



UK Net Zero Carbon Buildings Standard

Technical Update & Consultation

14 June 2023

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PARTNERSHIP



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StructuralEngineers



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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

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.

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.

6. New Build Embodied Carbon Performance Levels



UK Net Zero Carbon
Buildings Standard

New Build Embodied Carbon Performance Levels



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5. Bottom Up Performance Levels



UK Net Zero Carbon
Buildings Standard

Bottom Up Performance Levels



Overview

The bottom-up workstream has been working over the last six months to use benchmarking, case studies and modelling to create Performance Levels that provide the context of technical feasibility for the various sectors. The next phase of work over the summer of 2023 will be for the top-down workstream to establish the relevant national carbon 'budgets' which show what the industry needs to achieve to play its part in a net zero carbon UK. The outputs from these workstreams will then be combined to create relevant limits and targets for the Standard.

The performance levels represent what can be achieved at the individual building level. **They do not represent the final NZCBS limits**, since these limits will be determined as part of the process of Bottom Up & Top Down analysis, to represent what is required to meet the UK's carbon budgets as well as what is expected to be achievable, taking account of:

- How much zero carbon energy is expected to be available
- How efforts are shared across sectors
- How efforts are shared between buildings in a sector e.g. to represent different types and levels of constraints on some buildings.



The performance levels are one part of the process for defining the net zero limits.

What the Performance Levels represent



Operational Energy



The operational energy performance levels result from the 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. Two types of performance levels have been developed:

- Best Practice Today
- Future Exemplar.

The purpose of these 2 levels is to assist the balancing of carbon budgets: depending on how much effort is required across sectors to meet UK-wide carbon budgets, the Net Zero limits will be set more closely towards Best Practice Today or, if more efforts are required, towards Future Exemplar.

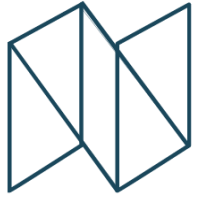
Embodied Carbon



For the embodied carbon performance levels, we are assuming that the data submitted lies somewhere between mean performance and current best practice, as embodied carbon calculations have historically only been undertaken on projects with strong sustainability agendas. We have also not yet differentiated between best practice and future exemplars, the latter of which is based largely on material decarbonisation and can only be driven a little by today's design decisions.

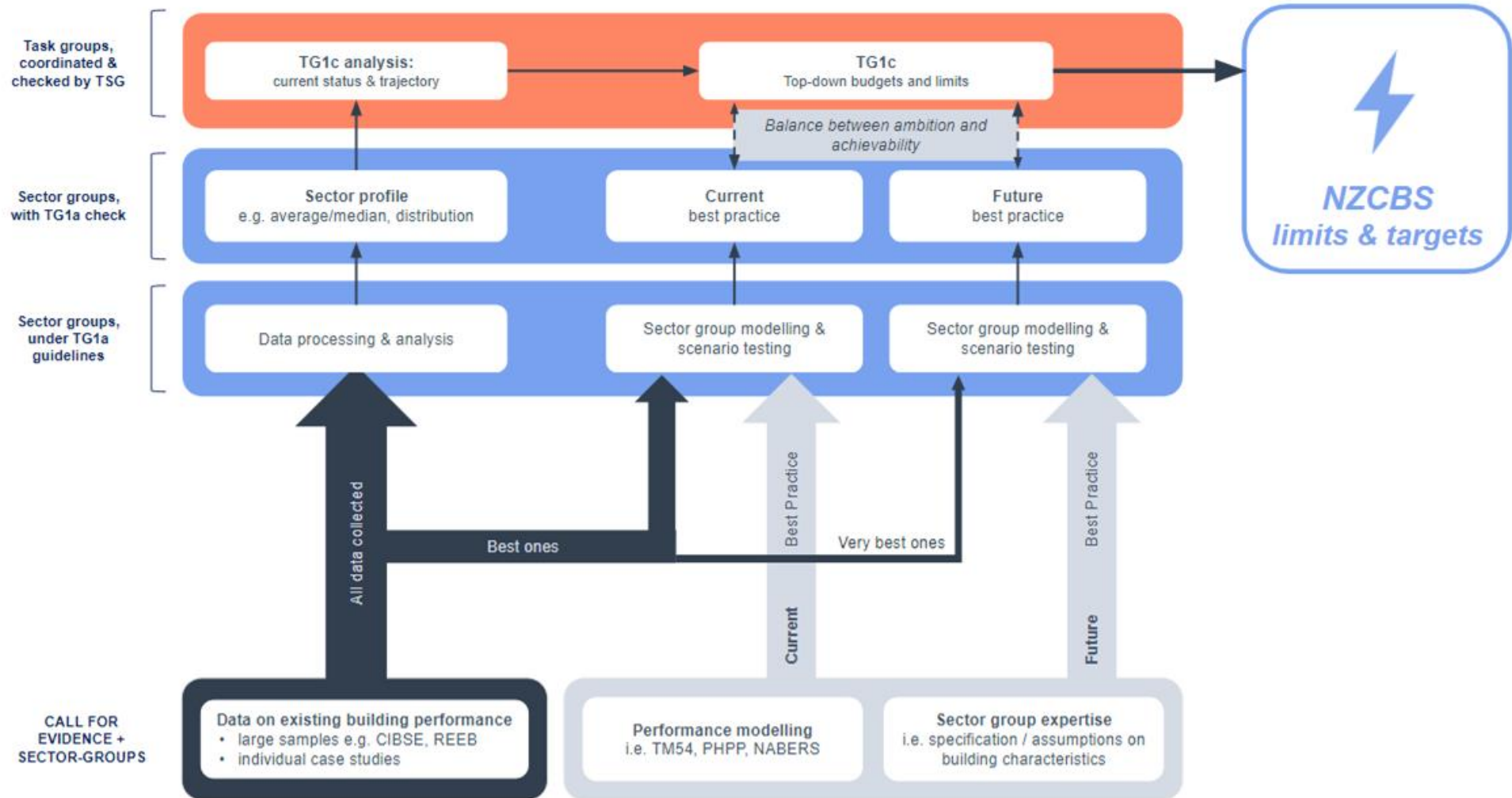
For that reason, embodied carbon performance levels are articulated solely in terms of the range of data received today - percentiles and median/mean values.

