

Summary of Findings from Consultation on a Definition for Net Zero Carbon Buildings in the UK

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With thanks to the UKGBC Advancing Net Zero programme partners

Lead Partners:



Programme Partners:



Introduction

Summary of Consultation Responses

In February 2019, UKGBC released a paper for public consultation titled ‘Consultation on a Definition for Net Zero Carbon Buildings in the UK’. The consultation proposals were developed by an industry task group and the consultation responses informed the development of the [Net Zero Carbon Buildings Framework](#).

This paper provides a summary of the consultation responses received and subsequent decisions taken by the task group to finalise the Framework. It is structured around a set of draft principles for achieving net zero carbon:

1. The original draft principles,
2. A breakdown of the scoring responses,
3. A summary of the written responses, and
4. An outline of the proposed updates.
5. The feedback from the task group and final decision made in the framework

Please see the example below for clarity.

Original draft principle	<p>1.2 A net zero carbon building should report annual consumption in energy (kWh) and carbon dioxide equivalent (CO₂e).</p> <p>Energy consumption in kWh should be made equivalent across all fuel types (e.g. grid electricity, gas) as determined by the energy measured at the utility meter.</p> <p>Carbon dioxide equivalence (CO₂e) equates greenhouse gases into a common unit of carbon dioxide. Through multiplying each greenhouse gas (GHG) by a global warming potential (GWP) factor the resultant is the equivalent amount of carbon dioxide (CO₂) from that GHG. The UK Government’s conversion factors¹ should be used.</p>										
Breakdown of scoring responses	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th>Strongly agree (5)</th> <th>Agree (4)</th> <th>Neutral/Don't know (3)</th> <th>Disagree (2)</th> <th>Strongly disagree (1)</th> </tr> </thead> <tbody> <tr> <td>17</td> <td>26</td> <td>4</td> <td>4</td> <td>0</td> </tr> </tbody> </table> <p>Weighted average score = 4.1</p>	Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)	17	26	4	4	0
Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)							
17	26	4	4	0							
Summary of written responses	<p>Most respondents were in support of reporting annual consumption in energy (kWh/sqm) and carbon (CO₂e/sqm). Some respondents highlighted different spatial boundaries and scopes of reporting energy use (e.g. landlord areas only vs. whole building area) will reduce overall comparability. There was a desire for this information to be made publicly available to assist industry benchmarking.</p> <p>A significant number of respondents queried the use of national conversion factors, in preference for location or market-based conversion factors, or time-of-use conversion factors. Some respondents requested a proposed calculation methodology to clarify these points.</p>										
Outline of proposed updates	<p>Proposed updates:</p> <ul style="list-style-type: none"> • Provide two options for calculations, provided these are used consistently and disclosed: <ol style="list-style-type: none"> 1. UK government emission factors, or 2. Location-based or market-based emission factors (GHG Protocol). • In future, seek to introduce ‘time of use’ emission factors to more accurately reflect the fluctuations in carbon intensity of the electricity grid. It is recognised that this is not currently practicable in the definition. 										
Outcome	<p>Final outcomes and/ or task group decisions on the proposed amendments.</p>										

Task Group members were encouraged to review the summary of findings prior to the final Task Group meeting on **20th March 2019**. Major updates to the principles were discussed and agreed upon at the task group meeting. These have been **highlighted yellow** in this paper and summarised in the discussion questions on pg.3.

Consultation responses

Two Tier Definition

The proposed definition for net zero was divided into two tiers: **net zero operational carbon** and **net zero whole life carbon**, as per Diagram 1 below. This approach should offer flexibility and allow the framework to be relevant to all types of new and existing buildings.

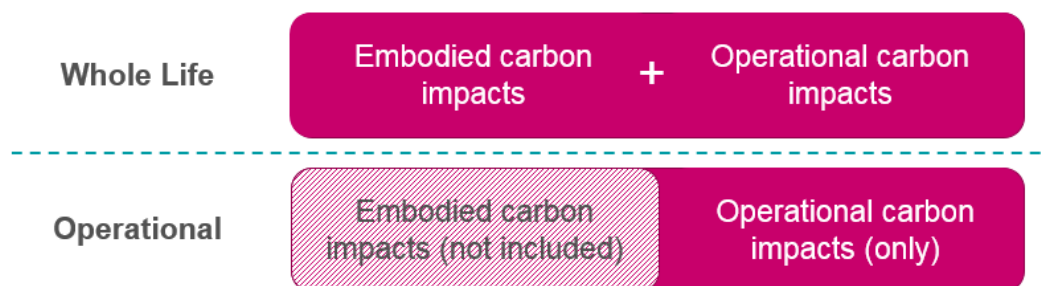


Diagram 1: Two tier definition for net zero carbon buildings

All net zero buildings would need to meet the requirements for **net zero operational carbon**, but buildings seeking to achieve **net zero whole life carbon** would also need to meet additional requirements for reducing and offsetting embodied carbon impacts. The below table sets out the principles in this paper and the relevance to each definition:

	Net zero operational carbon	Net zero whole life carbon
1. Disclosure	✓	✓
2. Energy Efficiency	✓	✓
3. Renewables	✓	✓
4. Offsets	✓	✓
5. Whole Life	✗	✓

In the long term, it is expected that the **net zero operational carbon** definition will be phased out and all buildings would be required to consider their embodied carbon impacts using the **net zero whole life carbon** definition. This will be necessary to transition to a net zero carbon built environment that is in line with the ambitions of the Paris Climate Agreement. However, this will need to be enabled by a wider transition to a net zero carbon economy as well as significant improvements in the accuracy and reporting of embodied emissions.

Do you agree with the two-tier definition?

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
8	29	1	6	3

Weighted average score = 3.7

Most respondents tended to support the flexibility offered with the two-tier definition, recognising the Operational outcome is easier to achieve at present compared to the Whole Life outcome. There was general support for the focus to transition from Operational to Whole Life over time. Some respondents found two definitions confusing, with a preference for a single definition, especially in its application at different building lifecycle stages e.g. new, existing.

Building on this feedback, the issue was subsequently discussed by the task group (see pg 32) which made the following recommendations:

- Simplify the definition to enable the flexibility of two pathways whilst also making clear applicability to new vs. existing buildings, see proposal below.
- For new buildings and major refurbishments, the decision on whether embodied carbon impacts need to be addressed prior to addressing operational carbon impacts is to be determined. See voting options.

- For future, provide a roadmap on when and how the focus of the definition could transition to addressing embodied carbon impacts.

Outcome:

Following the meeting of the task group, it was decided that the framework would include two definitions of equal importance.

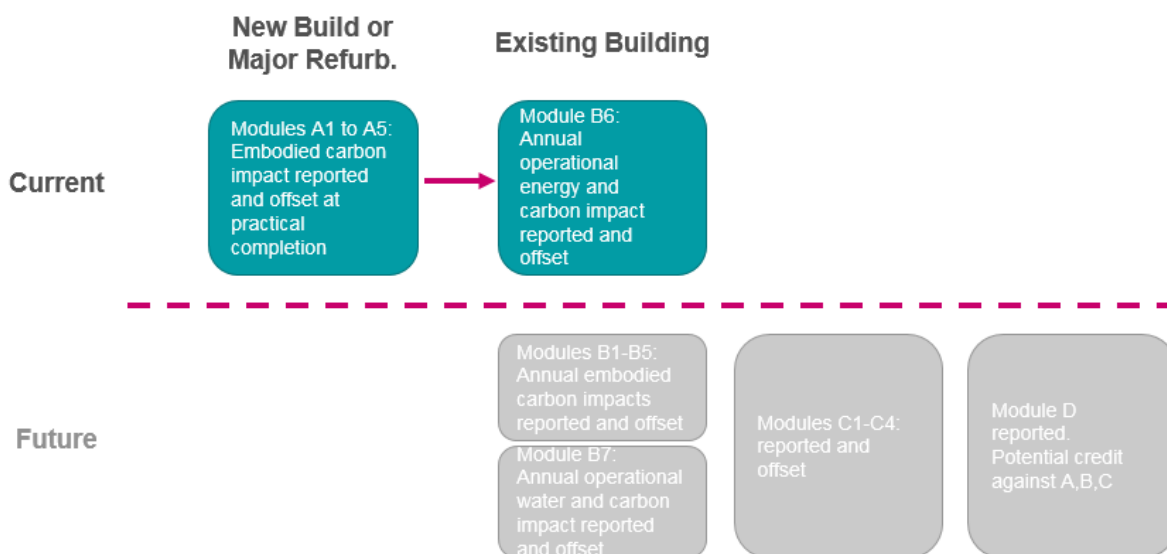
Net zero carbon – construction (1.1):

“When the amount of carbon emissions associated with a building’s product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy.” Modules A1 to A5 of EN15978 (‘embodied carbon to practical completion’ as per Section 1 of the RICS Professional Statement). A whole life carbon assessment should be undertaken in line with the RICS Professional Statement ‘Whole life carbon assessment for the built environment’. This includes alignment with the minimum scope and reporting requirements, as per Section 3 of the RICS Professional Statement. A whole life carbon assessment should also be accompanied by reporting in line with ICMS 2.16

Net zero carbon – operational energy (1.2):

“When the amount of carbon emissions associated with the building’s operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset.” (Module B6)

A whole life approach to net zero is due to be considered as part of future development of the framework.



Net Zero Carbon Hierarchy

The framework follows an overarching net zero carbon hierarchy, as per Diagram 2.

The intention of the hierarchy is to encourage demand reduction and onsite renewable energy, but also to also provide flexibility for offsite and offsetting solutions where these would be more appropriate.

