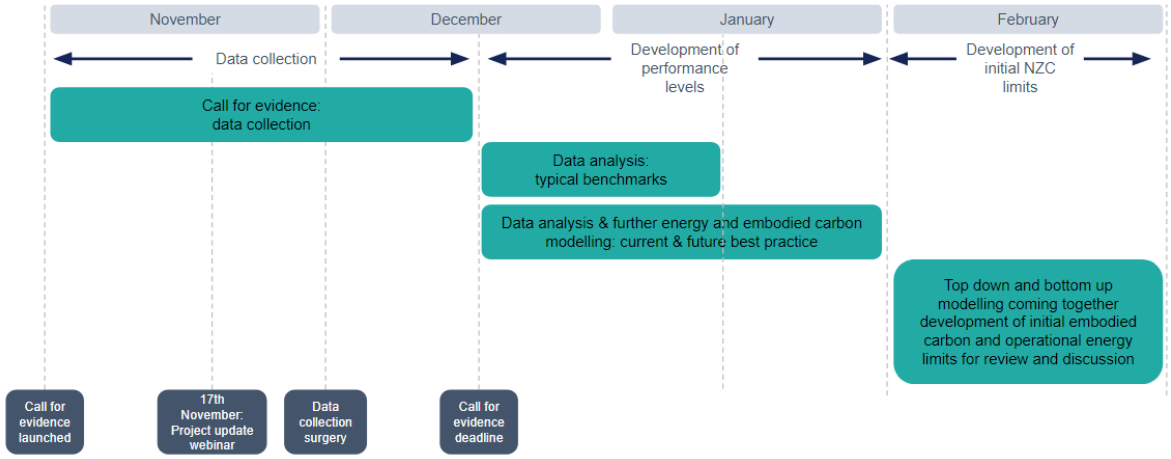
If you are responsible for a dataset of buildings and would like to share it with the project, please contact Energydata@NZCBuildings.co.uk **before the 16th of December 2022.** The team will then be in touch to better understand the size of the dataset, granularity and completeness of data and data quality.

2.2 Timeline

Data collection will commence on the 3rd of November 2022 and will run until 16 December 2022. Processing and analysis of the data will follow in Q1 2023.

Figure 5 shows a high-level timeline for the development of performance limits and targets for the Standard including data collection and processing activities and milestones.

Figure 5: UKNZCBS timeline



2.3 Prioritisation

Data entry into the BECD or operational energy pro forma can be time consuming if inputted and checked thoroughly throughout the process. A large number of firms are being approached for data, and so individuals are asked to prioritise entering **a few, high-quality sets** of data, rather than a larger number of low-quality sets of data.

We request that where firms have high quality data for multiple sectors, they prioritise the following sectors, which are expected to receive less data overall:

- Culture & entertainment (e.g., theatres, cinemas)
- Sport & leisure (e.g., leisure centres)
- Data centres
- Smaller buildings (e.g., offices below 2000m^2 floor area)

2.4 Data quality

The quality of data entries will be assessed in order to help determine which data is most likely to be representative of what is actually being built in the industry today. The highest quality data will demonstrate the following characteristics

- be complete - with all optional data entry points completed in addition to those which are mandatory
- be as recent as possible - the project team recognise that in particular for operational energy data, the effects of the COVID-19 pandemic on building occupancy and HVAC servicing patterns in certain buildings may not be representative of normal performance. This call for evidence is seeking data representing normal occupancy conditions where possible.

- have been third-party reviewed and verified[6] (though we recognise that this is not always the case and invite data that is not third-party reviewed and verified)

For *embodied carbon* data, the following specific quality indicators will also determine high quality data:

- at least 95% of the cost allocated to each building element category included in the assessment
- entered at RIBA stage 6 or 7 (i.e., post-completion of construction)
- based on project specific EPD where available
- use as-built material quantities

For *operational energy* data, the following specific quality indicators will also determine high quality data:

- energy data representing a full year of metered data
- from a year in which the building was operating at normal occupancy, unless the occupancy levels are otherwise stated
- energy data provided with further contextual information on building occupancy, usage patterns and services (see pro forma for specific questions)

It is not essential for data to meet all these criteria – data providers are encouraged to come forward if this is the case and the project team will review the data for quality and assess whether it will be included.