Creation of the Performance Levels



5. Bottom Up Performance Levels

We have completed this step for new buildings



6. New Build Embodied Carbon Performance Levels



UK Net Zero Carbon
Buildings Standard

New Build Embodied Carbon Performance Levels



Executive summary

The embodied carbon of nearly 500 UK-based new-build projects has been analysed for the Standard, to understand what levels of performance are currently achieved on our projects. This section of the report explains what data was received, how it was interpreted, and what performance levels were derived from it.

It should be noted that there was a lack of usable data in four sectors (retail, data centres, hotels and sports & leisure), and most sectors did not provide sufficient life-cycle embodied carbon data to allow analysis for modules A-C. This section therefore focuses on upfront embodied carbon (modules A1-A5) for the nine remaining sectors only.

We also comment on the next stages of work for embodied carbon: predicting future possible performance levels, and setting limits for new-build and retrofit projects.

The consultation questions for this section of the report focus on whether the consultees support the approaches taken to analysing data so far, and whether there is support for the proposed approaches to be taken as next steps.



New Build Data Collection and Analysis Processes

New Build Embodied Carbon Data Collection



Data format

Embodied carbon data was collected from several sources, including the beta version of the Built Environment Carbon Database (BECD). Project data was also submitted using the LETI proforma, and OneClick downloads.

Multi-project datasets were submitted by the Greater London Authority, Future Homes Hub, and both Price & Myers and Smith & Wallwork shared their in-house structural embodied carbon datasets.

Scope (modules)

All building lifecycle modules could be submitted, across modules A-C and D. Sequestered biogenic carbon could be reported, but was to be reported separately to the fossil emissions modules.

Scope (elements)

Using the element categories provided by the RICS Professional Statement on WLCA in the Built Environment, most submissions concentrated on elements 1 through 5, meaning that facilitating works and external works were omitted from submission.

This means that the Standard team focussed on the analysis of the data submitted for:

- Substructure (1)
- Superstructure (2.1-2.4)
- Facade (2.5-2.6)
- Cat A fitout (2.7-3)
- FF&E (4)
- Building services/MEP (5)

Very few datasets included all six elements shown on this page; many were structure-only (1-2.4).

For office submissions, it was assumed that all data provided was Shell & Core plus Cat A only, unless specified otherwise in the submission. This means that no embodied carbon allowances have been made for tenant installations and modifications.

We note that the forthcoming updates to the RICS Professional Statement increases the scope as to minimum reporting requirements, as referred in the RICS Professional Statement v2.

New Build Embodied Carbon Data Analysis



The primary role of the embodied carbon Task Group was to consolidate the various data sources, and ensure that they were comparable in scope to one another.

We removed data that was largely incomplete or appeared to be too high or low, and imported the remainder into PowerBI to allow the various sources of data to be compared alongside each other.

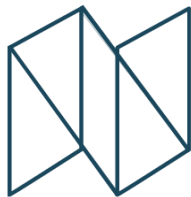
As most data submitted was only for some elements (e.g. structural-only, with no data for facades, MEP etc.), we backfilled the gaps using average values from where elements did have data submitted.