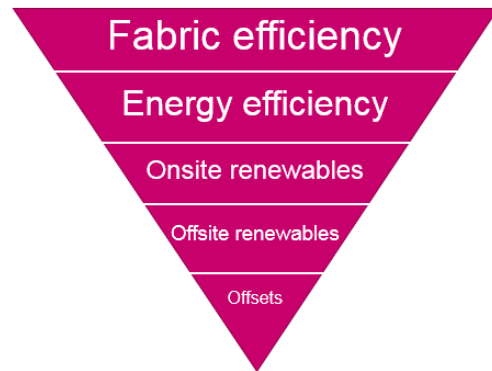


Diagram 2: The net zero carbon hierarchy

Do you agree with the net zero carbon hierarchy?

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
12	25	4	8	2
Weighted average score = 3.7				
<p>Most respondents tended to support the hierarchy, highlighting the flexibility it allows and ease of understanding. There was general clarification sought over the enforcement of the hierarchy – whether it was prescriptive (e.g. thresholds prior to proceeding) or guidance only. Additionally, some respondents sought clarification on the relevance to the Whole Life pathway.</p> <p>Some respondents suggested adding a first tier around ‘energy demand reduction’ (e.g. occupant behaviour, passive design efficiency). Some respondents sought further detail on the tiers, including ‘energy efficiency’ – to what extent this addresses, for example low carbon heating; and ‘renewables’ – suggestion to consolidate onsite and offsite into one tier as they have the same benefit.</p> <p>A significant number of respondents raised concern with the ‘offsets’ tier, highlighting that this could be easily targeted, especially with no enforcement of the hierarchy. Suggestions included placing limitations on the types and amounts of offsets that could be accepted.</p> <p>The issue was subsequently discussed by the task group (see pg 32) which made the following recommendations:</p> <ul style="list-style-type: none"> • Provide clear guidance that this hierarchy is high-level guidance only, not prescriptive. • Provide further descriptions against each tier of the hierarchy to make relevant to new and existing buildings, see proposal below. • Introduce an additional requirement for a narrative section alongside the disclosure requirements (see 1.3) setting out how the hierarchy has been applied to achieve net zero carbon. • See Renewables section for discussion on consolidation of onsite and offsite renewables into one tier. • See Offsets section for discussion on types and amounts of allowable offsets. 				

Outcome:

Following the task group meeting it was decided that the hierarchy would not be prescriptive and that the disclosure element would allow the market to appreciate the level of achieving net zero carbon.

The embodied and operational hierarchies proposed were factored into the overall construction and operational strands, with a more detailed outline featuring the relevant modules for each approach.

It was decided to include non-prescriptive guidance on how to achieve efficient embodied carbon reduction at different stages of a building project.

Clear guidance would be provided for new and existing buildings across the principles and framework layout, including a ‘net zero ready’ approach for future development.

Verification

The framework recommends that any data being used in the net zero calculation is third-party assured, in order to achieve a verified outcome. This will improve the standing of any building that achieves a net zero carbon outcome and reduce the likelihood of inaccurate self-reported claims. In the absence of a single, market-accepted means of verification, the framework points to several 'Market Mechanisms' that may be used to embed a verification process in the first instance, detailed in the 'Adoption' section of this paper.

For 'Market Mechanisms', the framework recommends that a net zero carbon building outcome should be achieved either through a third-party verification scheme or audit process. The scheme used will determine the building's reporting scope and boundaries. This should be clearly disclosed e.g. 'Net Zero Carbon Operational for Whole Building via NABERS'.

Using this approach enables flexibility in the pathway chosen to achieve a net zero carbon building. Additional benefits of this approach include:

- Reduces duplicated effort,
- Builds on existing practices,
- Enables flexibility in the scheme chosen, and
- Provides sector and building-type specific guidance.

The framework will increase demand for verification schemes that address the constituent principles. This may, in turn, lead to the development of a new verification scheme responsible for verifying net zero carbon buildings in the UK. For existing schemes, there may be additional requirements in order to demonstrate the net zero carbon outcome. This 'gap analysis' may be outlined over time, in partnership with the scheme operator e.g. the net zero carbon building framework + NABERS addendum.

It is acknowledged that the varying reporting scopes and boundaries of different verification schemes will reduce comparability between net zero carbon buildings. However, in the absence of a single market-accepted verification scheme, this is deemed currently acceptable.

Do you agree with the principles set out for verification?

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
7	31	9	3	1
Weighted average score = 3.8				
Most respondents preferred a cost-effective and simple approach to verification. A slight majority of respondents preferred using existing verification schemes in place of a single new verification scheme.				
Proponents for using existing verification schemes highlighted current market acceptance of these schemes would reduce barriers to entry, enable flexibility in the scheme used and quicker uptake, and that verification could take place immediately upon release of the definition. Opponents highlighted a lack of comparability between schemes and the risk of inaccurate accounting, thereby reducing effectiveness of verification. Some suggestions to address these concerns included stipulating minimum reporting requirements (e.g. minimum spatial boundary, calculation methodology), having an approved list of verification schemes, and sample audits.				
Those in favour of a new verification scheme highlighted the lack of uptake of any current schemes in the UK (especially for existing buildings) and the opportunity for market differentiation with a new 'label'.				
Proposed updates:				
<ul style="list-style-type: none"> • The principle of third-party verification should be maintained but further work is needed to identify the tools that are aligned with the framework and could be used as compliance mechanisms • Options could also be developed in the future for a simplified verification process for smaller buildings. 				

Please see the 'Adoption' section of this paper for additional detail on 'Market Mechanisms' and 'Policy Opportunities'.

Outcome:

It was decided that third-party auditing should be maintained, but that further work would be needed to identify tools that are aligned with the framework and could be used as compliance mechanisms. Over time, the intention is to provide alternative routes using existing rating tools and verification schemes. UKGBC will seek to actively begin engagement with scheme providers following publication of the framework, with the aim of developing guidance on how they can be used to demonstrate compliance. The intention is to also encourage the use of this framework to inform the future direction of relevant rating tools and verification schemes.

1. Disclosure – recommended principles

1.1 A net zero *operational* carbon building should be defined as:

“When the amount of carbon dioxide emissions associated with a building’s operational energy on an annual basis is zero or negative. Using WorldGBC’s definition, a net zero operational carbon building is highly energy efficient and fully powered from on-site and/or off-site renewable energy sources and offsets.”

This has been adapted from the WorldGBC’s globally-accepted definition for a net zero carbon building. Assessing a building’s operational carbon emissions over an entire year considers seasonal variances in energy supply and demand.

Additionally, reporting on an annual basis for in-use performance provides a robust mechanism for verification, rather than modelled or predicted energy use. Currently, there is a lack of third-party verification schemes for in-use performance in the UK – the framework will help drive demand for these.

Please see sections ‘3. Renewables’ and ‘4. Offset’ in this paper for additional detail.

*Please see principle 5.1 for the net zero **whole life** carbon building definition.*

Strongly agree (5)	Agree (4)	Neutral/Don’t know (3)	Disagree (2)	Strongly disagree (1)
7	33	3	7	1
Weighted average score = 3.7				
Most respondents were in support of annual, in-use reporting of performance highlighting that this would address the ‘performance gap’ and account for seasonal variations in the building’s carbon emissions. A significant number of respondents opposed the inclusion of offsets within the definition, with suggestions on how this could be re-worded to ensure it is a last resort option or no option at all.				
Proposed update:				
<ul style="list-style-type: none"> Retain the definition as is, with a view to potentially updating based on the option selected by the task group for allowing offsets. 				

Outcome:

It was agreed to retain the original definition and maintain potential use of offsets.

1.2 A net zero carbon building should report annual consumption in energy (kWh) and carbon dioxide equivalent (CO₂e).

Energy consumption in kWh should be made equivalent across all fuel types (e.g. grid electricity, gas) as determined by the energy measured at the utility meter.

Carbon dioxide equivalence (CO₂e) equates greenhouse gases into a common unit of carbon dioxide. Through multiplying each greenhouse gas (GHG) by a global warming potential (GWP) factor the resultant is the equivalent amount of carbon dioxide (CO₂) from that GHG. The UK Government’s conversion factors¹ should be used.

Strongly agree (5)	Agree (4)	Neutral/Don’t know (3)	Disagree (2)	Strongly disagree (1)
17	26	4	4	0
Weighted average score = 4.1				
Most respondents were in support of reporting annual consumption in energy (kWh/sqm) and carbon (CO ₂ e/sqm). Some respondents highlighted different spatial boundaries and scopes of reporting energy use (e.g. landlord areas only vs. whole building area) will reduce overall comparability. There was a desire for this information to be made publicly available to assist industry benchmarking.				

¹ <https://www.gov.uk/government/publications/greenhouse-gas-reporting-conversion-factors-2018>

A significant number of respondents queried the use of national conversion factors, in preference for location or market-based conversion factors, or time-of-use conversion factors. Some respondents requested a proposed calculation methodology to clarify these points.

Some respondents highlighted that this level of reporting will be difficult for home owners and portfolio owners (given it is at the asset level).

Proposed updates:

- **Provide two options for calculations, provided these are used consistently and disclosed:**
 1. **UK government emission factors, or**
 2. **GHG Protocol – location-based or market-based emission factors.**

It is recognised that this may reduce comparability between buildings, however that this approach will enable flexibility in the approach used. This may be updated in future.

- **In future, seek to introduce ‘time of use’ emission factors to more accurately reflect the fluctuations in carbon intensity of the electricity grid. It is recognised that this is not currently practicable in the definition.**

Outcome:

It was decided that the emissions factors used should be market-based or location-based. Operational Energy Minimum Reporting Template Guidance would include location-based or market-based emission factors.

An area allocated for future development was the adoption of dynamic ‘time of use’ emissions factors. It was decided that, ultimately, these should be adopted for all carbon calculations as they provide a greater level of accuracy. These emission factors are based on the carbon intensity of the electricity grid when energy is imported (or exported). A consistent and commonly understood methodology is needed for this approach to be utilised in the framework.