2.5 Confidentiality

Operational energy data

Data can be provided on an anonymised basis, with at most the first half of the postcode as a geographical identifier.

Data will not be used for purposes other than the development of benchmarks and limits for the Standard unless the provider has allowed permission for the data to form part of the BECD.

Embodied carbon data

Data entered via the BECD will not enable any specific projects to be identified based on data entered. Data can be entered without needing to fully disclose a project's identity. A unique ID number will be given to the project entry for identification, and the value entered for 'project name' entered will be the entrant's choice (this will be publicly visible so should be a generic name). The first half of the project's postcode will be requested to assist in checking for geographical variations.

[6] For example: ASAE3000, Carbon Trust Standard, ISAE3000, ISAE 3410, ISO 14064-1, ISO 14064-3

Further, the data entered into the BECD at this time will only be used for the purposes of developing benchmarks, targets, and limits for the writing of the NZCBS. On entering data, users will have the option to confirm the data's suitability for submission to the final version of BECD when that goes live in 2023, however this is entirely optional.

2.6 Outreach

To make the Standard a success, we are looking to collect as much quality data as is possible. **To facilitate this process, we encourage all data providers to approach five industry colleagues and encourage them to submit data for the Standard too.**

Social media graphics to highlight that an individual or organisation has submitted data have been produced by the NZCBS team and will be provided to data suppliers - we encourage all data-providers to use these graphics on social media to share with the industry that they are contributing to this initiative.

2.7 Any Questions?

If you have any questions relating to the call for evidence, please share these with the team using the following survey link: https://www.surveymonkey.co.uk/r/S8FBHHQ

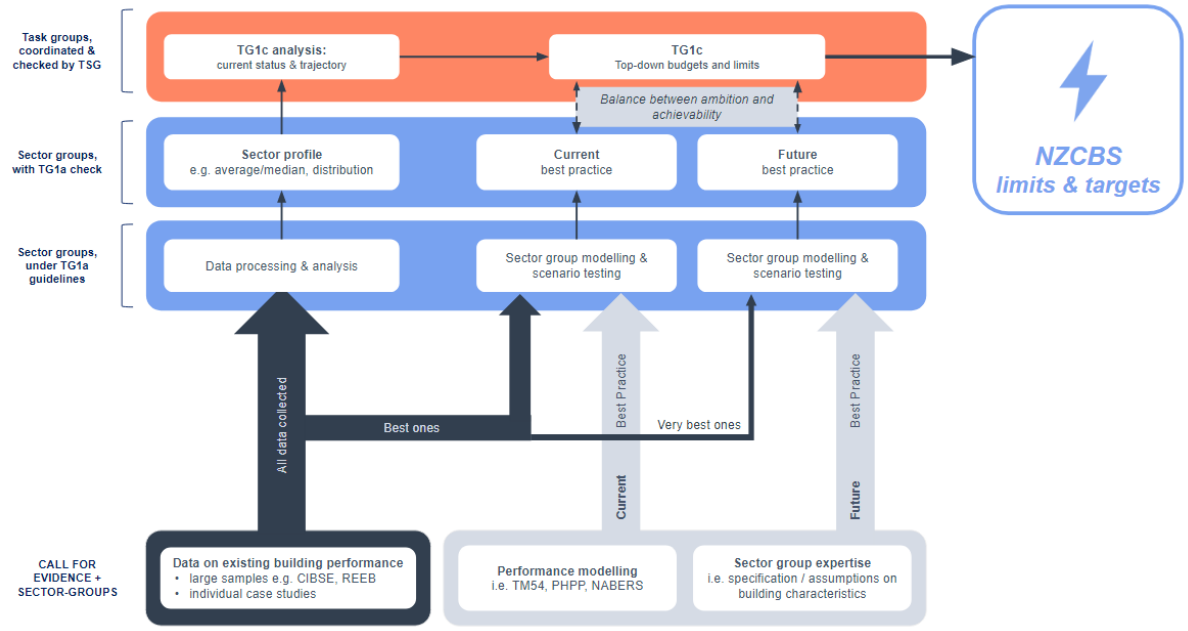
3.0 Data processing and analysis

As noted above, the data on operational energy and embodied carbon that is supplied to the project will be used to develop benchmarks, targets, and limits for each sector for the Standard. The following section provides a high-level outline of the process that will be followed.