This 'notionally complete' dataset was then used to create embodied carbon histograms for different sectors, and derive percentiles.

This process is shown overleaf.



New Build Data Collection and Analysis Flowchart



Embodied Carbon Data Collection

BECD
LETI
Price&Myers
Smith&Wallwork
Future Homes Hub
Other



Averages used to backfill projects to obtain full project data

	Sub-structure	Super-structure	Facade	MEP	Finishes	FF&E
Project1	X	X	Y	X	X	Y
Project2	Y	Y	X	Y	X	X
Project3	X	X	Y	X	Y	Y

Averages calculated for each element, for each sector, for each lifecycle stage

	Sub-structure	Super-structure	Facade	MEP	Finishes	FF&E
Project1	X	X		X	X	
Project2			X		X	X
Project3	X	X		X		
Office A1-A3 Averages	Y	Y	Y	Y	Y	Y

Each project contained only selected elements

	Sub-structure	Super-structure	Facade	MEP	Finishes	FF&E
Project1	X	X		X	X	
Project2			X		X	X
Project3	X	X		X		

Completed embodied Carbon Dataset

Histograms created for each sector, for each lifecycle stage



Review of 25th / 50th / 75th percentiles, averages, medians, etc

TG1b agrees bottom up Embodied Carbon Benchmarks



Overview of Submitted Data

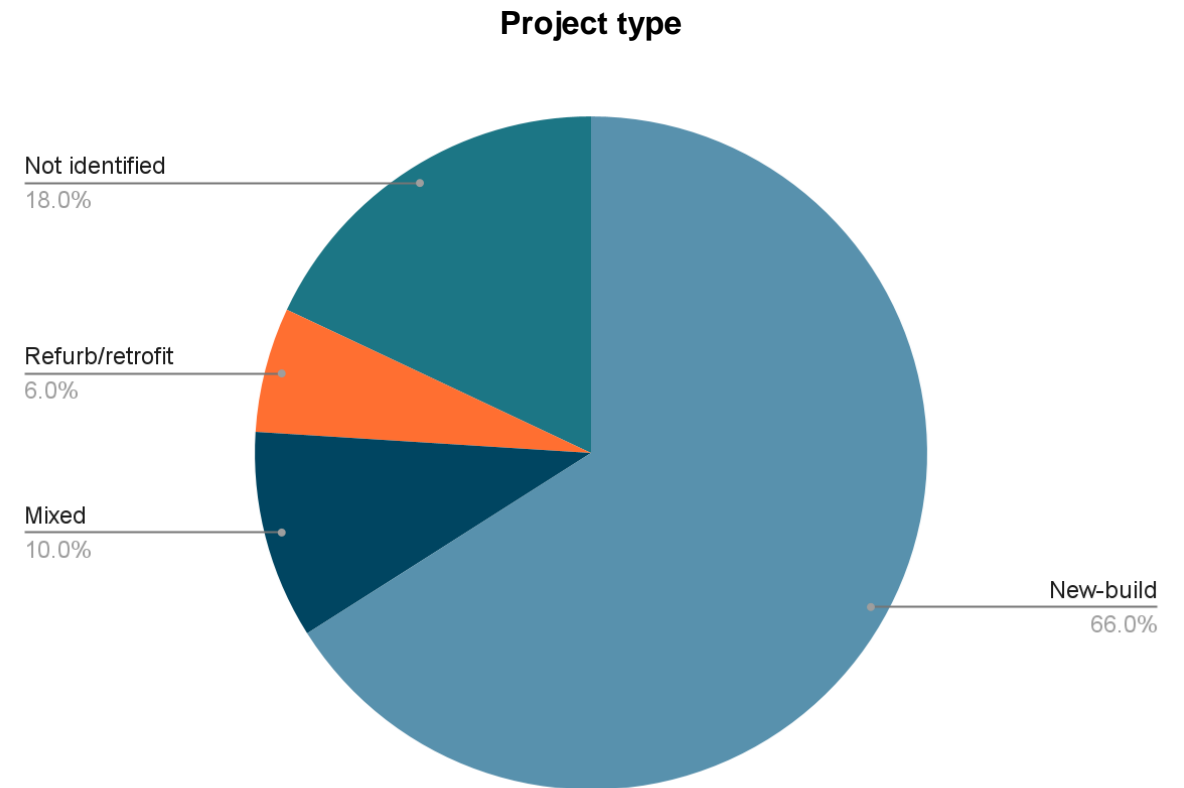
Types of Project Submitted



The majority of projects submitted to the call for evidence were new-build, with only 16% containing elements of refurbishment or retrofit.

The work leading up to this consultation document has focussed on interpreting the new-build data only.

The proposed approach to setting retrofit limits (during the next stage of works) is outlined on page 28.