1.3 The annual net zero carbon calculation should be broken down into the following:

- **Renewable – onsite (generated and exported) and offsite (imported)**
- **Onsite fossil fuel consumption**
- **Offsets**

Renewable energy generated onsite and imported from offsite should each be disclosed annually. The definition of renewable energy should be determined by existing frameworks, which should be clearly disclosed.

Onsite fossil fuel based power generation may be required e.g. a back-up generator. In these cases, the use of these fuels should be estimated at design stage and in-use generation disclosed annually. The energy generation should be recorded as energy consumption attributed to the building and equivalent carbon emissions should be offset.

Over time, the framework should develop to exclude any form of fossil fuel based power generation, in line with the recommendations of the IPCC to phase out these types of fuels.

Carbon offsets represent the least attractive measure on the net zero carbon hierarchy for achieving a net zero carbon building. Therefore, the contribution of carbon offsets should be reported separately for comparability across buildings.

This breakdown within the annual reporting aligns with other disclosure requirements in the framework and provides visibility about the in-use performance of the building. This will be used to determine the building’s annual net zero carbon calculations. Please see Diagram 3 below.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
8	31	7	4	1

Weighted average score = 3.8

Most respondents were in support of a breakdown for the net zero carbon calculation (aligned to the net zero carbon hierarchy), however sought additional clarification and guidance on specific line items. Respondents felt that the accounting table was crucial to the definition and therefore required further refinement.

Some respondents suggested aligning with the GHG Reporting Protocol’s method of reporting or similar.

Proposed updates:

- The GHG Protocol’s reporting requirements were considered, however this does not include energy consumption data. An updated list of required data points is outlined covering both carbon and energy consumption:

Energy

- Total annual energy consumption (kWh/m²)
- Total annual fuel consumption (electricity) (kWh/m²)
- Total annual fuel consumption (gas) (kWh/m²)
- Electricity generated by renewable energy technologies (e.g. Photovoltaic etc.) (total kWh & kWh/m²)

Carbon

- Total annual CO₂ emissions from direct combustion of fuel (kgCO₂ p.a. & kgCO₂/m²/annum)
 - Total annual indirect CO₂ emissions from electricity use (kgCO₂ p.a. & kgCO₂/m²/annum)
 - Total annual displaced CO₂ emissions from electricity generation (kgCO₂ p.a. & kgCO₂/m²/annum)
 - Total annual net CO₂ emissions (kgCO₂ p.a. & kgCO₂/m²/annum) – this should equal zero for any net zero carbon building.
- For the ‘total annual displaced CO₂ emissions from electricity generation’ it should be disclosed how much of these (if any) are being used to offset embodied carbon from construction.
 - Provide a worked example to clarify the general calculation.

Source	Energy (kWh)	Carbon (CO ₂ e)
Energy ¹ (grid electricity, gas, other)	XX	+XX
Onsite fossil fuel	XX	+XX
Renewable – offsite (imported)	XX	N/A
Renewable – onsite ² (generated)	XX	N/A
Renewable – onsite (exported)	-XX ³	-XX ⁴
Offsets	N/A	-XX
Building Total	XX	0 (net zero carbon)

¹ include all energy consumed except from onsite fossil fuels (separate)

² include all onsite energy generation – used on site and exported

³ any energy generated onsite that is exported will be subtracted for the building’s total energy consumption

⁴ based on delivered savings relative to the carbon intensity of the electricity grid

Diagram 3: Net zero carbon calculation - please note this is an illustrative example

Outcome:

The final indicators included in the framework are:

Energy

Indicator	kWh	kWh/m ²
Total annual energy consumption		
Total annual electricity consumption		
Total annual fuel consumption (all other sources e.g. gas, heat network) per fuel type		
Total annual electricity generated by renewable energy sources minus storage losses (e.g. photovoltaic)		

Carbon

Indicator	t CO ₂	Kg CO ₂ /m ²
Total annual indirect CO ₂ e emissions from imported electricity		
Total annual direct CO ₂ e emissions from combustion of fuel (e.g. on-site gas) per fuel type		
Total annual indirect CO ₂ e emissions from combustion of fuel (all other sources e.g. heat network) per fuel type		
Total annual displaced CO ₂ e emissions from electricity generated by on-site renewable energy sources minus storage losses		
Total annual displaced CO ₂ e emissions from offsets		
Total annual net CO ₂ e emissions	0 (only when verified)	

It was agreed the embodied carbon impacts from the product and construction stages should be measured and offset at practical completion. The final indicators included in the framework are:

Offsets

Indicator	Amount
Total embodied carbon (tCO ₂ & kgCO ₂ e/m ²) from construction (modules A1 to A5 of EN15978) at practical completion	
Total embodied carbon offset (tCO ₂ e) at practical completion	
Total embodied carbon cumulatively offset (tCO ₂ e) in previous years through net export of renewable energy	
Total embodied carbon offset (tCO ₂ e) this year through net export of renewable energy	
Total outstanding embodied carbon (tCO ₂ e) balance	
Amount and type of offsets procured this year, including relevant framework used:	
Expected verification processes:	
Cost per tonne of CO ₂ e:	

Future Development

1.4 Over time, the level of reporting annual energy consumption should be increased to cover:

- Heating and cooling energy consumption (separated)
- Regulated energy consumption (separated by end use)
- Unregulated energy consumption

This improved level of reporting will increase the understanding of how a building is operating and where energy savings can be realised.

The ability to report at these levels is dependent on specific metering and data collection provisions being in place. It is acknowledged that this provision is limited within the current building stock and therefore these principles may be introduced over time.

Appropriate metering and data collection provisions should be introduced (i.e. for new buildings/fitouts or major renovations) to enable the achievement of a net zero carbon outcome in the future e.g. 'net zero carbon ready fitout'.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
13	21	8	9	0

Weighted average score = 3.7

Respondents were generally unsure on whether increased level of reporting for energy use will assist in achieving net zero carbon buildings.

Opponents highlighted that requiring this may make the reporting process too onerous thereby reducing the uptake of net zero carbon buildings, that existing buildings would not have the required sub-metering to achieve this, and that this reduces the original intent of the definition. Additionally, it was recognised that this would be difficult to achieve in residential buildings due to reporting barriers and privacy concerns. Proponents highlighted that the additional level of detail would assist in creating feedback loops to help reduce energy usage and in developing industry benchmarks.

Proposed updates:

- **Maintain the principle to develop improved reporting requirements in the future, but remove the specific approach suggested above (heating and cooling, regulated, unregulated). It is possible that different requirements will be needed for different building types and these approaches will need to be developed individually to help improve benchmarking in different sectors. It is recognised however that the provision of a building's overall energy consumption (in the preceding principle) could still provide an important first step in improving industry benchmarking.**

For future development of the net zero operational carbon outcome, please see recommendation 5.6 under the '5. Whole Life' section of this paper.

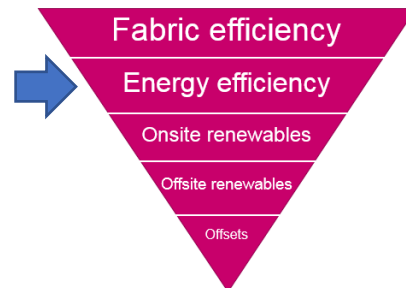
Outcome:

It was agreed that the principle to develop improved reporting requirements in the future would be maintained, but that the specific approach suggested above (heating and cooling, regulated, unregulated) would be removed.

2. Energy Efficiency – recommended principles

2.1 Energy efficiency should be encouraged as part of the net zero carbon hierarchy:

Following a hierarchy would offer flexibility in the approach to net zero carbon and allow the most cost-effective route to be taken for a particular building or site. New buildings already have minimum energy efficiency requirements from building regulations, and in some areas through supplementary local planning policies. More extensive and accurate data will be needed to develop a set of minimum standards based on in-use performance for all types of existing buildings.



Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
28	18	3	2	0
Weighted average score = 4.4				
<p>Most respondents agreed with encouraging energy efficiency through the hierarchy. A common theme was the desire for more clarity on how this would be 'encouraged' and adhered to. This included suggestion of targets or specific thresholds, alongside a narrative section on how a building achieved net zero carbon. However, there was disagreement over how strongly to encourage such measures.</p> <p>A concern raised by some respondents was that the hierarchy was not sufficiently flexible in relation to building type, (newbuild/existing building/domestic/non-domestic) with some assets, such as heritage buildings, requiring a different sequence.</p> <p>Proposed updates:</p> <ul style="list-style-type: none"> • Introduce an additional requirement for a narrative section alongside the disclosure requirements setting out how the hierarchy has been applied to achieve net zero carbon. This should include a clear outline of how energy efficiency measures have been deployed and encouraged, as part of demonstrating broader compliance with the hierarchy. 				

Outcome:

It was decided that compliance with the framework should be mainly through data disclosure. This should be made through any publicly accessible information, such as an organisation's annual sustainability report or clearly presented on a website. Public disclosure should be for the building developer, owner or occupier to 'show their working' on how they have achieved net zero carbon.