3.1 Operational energy

Figure 6 illustrates the process that will be followed to incorporate operational energy data into the project.

Figure 6: Operational energy data processing and analysis process diagram



Data enters the project in the bottom left corner of the diagram – either in the form of individual building records or large datasets. Data deemed representative of current typical performance will be processed by the Sector Groups to develop statistics on the distribution of performance levels today, allowing medians and percentiles to be derived. This will be used to develop benchmark performance levels for the sector and consider whether further disaggregation within the sector by building type is necessary.

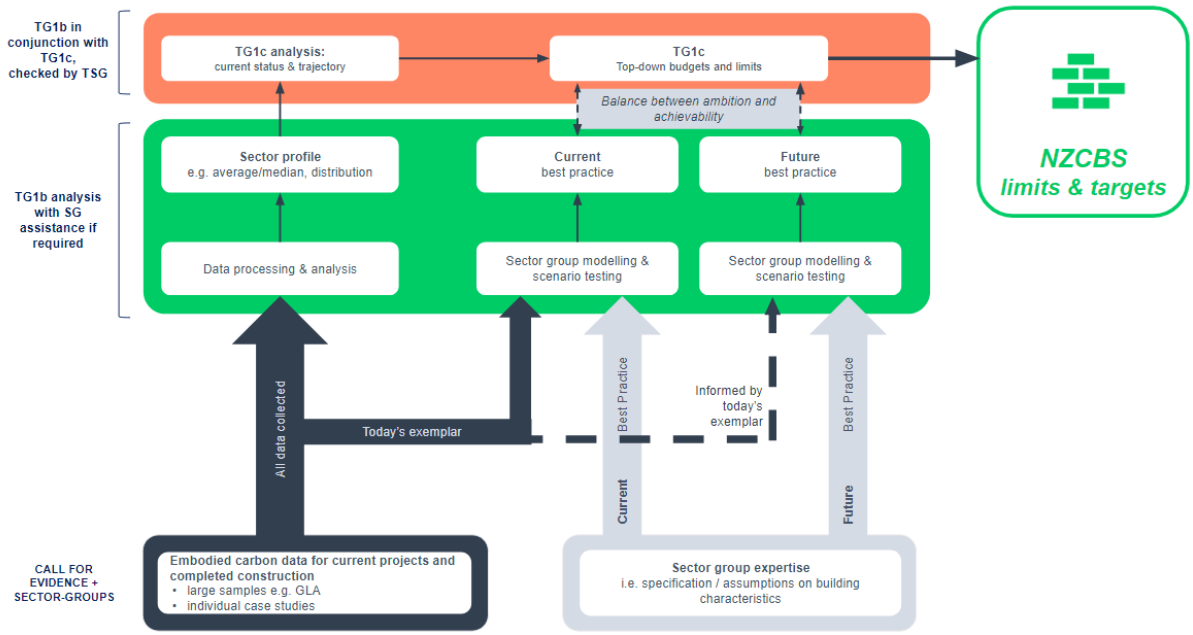
Data for good-performing and best-performing buildings within the sector will be used to develop current best practice and future best practice performance levels. This process will also be informed by performance modelling and sector group expertise. These current best practice and future best practice performance levels may be different for existing and new buildings (or based on other building characteristics, where the evidence supports this approach) - this will be decided by the Sector Groups in conjunction with the Operational Energy Task Group (TG1a).

The current best practice and future best practice performance levels will be compared with the results of modelling of the top-down carbon budgets and limits undertaken by the Top-Down Task Group (TG1c). Where this demonstrates agreement, it will be possible to select limits for the given sector. Where there is a difference between the 'bottom-up' and 'top-down' performance levels, this will be reconciled between the Operational Energy Task Group, TG1c and the Sector Groups. This may require redistribution of carbon budgets or a review of the underlying assumptions of the modelling.

3.2 Embodied Carbon

Figure 7 illustrates the process that will be followed to incorporate embodied carbon data into the project.