New Build Data Overview and Quality



The table overleaf shows the total extent of data within each sector, and level of scope covered.

Number of datapoints

Four sectors (retail, data centres, hotels, and sports & leisure) had insufficient data across all elements, and so the performance levels of those sectors is not currently understood. It will not be possible to set limits for these sectors without additional data.

The number of data points in the other nine sectors vary from 10 to 238 projects.

Project sizes

The average GIA for each sector is also shown in the table, ranging from less than 1000m² (healthcare and culture & entertainment), to more than 100,000m²

(offices, commercial residential, logistics & warehouses).

It is noted that whilst the homes sector averages 5,900m², the majority of the data is from multi-family buildings. The single-family home data submitted by Future Homes Hub will be considered separately when setting limits for this subsector.

Scope of submissions

Many sectors only submitted enough data to understand the performance levels of the sub- and superstructure for that sector.

Most sectors also only submitted sufficient data for upfront embodied carbon (modules A1-A5), meaning that the life cycle embodied carbon performance levels are not understood.

This means that it will only be possible for the standard to set limits on upfront embodied carbon (modules A1-A5) for the nine sectors.

The Standard still intends that life cycle embodied carbon (modules A-C) data will be required to be reported, and the aim is to set limits on this in future versions of the Standard.

Backfilling data

Where projects had no data shared for non-structural elements, this is shown as ND overleaf. Here, the A1-A5 average figures from other sectors were backfilled into the gap, using the *Office* sector figures for the Facade elements, and *Commercial Residential* for all other elements.

New Build Data Overview and Quality



Sector		Offices	Homes*	Commercial residential	Logistics & warehouses	Healthcare	Schools	Higher education	Culture & entertainment	Science & technology	Retail	Data centres	Sports & leisure	Hotels
Number of projects		72	238*	78	20	10	94	10	33	16	1	1	3	0
Mean GIA of projects (m ²)		105,000	5,900*	186,000	159,000	500	2,900	12,300	900	48,000	N/A	N/A	N/A	N/A
Quality of upfront embodied carbon data (A1-A5)	Substructure (1)	Good	Good, but not split by element	Good	Good	Good	Good	Good, but not split by element	Good, but not split by element	Good	N/A	N/A	N/A	N/A
	Superstructure (2.1-2.4)	Good		Good	Good	Good	Good	Good, but not split by element	Good, but not split by element	Good	N/A	N/A	N/A	N/A
	Facade (2.5-2.6)	Good		Good	Good	ND	Good	ND	ND	ND	N/A	N/A	N/A	N/A
	Cat A fitout (2.7-3)	Good		Good	Good	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A
	FF&E (4)	Good		Good	Good	ND	ND	ND	ND	ND	N/A	N/A	N/A	N/A
	MEP (5)	Good		Good	Good	ND	Only 2 projects	ND	ND	ND	N/A	N/A	N/A	N/A
Quality of in-use embodied carbon data (B1-C4)		Poor quality	Poor quality	Good	Good	ND	Poor quality	ND	ND	ND	N/A	N/A	N/A	N/A

ND = no data. For A1-A5 elements, this was then backfilled with average figures (facade taken from *Offices* sector, all other elements from the *Commercial Residential* sector)

*note: 31 projects were Future Homes Hub submissions, analysing single-family homes. This sub-sector will be considered separately when setting limits.

New Build Data Overview and Quality



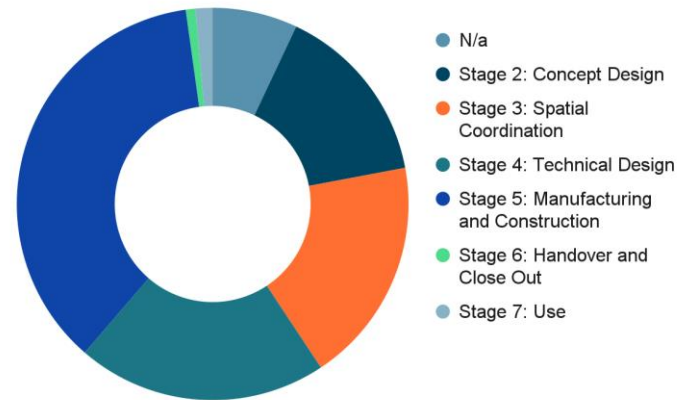
Most data submitted was for projects that were at least into RIBA Stage 4, and nearly 40% of projects were at least into Stage 5.

Over three-quarters of the embodied carbon data submitted was structures-only, in part due to the large amount of data that came from two structural consultancies, Price and Myers, and Smith and Wallwork.