2.2 Indoor air quality and overheating should not have specific requirements included in the framework.

Setting requirements around these areas was considered but rejected in order to maintain a strict focus on energy and carbon. Good quality design would nonetheless require the appropriate consideration of such factors alongside this framework.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
14	12	9	10	6
Weighted average score = 3.4				
<p>A small majority agreed with proposals to exclude specific requirements for overheating and air quality. This was because it was felt such factors were beyond the scope of a net zero focus and would be addressed by other measures linked to good design.</p> <p>However, a significant number of respondents were concerned by this potential omission. It was felt indoor air quality and overheating are in some cases directly linked to energy efficiency measures. For example, through having to install specific remedial technologies (air conditioning), future climate predictions and energy-use projections.</p> <p>It was generally suggested that further reassurances were needed, but that any consideration of overheating/indoor air quality should not be prescriptive or overly consuming. Suggestions included: integrating as future requirements, a clear consideration/exposition of the potential impacts, and/or noted compliance with good design principles.</p> <p>Proposed updates:</p>				

- **Update the principle to specifically recommend the use of techniques to model and monitor IAQ and overheating on relevant projects, but the framework will not set specific requirements or targets.**

Outcome:

It was agreed that attention to overheating would be recommended, but specific requirements should be stated as beyond the scope.

Future Development

2.3 Minimum levels of energy efficiency should be developed for the net zero carbon framework.

Setting minimum energy efficiency standards for net zero carbon buildings would provide the strongest driver towards energy demand reduction. This would also potentially encourage a consistent approach to measuring in-use energy performance across different types of buildings. But extensive further data and research are required for levels to be set for new build and existing buildings, and across different use types.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
16	23	7	4	0

Weighted average score = 4.0

Most respondents were in favour of minimum energy efficiency requirements. This was noted as a positive means of discouraging premature recourse to offsets. There was call for a clear trajectory, with rewards for going further.

A common concern was that the distinction between fabric and energy efficiency was impractical and should be removed in favour of a joint target. Concerns also included the extent to which targets would be compatible with different building types, such as heritage assets, whilst also ensuring comparability through accepted, recognizable metrics. The need for greater research, notably on building types and process energy, was recognized. Some respondents also indicated that flexibility should be maintained in how to meet these requirements.

Comments were equally divided as to whether to match targets to Part L and government policy efforts (for ease) or move to an alternative based on actual performance.

Proposed updates:

- **For future development of the framework, consider including energy intensity targets for net zero carbon buildings. It is recognised that commonly agreed and market-accepted energy intensity targets are not currently available.**

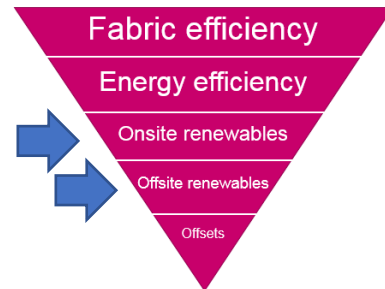
Outcome:

It was agreed that attention to overheating would be recommended, but specific requirements should be stated as beyond the scope.

3. Renewables – recommended principles

3.1 Net zero carbon buildings should work towards an energy hierarchy with a preference for onsite and then offsite renewable generation:

The net zero carbon hierarchy prioritises demand reduction followed by onsite renewable energy and then offsite solutions. Offsite renewable energy procurement would include Power Purchase Agreements (PPAs), preferably where these would provide additionality in renewable generation. Assurances over the retirement of renewable energy credits should be provided to avoid double-counting.



Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
13	29	4	4	0

Weighted average score = 4.1

Most respondents support the proposed hierarchy for onsite renewables to be prioritised over offsite renewables. There were calls for greater clarity on standards and compliance, in response to wider issues of double counting and a lack of source standards verification. Offsite sources were considered by many as similar to offsets. High-quality standards for the importation and additionality of renewables were suggested.

Some respondents were unclear as to the underlying rationale for prioritising onsite. This preference was challenged by several stakeholders on the basis that offsite may be more suitable in certain situations, such as for existing properties and urban areas. For those in favour of prioritising onsite, consumer / owner occupier benefits and land-use efficiency benefits were highlighted.

Proposed updates:

- Include reference to RE100 'Making credible renewable electricity usage claims'² and 'Technical note on renewable electricity options'³ guidance for acceptable renewable energy sources.
- The preference in the hierarchy for onsite over offsite will be maintained, with further descriptive justification linked to the hierarchy. This will include the implicit additionality of onsite, the benefits for grid capacity, consumer savings and increased building value.

Outcome:

It was agreed that renewable sources should match RE100 guidance documents: 'Making credible renewable electricity usage claims' and 'Technical note on renewable electricity options'. Preference for on-site renewable sources was maintained, with clear explanation provided.

3.2 The net export of onsite renewable energy generation can be used to offset building emissions.

Buildings that can demonstrate a net export of renewable energy annually can use this to offset other building emissions, for example any embodied impacts or on-site fossil-fuel power generation. The net exported energy should be converted to a carbon saving based on the carbon intensity of the electricity grid and be used to offset an equivalent carbon impact.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
8	29	6	5	3

Weighted average score = 3.7

Most respondents agreed that net export of onsite renewable energy generation could be used to offset the building's carbon impacts, particularly in cases where efficiency was unachievable. This included suggestion of clear demonstration requirements

² RE100 'Making credible renewable electricity usage claims': <http://media.virbcdn.com/files/d2/f9ea6f41ca833f44-RE100CREDIBLECLAIMS.pdf>

³ RE100 'Technical note on renewable electricity options': <http://media.virbcdn.com/files/73/4c55f6034585b02f-RE100TechnicalCriteria.pdf>

to progress through the hierarchy. Through clear standards, net exports should demonstrate genuine additionality and avoid unintended consequences, such as air pollution.

Several practical considerations were highlighted including the need for energy storage and further consideration of the relationship with (future and fluctuating) grid carbon factors. The importance of clear ownership responsibility was stressed to avoid double counting. The question of how this net export could be measured (whilst distinguishing between energy and carbon management) was also raised.

Proposed updates:

- **The current principle will be maintained and the net export of onsite renewable energy generation could be used to offset the building’s carbon impacts.**
- *See Disclosure section for clarification on future development of ‘time of use’ carbon factors which will impact the net renewable energy export calculation.*
- *See principle 3.1 for guidance on acceptable renewable energy sources.*

Outcome:

The current principle that the net export of onsite renewable energy generation could be used to offset the building’s carbon impacts was maintained.

3.3 No minimum onsite renewable energy generation requirements should be included in the framework.

All opportunities for on-site renewable generation should be considered and incorporated wherever feasible. But it is not recommended that the framework include specific targets for minimum renewable energy generation on-site. This will allow a flexible approach to renewable energy solutions based on an evaluation of each specific building or site.

Strongly agree (5)	Agree (4)	Neutral/Don’t know (3)	Disagree (2)	Strongly disagree (1)
20	19	2	7	3

Weighted average score = 3.9

A majority agreed no minimum onsite renewable energy generation requirements should be included in the framework. The main reason given was that onsite capacity is very site/ project dependent, and a minimum target may not be feasible in certain situations. Flexibility was welcomed, alongside the preference for energy efficiency.

A significant number of respondents raised concerns over how the hierarchy would be adhered to without minimum requirements, the lack of reward for going further to maximise possible opportunities, and the need to encourage renewable demand. Concerns over renewable standards, (additionality) and a lack of guidance were reiterated.

Proposed updates:

- **The current principle will be maintained and no minimum onsite requirements will be required by the framework.**
- *See principle 3.1 for clarification on the benefits of favouring onsite over offsite renewable.*

Future Development

None recommended.

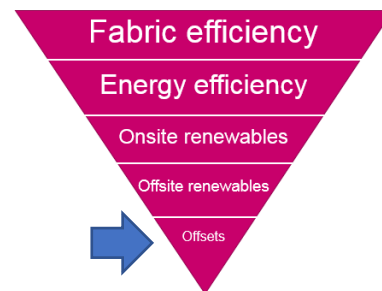
Outcome:

The principle that no minimum onsite requirements would be required by the framework was maintained.

4. Offsets – recommended principles

4.1 Offsets should be used as the final option in the net zero carbon hierarchy:

If demand reduction and renewable energy solutions are not feasible for a building to achieve net zero carbon, offsets can be utilised to cover the remaining carbon impacts.



Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
14	21	10	5	1
Weighted average score = 3.9				
<p>A clear majority agreed the offsets should be a last resort but there were numerous concerns raised about the robustness and additionality of offset mechanisms. Respondents highlighted the need for clear guidance on what types of offsets should be permitted and consistent verification and accreditation processes. Offsets should also be financially unattractive to ensure they are discouraged in favour of onsite solutions. There was a preference for locally-based offsets and against the use of tree-planting.</p> <p>Some respondents also suggested that offsets should only be permitted in certain circumstances, for example only for existing buildings or only for embodied carbon.</p> <p>The issue was subsequently discussed by the task group (see pg 32) which made the following recommendations:</p> <ul style="list-style-type: none"> • The use of offsets should be limited to specific circumstances. Offsets should only be permitted for operational energy emissions where there is onsite fossil fuel-based generation in existing buildings. In these cases, the continued use of onsite fossil fuel-based generation should have a clear justification e.g. back-up power provision or economic viability of replacing system. • Onsite fossil fuel generation should also not be permitted for new buildings, to avoid creating an incentive to install these systems to access the use of offsets. 				

Outcome:

Following the meeting of the task group, it was affirmed that where all feasible measures for reducing carbon impacts have been reasonably exhausted, offsets could be utilised to cover any residual carbon. Future guidance will be developed on the type of offsets and relevant frameworks that should be used. This guidance should set stricter requirements for permissible offsets to ensure robustness, consistency and additionality, based on an evidence review and lessons learnt from projects.

A future timetable will be developed for the phasing out of the use of offsets for operational energy. The endpoint of the timetable will be a requirement for all operational energy demand to be met using renewable energy.

It was decided the use of on-site fossil-fuel generation would be permitted under the framework for net zero carbon – operational energy. This was in recognition of the current prevalence of gas heating for the existing building stock and uncertainty about the use of the gas grid for future low-carbon heating. These impacts should be clearly disclosed and offset to achieve a net zero carbon balance.