Figure 7: Embodied carbon data processing and analysis process diagram



Data enters the project in the bottom left corner of the diagram – either in the form of individual building records or large datasets. Data deemed representative of current typical performance will be processed by the Embodied Carbon Task Group (potentially with Sector Group assistance) to develop statistics on the distribution of performance levels today, allowing medians and percentiles to be derived. This will be used to develop benchmark performance levels for the sector and consider whether further disaggregation within the sector by building type is necessary.

Data for high-performing and best-performing buildings within each sector will also be used to develop and inform current best practice and future best practice performance levels. This process will also be informed by further modelling and sector group expertise.

The current best practice and future best practice performance levels will be compared with the results of modelling of the top-down carbon budgets and limits undertaken by the Top-

Down Task Group (TG1c). Where possible, future embodied carbon limits will be set in a way which aligns both with the top-down carbon budgets, and the bottom-up best practice performance levels. Where there is a difference between these two performance levels, this will be reconciled between the Embodied Carbon Task Group, TG1c and the Sector Groups. This may require redistribution of carbon budgets or a review of the underlying assumptions of the modelling.

Appendix 1 – Extracts from example operational energy pro forma

The answers in the following examples are illustrative only; the intent of this section is just to illustrate the approach to filling in the operational energy pro-forma.

Example 1: Illustration project with pre-retrofit and post-retrofit data

In this illustrative example, the project is a home, for which energy data is available pre- and post-retrofit. The approach is simple:

- For each tab, copy & paste the response columns (i.e., the ones with the coloured cells), and make sure you select “pre-retrofit” and “post-retrofit” for the appropriate column, in answer to question E1-1 in Tab 1.
- Fill in the cells in both columns, as appropriate. Note that energy use is not the only parameter that may have changed through the retrofit e.g., in this example, data is considered of good quality post-retrofit as it was subject to post-occupancy evaluation, but pre-retrofit data may just have been based on previous energy bills, with only basic checks. Similarly, in this example, there was a gas boiler pre-retrofit, but no longer post-retrofit.

See filled-in Example 1 in the folder

Example 2: Illustration project with on-site systems

In this illustrative example, the project is all-electric. It is fed by both the grid (4,150kWh/yr) and by on-site PVs (850kWh/yr), which together form its total annual energy use (5,000 kWh/yr). The PVs also generate a small amount of additional electricity (150kWh/yr), which is exported. The approach is:

- In Tab 1 Section 1-3, enter the total energy use i.e., including both grid and PV supplies. The rows covering other energy supplies (e.g., gas) can simply be answered “no” and skipped”: they are hidden in the illustrative example.
- Also in Tab 1, in Section 1-4, enter the breakdown contributions from the grid and from PVs. The rows covering other on-site systems (e.g., wind turbines) can simply be answered “no” and skipped: they are hidden in the illustrative example.

See filled-in Example 2 in the folder

Example 3: Illustration project with special uses likely to be large energy consumers

In this illustrative example, the project is all-electric, and there are no on-site systems. It is a hotel with a number of supporting high energy consuming areas. The approach is:

- High-energy consuming areas are the gym/fitness, spa, and commercial kitchen, all of which are included in the building’s total energy use provided in Section 1-3. Energy use is sub-metered and provided.

- There are also some EV charging points. There is no information available on their energy use, but as their consumption is not included in the total provided in Section 1-3, this is not critical.
- There are also some office / administration areas. Their energy use is included in the building total; there is no information available on their energy use, but as they are not likely to be large energy users compared to the rest of the areas, this is not critical.

See filled-in Example 3 in the folder

Example 4: Illustration of sector-specific Tab 2, for an office (tenanted areas only)

In this illustrative example, the project is an office:

- The information submitted is only for tenanted areas (E2-4), which have a NABERS rating of 4* (O2-7)
- The user has entered the additional information which will allow the NZCBS to potentially benchmark the project against alternative metrics i.e., number of occupants (question O2-1)
- In addition, the user recommends that a useful metric to benchmark performance would be kWh/full time employee per year; however, they do not have that information for that project (O2-10).

See filled-in Example 4 in the folder