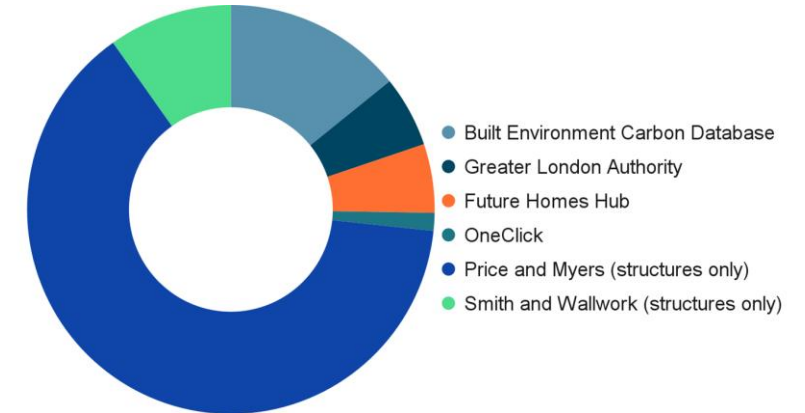
Where data submitted was not split up by element (e.g. where sub and superstructure had been combined) we disaggregated the data based on the percentage split taken from the whole dataset.

Most MEP data was not calculated using CIBSE TM65, and so separate modelling will be run later this year to understand whether a higher carbon intensity should be shown.

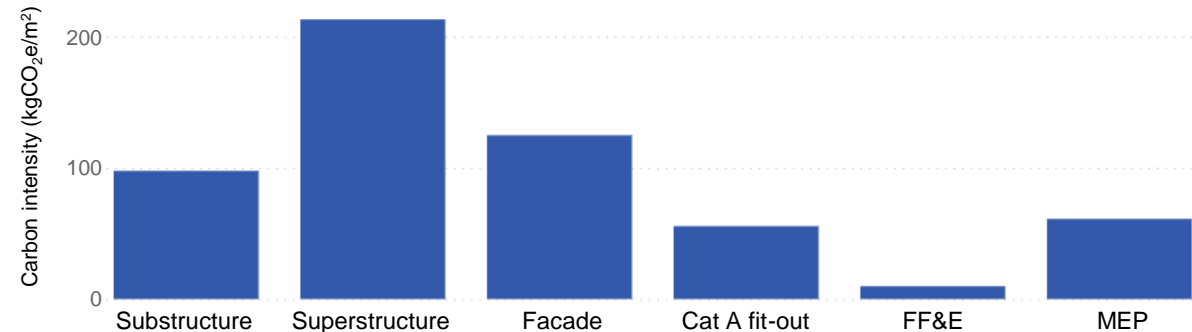
RIBA stages



Data sources



Average embodied carbon intensity per element, all buildings



New Build Data Distribution



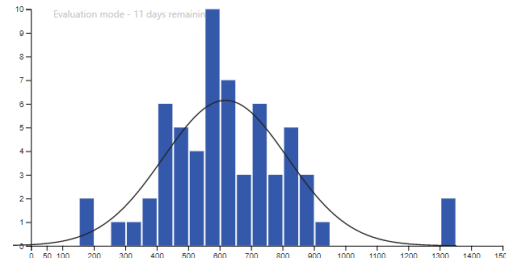
These histograms shown across these two pages demonstrate the range of data submitted for each sector.

Note that very high and very low datapoints were removed as part of the embodied carbon data analysis process.

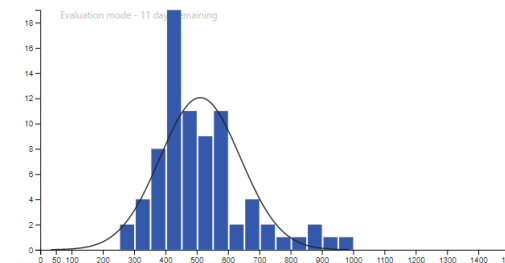
The x-axes on these graphs show upfront embodied carbon intensity ($\text{kgCO}_2\text{e/m}^2$) and are normalised to allow comparison of the distribution of carbon intensity between sectors.

The y-axes give the number of projects in each band, and are different on each graph as the number of projects submitted for each sector varies.