It was agreed trajectory should be set for the phasing out of on-site fossil fuel use. This is likely to be introduced with requirements for new buildings to move to renewable energy sourced heating, followed by existing buildings.

4.2 Offsets for operational emissions should either be procured directly, or via recognised existing offsetting frameworks, on an annual basis.

Operational energy emissions should be disclosed annually, and the verification of offsets should align with this frequency. The use of direct procurement or offsetting frameworks should both include verification processes which demonstrate that offsetting solutions have delivered required carbon savings. This should help to prioritise additionality and avoid double-counting of emissions reductions.

The type and number of offsets procured, and the frameworks utilised should be disclosed annually (also see principle 1.3).

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
11	22	13	4	0
Weighted average score = 3.8				
<p>Most respondents were in favour of this approach, but questions were raised about the practicalities. There was some support for further research and the development of a consistent and robust verification and governance, particularly to avoid double-counting of emissions. A number of suggestions were also made about how to maximise the benefits of offsets including a using penalty carbon factor on offsets vs onsite solutions or requiring that offsets should only be invested in energy efficiency. Clarification is also needed as to whether offsets relate to operational carbon or operational energy.</p> <p>Proposed updates:</p> <ul style="list-style-type: none"> • Clarification will be added that offsets should relate specifically to the carbon equivalent of operational energy consumption. There is a clear demand for further guidance on the types of offsets that should be permitted (e.g. geography) and existing offsetting mechanisms that align with the framework. Whilst developing guidance is beyond scope of the current work, the framework will include some suggested mechanisms such as those from the Clean Development Mechanism and Gold Standard. 				

Outcome:

It was decided offsets would relate to total annual CO₂e emissions from operational energy consumption.

Offsetting frameworks that should be considered include the Clean Development Mechanism and Gold Standard.

4.3 Embodied carbon can be offset either through the procurement of equivalent offsets at the point of completion and/or utilising the net export of on-site renewable energy during operation.

To cover the embodied impacts from new construction or a major renovation, there are two available offset routes:

- A one-off payment can be made at the point of completion on direct offset procurement or via an existing offset framework for an equivalent number of carbon credits; or
- The net export of on-site renewable energy generation can also be used to offset embodied impacts during operation, based on the delivered savings relative to the carbon intensity of the electricity grid. Annual disclosure of net energy exports is required to ensure that the expected level of offsetting is achieved.

These two offset routes can be used together, and the intended approach should be disclosed.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
4	31	7	5	1
Weighted average score = 3.7				
<p>Most respondents were in favour of this proposal. Several questions were raised about how it could encourage reductions in embodied carbon, rather than just being seen as a cost for developers. Some respondents also suggested that the end-of-life impacts should be considered in this approach. There were differing views on which (offsets or renewable energy) should take precedence, if any.</p> <p>Where respondents were opposed to the principle, this was mainly due to concerns about whether operational carbon (export of renewable energy) should be used to offset embodied emissions.</p> <p>Proposed updates:</p> <ul style="list-style-type: none"> • Additional requirements will be added to disclose annually any exported renewable energy that is used to offset embodied impacts. This should help to avoid double-counting of exported renewables that is used to offset both operational and embodied carbon. • See the 'Net Zero Carbon Hierarchy' principle for the proposed embodied carbon hierarchy to encourage reductions in embodied impacts before offsets are considered. 				

Outcome:

It was agreed the purchase of renewable energy generated off-site should demonstrate additionality, that is, supply directly attributed to the building developer, owner or occupier which would not otherwise have taken place. This reduces the likelihood of double-counting any off-site renewable energy.

In terms of minimum disclosure standards, the following requirements were added to avoid double counting:

- Total embodied carbon offset (tCO₂e) at practical completion
- Total embodied carbon cumulatively offset (tCO₂e) in previous years through net export of renewable energy
- Total embodied carbon offset (tCO₂e) this year through net export of renewable energy
- Total annual electricity generated by renewable energy sources minus storage losses (e.g. photovoltaic)
- Total annual indirect CO₂e emissions from imported electricity
- Total annual direct CO₂e emissions from combustion of fuel (e.g. on-site gas) per fuel type
- Total annual indirect CO₂e emissions from combustion of fuel (all other sources e.g. heat network) per fuel type
- Total annual displaced CO₂e emissions from electricity generated by on-site renewable energy sources minus storage losses
- Total annual displaced CO₂e emissions from offsets

5. Whole Life – recommended principles

5.1 A net zero *whole life* carbon building should be defined as:

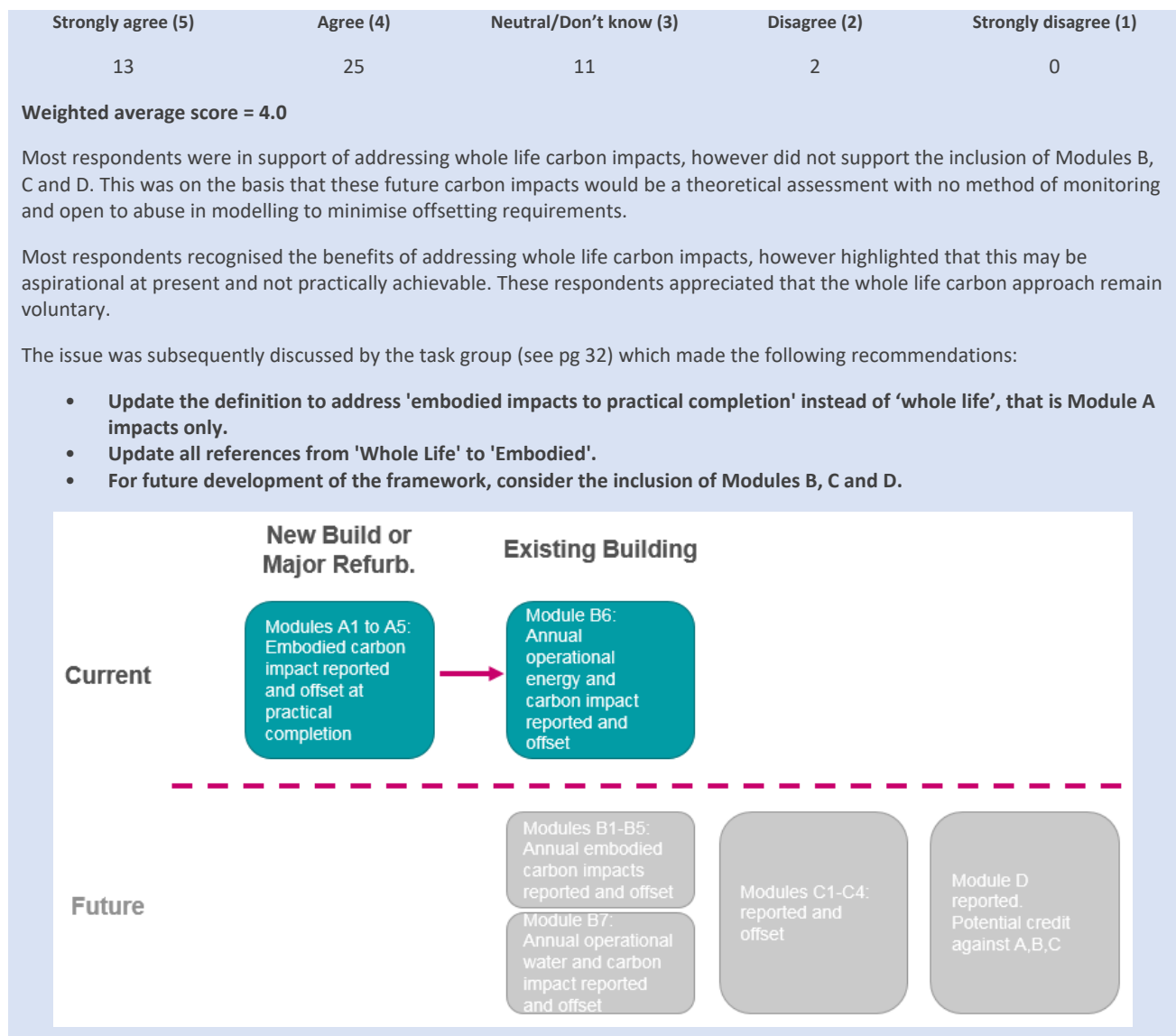
“When the amount of carbon emissions associated with a building’s embodied AND operational impacts over the life of the building, including its disposal, are zero or negative.”

This has been adapted from the WGBC’s globally-accepted definition for net zero *operational* carbon building definition. This definition includes the whole life impacts of a building, beyond operational energy.

To assess whether a building is a ‘net zero whole life carbon building’, Modules A, B, C and D (of EN 15978) should all be assessed at the design stage. Module D implies potential future reuse (circular) benefits, and although these are assessed separately, they are relevant to a net zero calculation.

A whole life carbon assessment recognises that embodied and operational emissions are interlinked. Actions with operational carbon benefits may also have embodied carbon costs. Considering these together means that a building’s whole life carbon impacts can be mitigated most efficiently.

Please see principle 1.1 for the net zero *operational* carbon building definition.



Outcome:

Following the task group meeting, it was agreed that 'embodied impacts to practical completion' would be used instead of 'whole life', that is Module A impacts only. An approach including Modules B, C and D (whole life) was indicated for future development.

5.2 Carbon impacts for the construction of the building (either new build or major renovation) should be reported and offset at the point of practical completion – Modules A1 to A5 of EN15978.

The LCA for Modules A, B, C and D should be undertaken in line with EN 15978 *Sustainability of construction works – assessment of environmental performance of buildings*, with detailed guidance from the RICS Professional Statement *Whole life carbon assessment for the built environment*.⁴ The life cycle impacts for Modules A1 to A5 should be reported in carbon dioxide equivalent (CO₂e) and offset. See Diagram 4 below.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
6	24	15	2	4
Weighted average score = 3.5				
<p>A significant number of respondents stated a lack of familiarity with this concept, highlighting the relatively nascent application of whole life carbon assessments. Of those respondents that were familiar, a majority supported the reporting and offsetting of carbon impacts for Module A at practical completion ('polluter pay' models). This was considered the simplest approach (some confusion was raised around the ability to gain credits through renewable energy export).</p> <p>A significant number of respondents sought additional guidance and principles around the reporting scope and offsetting process. Some respondents highlighted that this approach would not be practical for homes.</p> <p>Proposed updates:</p> <ul style="list-style-type: none"> • Maintain the reporting and offsetting of carbon impacts for Module A at practical completion • Provide additional clarification on the ability for a net carbon positive building (through renewable energy export) during operation to use this as an offset for embodied carbon impacts at construction stage. • State clear alignment with RICS Professional Statement, including minimum scope and use of 'embodied carbon to practical completion' definition. This will be applicable for new buildings and major refurbishments. 				

Outcome:

It was decided to maintain the reporting and offsetting of carbon impacts for Module A, at practical completion

Additional clarification would be added on the ability for a net carbon positive building (through renewable energy export) during operation to use this as an offset for embodied carbon impacts at construction stage.

It was agreed whole life carbon assessment should be undertaken in line with the RICS Professional Statement 'Whole life carbon assessment for the built environment'. This included alignment with the minimum scope and reporting requirements, as per Section 3 of the RICS Professional Statement. A whole life carbon assessment should also be accompanied by reporting in line with ICMS 2.

5.3 Carbon impacts for the Use, Maintenance, Repair, Refurbishment and Replacement stages (Modules B1 to B5 of EN 15978) together with the operational carbon impacts (Module B6) should be reported annually and offset for a net zero whole life carbon building.

Whilst the initial LCA might be undertaken for the building, in-use performance for these lifecycle stages should be reported and offset on an annual basis. This will verify both the operational and the embodied emissions in use performance over the initial design stage models. Additionally, this will allow the industry to gain a holistic understanding of a building's complete carbon impacts. See Diagram 4 below.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
8	20	15	2	2
Weighted average score = 3.6				
<p>Most respondents supported this principle, however highlighted the difficulty in practically reporting and offsetting these impacts.</p> <p>Reasons sighted included an overly complex process considered disproportionate to the actual carbon impacts, the time and cost burden of reporting these impacts (engaging an LCA consultant on an annual basis) potentially disincentivising stakeholders pursuing the whole life pathway, and that this may be geared to the 'big players' in the industry not the majority SMEs. It was also</p>				

⁴ RICS 'Whole Life Carbon Assessment for the Built Environment': <https://www.rics.org/uk/upholding-professional-standards/sector-standards/building-surveying/whole-life-carbon-assessment-for-the-built-environment/>

noted that the reporting and verification of this process was not currently resolved. Suggestions to address this included a phased approach to introduction, a 'light touch' approach, or requiring this for buildings over a certain threshold in the first instance.

The minority of stakeholders in support of the principle highlighted that this would address the 'performance gap' between the whole life carbon assessment and actual impacts of buildings.

Proposed update:

- **Requirements for reporting and offsetting Modules B1 to B5 will be removed.**

Outcome:

Requirements for reporting and offsetting Modules B1 to B5 were removed to be part of a future whole life carbon approach.

5.4 Carbon impacts at the end of life, including deconstruction, demolition, waste processing and disposal will be assessed and offset when this occurs.

These are EN15978 Modules C1-C4. At this stage Module D (Reuse, recovery, and recycling potential) can be assessed and offset against Modules C1-C4.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
6	20	16	4	3

Weighted average score = 3.4

Most respondents supported this principle, however highlighted the difficulty in practically reporting and offsetting these impacts.

Reasons sighted included a lack of rigour (or availability) around the verification of this reporting and offsetting, the building owner not being incentivised to maintain the whole life carbon accreditation at the demolition stage, and the high uncertainty of carbon impacts at the demolition stage from modelled outcomes. It was also noted that reporting and offsetting at the point of demolition is effectively 'kicking the can down the line' when the original design team or building owner will have minimal influence.

The stakeholders in support of the principle highlighted that this would promote 'circular design' principles, however with some hesitation over modelled outcomes being different to actual scenarios.

Proposed updates:

- **Requirements for reporting and offsetting Modules C1 to C4 will be removed.**
- **Provide clear guidance on the benefits of 'circular design' principles, through an embodied carbon reduction hierarchy. See the 'Net Zero Carbon Hierarchy' principle for the proposed embodied carbon hierarchy.**

Outcome:

Reference to module C1-C4 was removed in favour of module C. Reporting and offsetting processes for whole life carbon will be developed and introduced into the framework within the next five years to take account of all building lifecycle stages.

Circular design principles were mentioned but further exposition was decided as beyond the remit of the current framework iteration.

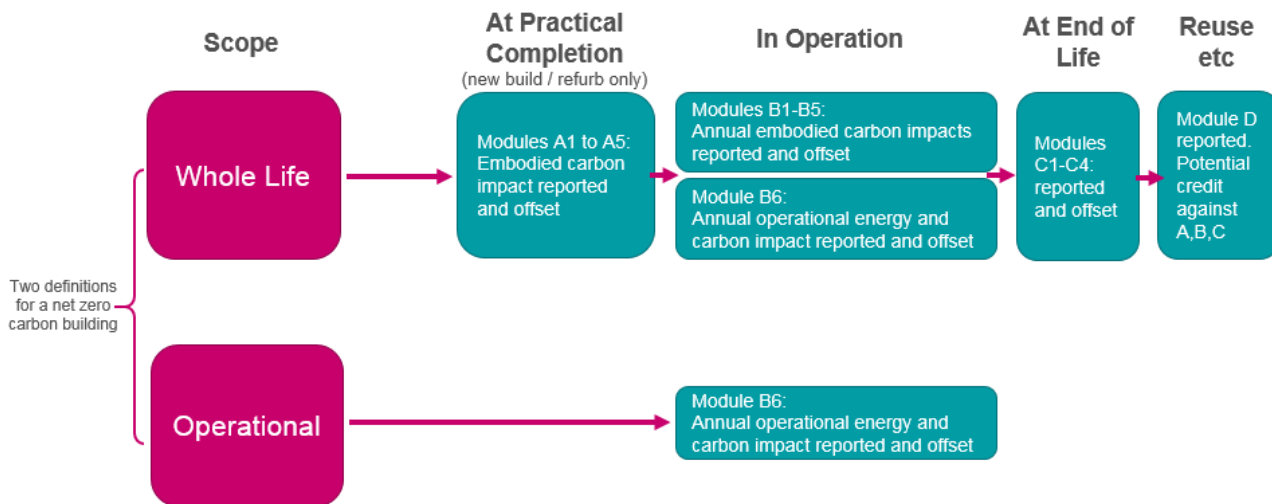


Diagram 4: Reporting and offset requirements

5.5 New buildings or buildings undergoing major refurbishment should target a net zero whole life carbon achievement. A building undergoing normal operations can target either a net zero operational or net zero whole life carbon achievement.

	Net zero operational carbon	Net zero whole life carbon
New building or major refurbishment	✗	✓
New building or major refurbishment – after transition period	✓	✓
Existing building – under normal operation	✓	✓

For new buildings and major renovations, understanding the whole life carbon impacts at the design stage improves delivery and all subsequent life cycle stages. A transition period should be in place for any new buildings to achieve a net zero whole life carbon outcome, to avoid new buildings targeting a net zero operational carbon outcome only.

For existing buildings undergoing normal operation, annual embodied emissions from maintenance, repair, replacement, waste and refrigerant can optionally be assessed alongside operational emissions and offset to achieve a net zero whole life carbon outcome. Carbon impacts from construction (Modules A1 to A5) do not need to be considered for existing buildings, as the opportunity to minimise these impacts are likely to have passed.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
6	27	13	3	0

Weighted average score = 3.7

A significant number of respondents queried what exactly was being proposed with this principle, highlighting potential over-complication in the approach put forward. Many respondents supported the whole life carbon pathway (potential change to embodied carbon) only being available to new buildings and major refurbishments as design and construction teams have the greatest degree of influence over these impacts. Existing buildings would have the option but no strong incentive to report their embodied carbon impacts.

See the update to the 'Two Tier Definition' principle (pg 3-4) in the Overview section to simplify the net zero carbon definition, making clear applicability for new and existing buildings.

For offsetting whole life carbon impacts, please see recommendation 4.3 under the '4. Offsets' section of this paper.

Future Development

5.6 Over time, the net zero operational carbon definition should be phased out to ensure a building's total carbon impacts, including embodied, are measured and reported upon.

The operation of a building also has carbon impacts outside of energy, including refrigerant use, repair, replacement, maintenance and refurbishment. Over time, these carbon impacts should be integrated into the framework, by only having a net zero whole life carbon definition. See Diagram 4 above.

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
11	25	8	4	2
Weighted average score = 3.8				
A significant number of respondents preferred starting with net zero operational carbon buildings and allowing market acceptance first before proceeding with net zero whole life carbon only. Respondents highlighted that the principle of segueing to net zero whole life carbon is aspirational and a realistic timeframe could not be developed at present.				
Proposed updates:				
<ul style="list-style-type: none"> • Run the 'net zero embodied carbon' and 'net zero operational carbon' labels in parallel – maintain two tier flexibility for the foreseeable future. See the update to the 'Two Tier Definition' principle in the Overview section to simplify the net zero carbon definition, making clear applicability for new and existing buildings. 				

Outcome:

It was agreed that net zero carbon – construction (for new buildings and major renovations) and net zero carbon – operational energy (for all buildings in operation) definitions would run in parallel.