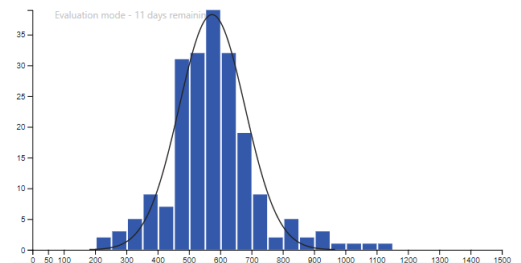
Offices



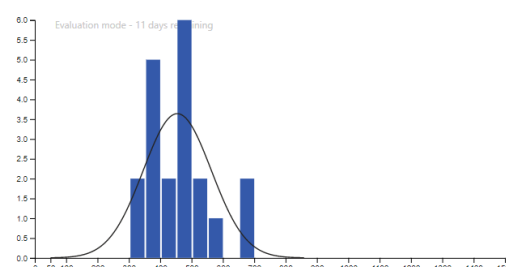
Commercial residential



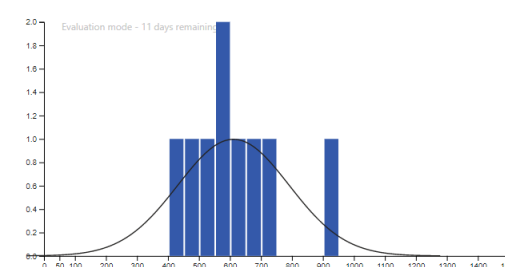
Homes



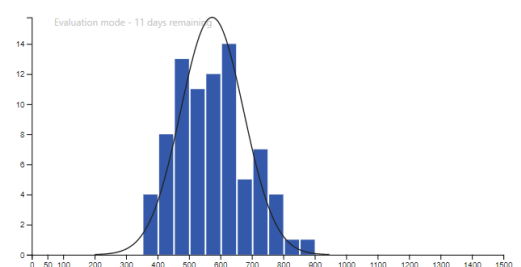
Logistics & warehouses



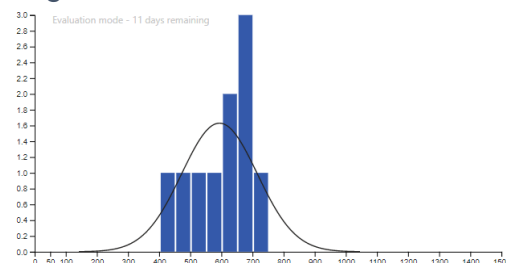
Healthcare



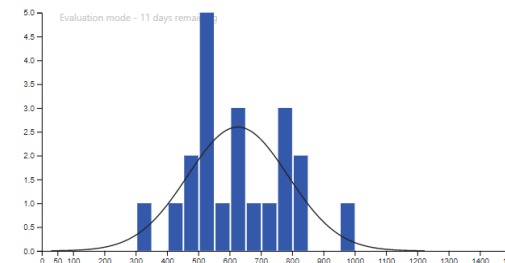
Schools



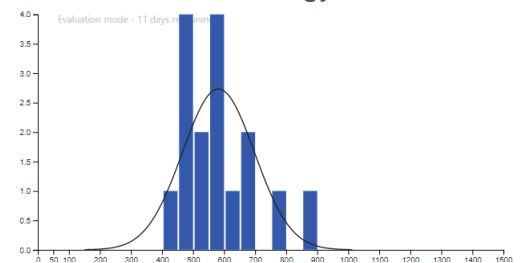
Higher education



Culture & Entertainment



Science & technology



New Build Embodied Carbon Data Gathering and Interpretation



Talking Points

43. What is your general opinion about the quality of data received?

- Highly unsatisfactory.
- Unsatisfactory.
- Neutral.
- Satisfactory.
- Highly satisfactory.

44. 75% of the data collected was structures-only. What is your opinion of this?

- I have no problem with this at all - the structure is the most impactful element for embodied carbon.
- I'm neutral about this situation.
- I would like to see more non-structural data gathered but it won't affect my support for the Standard.
- I won't be able to advocate for the Standard's use without more non-structural data being gathered.

45. Where we had incomplete projects (e.g. structure-only), we backfilled the gaps using average data from other projects in different sectors. What is your opinion of this?

- I have no problem with this approach.
- I'm neutral about this situation.
- I would like to see a different approach followed (explain your approach below under 'any other comments') but it won't affect my support for the Standard.
- I won't be able to advocate for the Standard's use without a different approach (explain your approach below under 'any other comments') being followed for this.

46. Do you have any other comments regarding data gathering and interpretation process?





Analysis Output: Performance Levels

New Build Embodied Carbon Performance Levels



Derived levels of performance

The table overleaf outlines the levels of performance demonstrated by the final 571 new-build projects that passed the QA process undertaken in early 2023.

The performance levels only cover upfront embodied carbon (modules A1-A5), due to the extent of data submitted only covering this.

A range of levels is shown, showing the 25th, 50th and 75th percentiles, along with the mean value of each sector.

This information will be used to inform the embodied carbon limits that will be set during the next stage of the works.

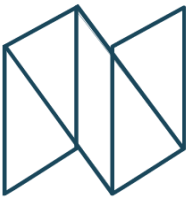
These are not limits

Note that the performance levels shown here do not represent the limits and targets for the Standard - just the findings of the evidence gathering exercise to understand embodied carbon performance of buildings today.