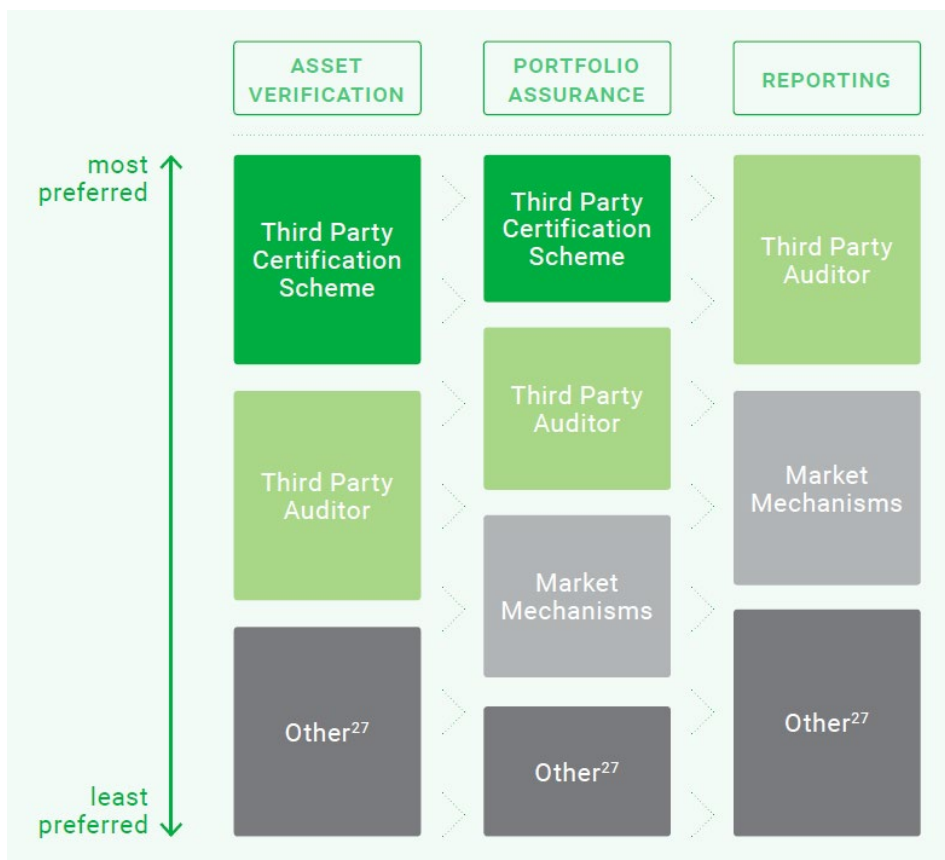
Adoption

Verification

The aim of the framework is to catalyse the uptake of net zero carbon buildings in the UK. The verification of a net zero carbon building should take place through existing (or new) third-party schemes. Using existing third-party schemes is preferred as this reduces barriers to entry for buildings seeking to demonstrate the achievement of a net zero carbon building.

This framework sets out the principles that should be followed to achieve a net zero carbon building, however does not prescribe any third-party verification schemes. The framework will increase demand for verification schemes (new or existing) that address the principles in this framework.

The diagram below outlines the proposed approach to verification. There is a preference to apply third-party verification schemes over bespoke (“other”) approaches to achieve verification. This will help build the industry’s capacity to verify net zero carbon buildings.



Adapted from 'WorldGBC Net Zero Carbon Buildings Commitment', WGBC 2018

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
9	24	13	1	1
Weighted average score = 3.9				
Most responses agreed with the use of third-party verification and agreed with the need for flexibility. But a number of issues were raised about the accuracy of existing schemes and consistency between different tools. Questions were also raised about how applicable this approach could be for smaller projects given the costs involved with verification.				
Some responses suggested that a new third-party verification process should be established which specifically aligns with the framework.				
Proposed updates:				

- **The principle of third-party verification should be maintained but further work is needed to ensure that individual tools are aligned with the framework before they can be recognised as compliance routes.**
- **Options should be developed in the future for a simplified verification process for smaller buildings.**

Outcome:

It was decided that third-party auditing should be maintained, but that further work would be needed to identify tools that are aligned with the framework and could be used as compliance mechanisms

Over time, the intention is to provide alternative routes using existing rating tools and verification schemes. UKGBC will seek to actively begin engagement with scheme providers following publication of this framework, with the aim of developing guidance on how they can be used to demonstrate compliance. The intention is to also encourage the use of this framework to inform the future direction of relevant rating tools and verification schemes.

Market Mechanisms

The below table outlines current third-party schemes which are proposed to be used to verify net zero carbon buildings. There may be requirements over and above those in the current scheme to demonstrate equivalency with the framework. These may be detailed in partnership with the scheme operator in future.

Verification Route	Overarching Net Zero Carbon Buildings Framework Definition	
	Operational	Whole Life
All	<ul style="list-style-type: none"> BREEAM In-Use Greenhouse Gas Protocol: A Corporate Accounting and Reporting Standard. ISO 14064-1:2018 Greenhouse gases -- Part 1: Specification with guidance at the organization level for quantification and reporting of greenhouse gas emissions and removals Third-party audit process 	<ul style="list-style-type: none"> BREEAM New Construction Third-party audit process
All - portfolios	<ul style="list-style-type: none"> CDP GRESB 	N/A
Office	<ul style="list-style-type: none"> DECs (whole building only) NABERS / DfP (tenancy, base building or whole building) BBP REEB Passivhaus 	Guidance only, not verification: <ul style="list-style-type: none"> RICS Professional Statement RIBA Guidance
Industrial	<ul style="list-style-type: none"> Passivhaus 	
Public Buildings	<ul style="list-style-type: none"> DECs Passivhaus 	
Residential	<ul style="list-style-type: none"> EnergieSprong HQM Passivhaus / Passivhaus Plus 	
Retail	<ul style="list-style-type: none"> Passivhaus 	

What other mechanisms might increase the uptake for net zero carbon buildings?

Strongly agree (5)	Agree (4)	Neutral/Don't know (3)	Disagree (2)	Strongly disagree (1)
0	23	14	8	4

Weighted average score = 3.1

Most responses agreed with the proposed schemes, but there was also a minority of strong opposition. Some of those in favour of the proposal had concerns that there were not sufficient routes in place to cover all sectors and that the data collection would not be transparent for the individual schemes.

Those opposed to the proposals highlighted concerns that the existing mechanisms were not specifically designed to achieve net zero carbon outcomes and would be gathering inconsistent data.

Proposed updates:

- The matrix of suggested compliance routes will be removed from the framework. Further work is needed to understand how each mechanism aligns with the framework before they can be considered viable compliance routes.
- UKGBC will undertake direct engagement with scheme administrators to discuss alignment and agree to their use as compliance routes on a case-by-case basis.

What other mechanisms might increase the uptake for net zero carbon buildings?

Many responses highlighted the need for strong policy and regulation, including building regulations, planning requirements minimum energy efficiency standards at the point of sale, and tax incentives.

Additional voluntary schemes suggested included the International Living Futures Institute, LEED, Ska and the EU Levels framework. Other respondents highlighted the need for further data and standards, particularly around embodied carbon.

Outcome:

It was decided that the matrix of suggested compliance routes would be removed from the framework and that further work is needed to understand how each mechanism aligns with the framework before they can be considered viable compliance routes.

UKGBC will undertake direct engagement with scheme administrators to discuss alignment and agree to their use as compliance routes on a case-by-case basis.

Policy Opportunities

Voluntary use by the industry is likely to be the primary route for adoption of the framework in the short term. But there will clearly be a role for policy and regulation if we are to meet the UK's climate change commitments and transition towards all new and existing buildings being net zero carbon.

The task group will not be developing specific policy recommendations to publish alongside the framework, but it will nonetheless be important for the project outputs to acknowledge the role that policy will need to play in adoption. This will include setting out some potential policy options which could be explored in detail in the future.

The tables below set out some of the existing and potential policy levers at a national and local level that could align with the net zero carbon buildings framework. The various policy mechanisms have been set out against the five areas of the framework (disclosure, energy efficiency etc.) to indicate their relevance to encouraging the specific outcomes of the framework. The 'Potential' policy options are suggested future regulatory requirements and further work would be needed on the detail for these to become clear policy recommendations.

We invite feedback on the proposed mechanisms below and comments on any additional relevant policy options that are not highlighted here.

National policy options		
	Existing policy	Potential new policy
Disclosure	<ul style="list-style-type: none"> Display energy certificates for public buildings 	<ul style="list-style-type: none"> Requirements in Building Regulations for reporting of operational performance of new buildings e.g. sampling of buildings for compliance Mandatory disclosure of operational energy performance for all commercial buildings Use of smart meter real-time data to inform the ratings of Energy Performance Certificates
Energy Efficiency	<ul style="list-style-type: none"> Target Energy Efficiency Rate in Building Regulations Part L Minimum energy efficiency standards for private rented properties Clean Growth Grand Challenge Mission to halve energy use from new buildings by 2030 	<ul style="list-style-type: none"> Alignment of energy efficiency standards in Building Regulations Part L with minimum levels developed in future for net zero carbon Transition to operational energy ratings as the basis of minimum energy efficiency standards for commercial rented properties
Renewables	<ul style="list-style-type: none"> Target Emissions Rate in Building Regulations Part L National Planning Policy Framework (NPPF) 2018 Planning Policy Guidance (PPG) on Climate Change 	<ul style="list-style-type: none"> Recognition of offsite renewable energy procurement as carbon abatement measure within Building Regulations Updates to NPPF and new PPG on Climate Change and Renewable Energy could require 'net zero' for all new developments
Offsetting	<ul style="list-style-type: none"> Infrastructure Act 2015 provision on allowable solutions mechanism 	<ul style="list-style-type: none"> National offset framework or fund in line with Infrastructure Act provisions
Whole Life		<ul style="list-style-type: none"> Requirement through Building Regulations for whole life carbon assessments of new buildings and major renovations Requirement through NPPF for whole life carbon assessments of new buildings and major renovations

Please provide your feedback on the above proposed mechanisms:

Most responses were broadly supportive of the policy options outlined, particularly around changes to building regulations. Additional suggestions included increased site sampling for EPCs, requirements for post occupancy evaluations to address the 'performance gap', and the use of incentives to encourage action. Several concerns were raised about trying to align the framework with the current Part L as a compliance mechanism.