It is important to note that whilst a range of values are shown, the limits may not sit within this range.

We also acknowledge that the projects shown here are probably lower embodied carbon than 'business as usual', and this will be reflected when final limits are set.

New Build Embodied Carbon Performance Levels

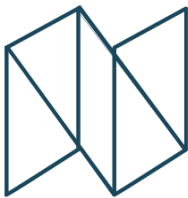


6. Embodied Carbon Performance Levels

Sector	All	Offices	Homes*	Commercial residential	Logistics / warehouses	Healthcare	Schools	Higher education	Culture and entertainment	Science and technology
<i>Number of projects</i>	<i>499</i>	<i>61</i>	<i>204</i>	<i>78</i>	<i>20</i>	<i>9</i>	<i>80</i>	<i>10</i>	<i>21</i>	<i>16</i>
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

All figures shown are A1-A5 emissions, kgCO₂e/m²
All numbers rounded to nearest 10kg.
*It is noted that the Future Homes Hub Implementation plan study gave a figure of 425 kgCO₂e/m² for single-family homes, which will be accounted for when setting limits
Data centres, sports & leisure, hotels, and retail sectors currently have insufficient data and so are not included here

Comparison with Existing Targets



This table outlines some of the carbon targets set by industry already, demonstrating that most of the performance levels shown in the previous table fall within expected ranges.

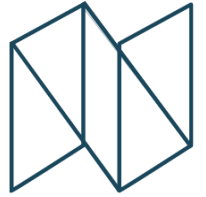
These numbers are only shown for information and do not necessarily reflect the limits that will be set in the Standard.

Sector	All	Offices	Homes	Commercial residential	Logistics / warehouses	Healthcare	Schools	Higher education	Culture and entertainment	Science and technology
LETI band A ¹	-	375	300	-	-	-	300	-	-	-
LETI band C ¹	-	600	500	-	-	-	500	-	-	-
GLA aspirational target ²	-	600	500	-	-	-	500	-	-	-
GLA benchmark figures ²	-	950	850	-	-	-	750	-	-	-
SBTi 2025 targets based on global emissions and GIA ³	-	600	410	-	-	-	-	-	-	-

A1-A5 emissions, kgCO₂e/m²
All numbers rounded to nearest 10kg.

[1] LETI, https://www.leti.uk/files/ugd/252d09_25fc266f7fe44a24b55cce95a92a3878.pdf
[2] Greater London Authority, Appendix 2 of https://www.london.gov.uk/sites/default/files/lpg_-_wlca_guidance.pdf
[3] Science Based Targets initiative, Table 6.1 of https://sciencebasedtargets.org/resources/files/DRAFT_SBTi_Embodied-carbon-pathway-development-description.pdf

New Build Embodied Carbon Performance Levels



Talking Points



47. Do you think that the performance levels shown are in the right order of magnitude?

- Far too low
- A bit low
- About right
- A bit high
- Far too high

Do you have any comments on the performance levels shown for specific sectors? Please provide evidence to support any arguments of too high/low you might make.

48. Are you able to share data to support your comments?

If so, please share the data via the BECD (<https://beta.becd.co.uk/>) and write your Assessment ID, or IDs, (e.g.: *f024ff69-0ff6-4f8b-849a-08daacf690a1*, found in the top-left corner of the embodied carbon page) in the text-box below:



Future Decarbonisation Predictions

Future Decarbonisation Predictions



To help inform the embodied carbon limits for future years, we must first predict the possible future levels of performance, based on today's levels but modified for our decarbonisation predictions. To do this, we researched the rates at which different sectors could reasonably be forecast to reduce their embodied carbon intensity by considering four main aspects:

Material decarbonisation

This is the forecast decarbonisation of materials used in the built environment. Figure 30 of the UKGBC "Net Zero Whole Life Carbon Roadmap" (2021) gives trajectories for each material. We researched whether any more recent reports or data would supersede this roadmap, including speaking to its original authors, and the only change accounted for is the 2023 Timber Development UK net zero roadmap.

Material consumption patterns

The sector groups were asked to advise as to which materials were used the most in their sectors, to feed into the next two aspects, efficiency gains and material selection. Steel and concrete were highlighted as the main sources of embodied carbon emissions in every sector.

Material efficiency gains

The sector groups were asked to advise as to how much more efficiently they thought that materials could be used in the design of their buildings. Very little quantitative data was found to exist on this, though in general most sectors expected that a 10-20% improvement was possible today. The UKGCB roadmap predicted an improvement of around 20% by 2050 compared to 2018 levels, but predicted a linear change between now and then.