It was also recommended that funding from UK Research & Innovation and relevant Catapults should also be targeted as technical solutions and data gathering.

Proposed updates:

- **Specific suggestions will be added to the policy options around post-occupancy evaluation of new builds, incentives for energy efficiency, and directing research funding to relevant topics.**
- **The policy proposals will be clearly caveated with the need for further work on the individual policies.**

Outcome:

UKGBC will continue to push for suitable policy in these areas.

They do not represent specific recommendations from the task group but are intended to provide some initial guidance as to how the framework could be reflected in different policy areas, and further work will be needed to develop the individual policy options in more detail. These mainly focus on increasing transparency in building energy use, shifting towards in-use performance outcomes, and improving the measurement and mitigation of embodied carbon. Further policies, regulations and incentives beyond these will be needed to drive energy efficiency and renewable energy in the transition to a net zero carbon built environment.

Local policy options		
	Existing policy	Potential new policy
Disclosure	<ul style="list-style-type: none"> • Local Plan requirements for monitoring and reporting energy performance in operation of major new developments: <ul style="list-style-type: none"> ○ GLA Draft London Plan: <i>requirement for first five years of operation</i> 	<ul style="list-style-type: none"> • Extension of Local Plan requirements for monitoring and reporting energy performance to all new developments
Energy Efficiency	<ul style="list-style-type: none"> • Local Plan requirements for carbon and energy performance above Building Regulations: <ul style="list-style-type: none"> ○ GLA Draft London Plan, Reading Draft Local Plan: <i>35% carbon reduction including 10% from energy efficiency</i> ○ Ipswich, Cambridge, Brighton and Hove: <i>Adopted Local Plans requiring 19% carbon reduction over Part L 2013.</i> ○ Additional emerging local plans ⁵ 	<ul style="list-style-type: none"> • Tightening of Local Plan requirements for energy efficiency to align with future minimum standards for net zero carbon framework • Local Plan requirements for compliance with minimum energy efficiency standards based on in-use performance
Renewables	<ul style="list-style-type: none"> • Local Plan requirements for carbon and energy performance above Building Regulations (examples as above) • Adopted and draft local plans requiring a percentage of renewable energy onsite (Merton Rule), ranging from 10%-20%: <ul style="list-style-type: none"> ○ Milton Keynes draft Local Plan ○ Greater Manchester (GM) Draft Spatial Framework ○ Oxford draft Local Plan 	<ul style="list-style-type: none"> • Local Plan requirements for minimum onsite renewable energy • Local Plan requirements for offsite renewable energy solutions as a route to achieving zero carbon where onsite generation is not feasible

⁵ See UKGBC Planning Policy Playbook for examples of relevant emerging Local Plans: <https://www.ukgbc.org/ukgbc-work/sustainability-standards-new-homes/>

Offsetting	<ul style="list-style-type: none"> • Local Plan requirement for new developments to be ‘zero carbon’ or ‘net zero’ and offset funds: <ul style="list-style-type: none"> ○ GLA Draft London Plan ○ Reading draft Local Plan ○ Milton Keynes draft Local Plan ○ Greater Manchester (GM) Draft Spatial Framework (by 2028) ○ Oxford (by 2030) 	<ul style="list-style-type: none"> • Consistent national framework for local offset funds to improve consistency and transparency
Whole life carbon	<ul style="list-style-type: none"> • Local Plan requirements for modelling of whole life carbon impacts for major new developments: <ul style="list-style-type: none"> ○ GLA Draft London Plan ○ Greater Manchester (GM) Draft Spatial Framework 	<ul style="list-style-type: none"> • Extension of Local Plan requirement for modelling of whole life carbon impacts to all new developments • Extension of Local Plan ‘zero carbon’ requirements to cover whole life carbon, including offsetting of these impacts.

Please provide your feedback on the above proposed mechanisms:

Responses were mostly supportive of the proposed options. It was also suggested by a few respondents that local carbon offset funds should be aligned with the offsetting elements of the net zero framework.

Some respondents questioned the effectiveness of disjointed Local Authority leadership compared to consistent national standards. Resourcing within Local Authorities was also highlighted as a major barrier to setting local standards.

There was some opposition to the use of LCAs as a regulatory tool given the lack of data available and concerns about the accuracy of current methodologies.

Proposed updates:

- **The local policy options will emphasise that local authorities should seek to take a consistent approach to net zero carbon rather than creating a plethora of different standards and requirements in different areas.**

Outcome:

Local Policy recommendations were stressed as within a consistent national framework for local offset funds to improve consistency and transparency.

The final recommendations included were:

Policy options to support the framework

	National policy	Local policy
Reduce embodied carbon	<ul style="list-style-type: none"> Requirement through Building Regulations for whole life carbon assessments of new buildings and major renovations Requirement through NPPF for whole life carbon assessments of new buildings and major renovations 	<ul style="list-style-type: none"> Local Plan requirements for modelling of whole life carbon impacts for new developments Extension of Local Plan 'zero carbon' requirements to cover whole life carbon, including offsetting of these impacts
Reduce energy demand	<ul style="list-style-type: none"> Requirement through Building Regulations for Thermal Energy Demand Intensity (or similar indicator) requirements to be predicted for compliance and verified on completion Clean Growth Grand Challenge Mission to halve energy use from all new buildings by 2030 (from a 2018 baseline) Future Homes Standard ambition for 'world leading energy efficiency standards' for new homes from 2025 Mandatory disclosure of operational energy performance ratings for all commercial buildings (with delineation between landlords and tenants where applicable) Transition to using operational energy ratings as the basis of minimum base building energy efficiency standards for commercial rented properties 	<ul style="list-style-type: none"> Local Plan requirements for carbon and energy performance beyond Building Regulations³³ Local Plan requirements for monitoring and reporting energy performance of new developments for first years of operation³⁴
Increase renewable energy supply	<ul style="list-style-type: none"> National Planning Policy Framework (NPPF) 2018 Planning Practice Guidance (PPG) on Climate Change to require 'net zero' for all new developments Recognition of off-site renewable energy procurement as carbon abatement measure within Building Regulations 	<ul style="list-style-type: none"> Local Plan requirements for carbon and energy performance above Building Regulations (examples as above) Local Plan requirements for a minimum percentage of renewable energy on-site (Merton Rule) Local Plan requirements for off-site renewable energy solutions as a route to achieving zero carbon where on-site generation is not feasible
Offsetting	<ul style="list-style-type: none"> Infrastructure Act 2015 provision on allowable solutions mechanism National offset framework or fund in line with Infrastructure Act provisions 	<ul style="list-style-type: none"> Consistent national framework for local offset funds to improve consistency and transparency Local Plan requirement for new developments to be 'zero carbon' or 'net zero' and offset funds³⁵

Please visit the UKGBC's [Advancing Net Zero webpage](#) to stay updated on this project.

Task group discussion questions

Following the outcomes of the consultation, a number of key follow-up questions were put to the task group to make final decisions about the Net Zero Carbon Buildings Framework. The questions below were discussed at the task group meeting on 20th March when participants cast their votes for the different options.

A	Should the reporting and offsetting of embodied carbon from construction be optional or mandatory for new buildings and major refurbishments?	
Options	A.1	A.2
	New buildings and major refurbishment can report and offset <i>either</i> : <ul style="list-style-type: none"> Operational carbon (Module B6) OR Embodied carbon (Module A) AND Operational carbon (Module B6) 	New buildings and major refurbishment <i>must</i> report and offset: <ul style="list-style-type: none"> Embodied carbon (Module A) AND Operational carbon (Module B6)
Voting	26 (57%)	20 (43%)

B	Should offsets only be permitted in specific circumstances?		
Options	B.1	B.2	B.3
	Offsets permitted for all emissions, operational and embodied	Offsets not permitted for operational energy emissions, only embodied	Offsets not permitted for operational energy emissions except where there is existing onsite fossil-fuel generation
Voting	27 (59%)	11 (27%)	8 (17%)

C	Should the net zero carbon hierarchy be expanded to include energy management to increase the applicability to existing buildings? See annotated framework pg.5 for further description of proposed hierarchy.	
Options	C.1 - Current hierarchy	C.2 - Proposed expanded hierarchy
	<ol style="list-style-type: none"> Fabric efficiency Energy efficiency Onsite renewables Offsite renewables Offsets 	<ol style="list-style-type: none"> Energy demand reduction Energy efficiency Energy management Onsite renewables Offsite renewables Offsets
Voting	7 (15%)	39 (85%)

D	Should the framework include proposals for 'net zero ready' buildings be developed in the future for circumstances where ongoing monitoring is not possible? E.g. build for sale, existing homes.	
	A proposed 'net zero ready' option would need to meet the following requirements, each of which will require further clarification: <ul style="list-style-type: none"> ➤ Meet energy efficiency minimum standards, in line with a net zero carbon economy ➤ Demonstrate as-built performance through testing ➤ Ensure all energy demand from 'average use' can be met through renewable energy, either onsite or offsite 	
	Agree	Disagree
Voting	41 (89%)	5 (11%)