Material selection

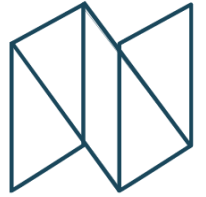
Finally, the sector groups advised on material selection, prioritising the use of the lowest carbon material for each building. Many sectors cited timber as an alternative to steel

or concrete for small/medium sized projects including housing. Natural and/or reclaimed materials were highlighted as usable for structure, insulation and finishes. Lower-carbon concrete mixes were commonly seen as an option too. This use of lowest-carbon materials, where safe to do so and meeting the functional requirements of the building regulations, will be considered when setting limits during the next stage of work.

The information gathered from these four areas will be used to inform our predictions for the future decarbonisation of each sector, and the expected future performance levels.

From material efficiency gains and swapping, we assume that a 10% improvement over business as usual embodied carbon is possible today, and that this will increase to 20% by 2030. Material decarbonisation benefits will follow on top of this.

Future Decarbonisation Predictions



Talking Points

49. Our understanding of possible future performance levels across the sectors will be informed by the UKGBC Whole Life Roadmap for the Built Environment (2021), specifically the work done to understand predicted material decarbonisation. Do you agree with this approach?

50. Predicted material efficiency increases will also be used to inform limit setting. In your opinion, what percentage reduction in upfront embodied carbon (A1-A5) is possible TODAY purely from more efficient use of materials?

- no room for improvement
- at least 10% better
- at least 20% better
- at least 30% better
- at least 40% better
- at least 50% better

51. Predicted material efficiency increases will also be used to inform limit setting. In your opinion, what percentage reduction in upfront embodied carbon (A1-A5) will be possible BY 2030 purely from more efficient use of materials?

- no room for improvement
- at least 10% better
- at least 20% better
- at least 30% better
- at least 40% better
- at least 50% better





Further Embodied Carbon Considerations

RICS Professional Statement v2



The RICS Professional Statement (PS) on Whole Life Carbon Assessment for the Built Environment is in the process of being updated this year, to bring more consistency to the industry's approach to carbon accounting.

The following key changes will need to be considered as possible modifiers to the shown performance levels, in order to set embodied carbon limits aligned with the updated PS:

- The introduction of new life-cycle stages some of which are mandatory to report (e.g. A5.1, demolition).
- The need for all elements listed in the cost plan to also be included within the carbon assessment.
- Carbon offsets for materials must be excluded (e.g. "net zero

carbon" building products must be reported without their offsets accounted for).

- Transport emissions to include return trips, calculated using DEFRA factors.
- Percentages of cement replacement and scrap steel must follow default figures until products are known.
- Upfront carbon should not include biogenic carbon (could be reported separately) but land use and land use change (LULUC) emissions must be reported.
- Biogenic carbon can only be claimed for sustainably sourced materials.

There are further related changes which will not affect the limit-setting process, but may need to be taken into account

depending on how the development of the Standard progresses. These include:

- Grid decarbonisation to be reflected in modules B-C emissions. This will become relevant once sufficient data has been obtained for module B-C and limits are being set for the life-cycle embodied carbon emissions (A-C) of projects.
- Infrastructure emissions to be reported. This will become relevant if future revisions of the standard set limits on the infrastructure related to a building's construction.

Beyond new-build & whole buildings



Later in 2023, the embodied carbon performance levels shown in this document will be used to inform embodied carbon limits for new building projects.

Beyond this, we have also been considering the implications of setting embodied carbon limits for other aspects, including:

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.



Next Steps and Call for Further Data

Next Steps

Embodied Carbon performance levels

Please do complete the technical testing **consultation** giving feedback on the embodied carbon performance levels.

If you feel that the performance levels shown are too high/low due to your experience, we would encourage you to share the data from your own projects (see below).

Embodied carbon further data

The NZCBS is also currently actively seeking further Embodied Carbon data, particularly:

- for the **Retail, Data Centre, Hotels, and Sports and Leisure** sectors
- for projects with high-quality data for **Modules A-C**.
- where the assessment has been completed for **all elements**, not only structure.

Higher education, Healthcare, and Science and Technology sectors were also relatively low in data and more would be welcomed.

This data should be uploaded to the **BECD** at <https://beta.becd.co.uk>.

Refit data

If you have **embodied carbon refit data** from UK-based projects in either the **Office, Retail** or **Hotel** sectors, please get in touch by emailing TG1b@NZCbuildings.co.uk.

580

kgCO₂e/m² GIA
A1-A5 mean carbon
footprint across all
sectors

499

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

56%

Proportion of A1-A5
emissions due to
structure

“

A huge thank you to all those companies that have submitted embodied carbon data to develop our understanding of embodied carbon emissions in the UK.

*Will Arnold,
Chair of Embodied Carbon Task Group*