



Please note, the content of this guidance document was current at the time of publication. Given the evolving nature of research on net zero carbon buildings, some information may have since been superseded. Please visit the following page to access the latest UKGBC guidance on net zero carbon buildings: <https://www.ukgbc.org/ukgbc-work/net-zero-carbon-buildings-framework>

Net Zero Carbon Buildings: Levels of performance

A short primer document

9th March 2021

Lead Partner:



Programme Partners:



Net Zero Carbon - Levels of performance

Purpose

UKGBC published [Renewable Energy Procurement & Carbon Offsetting guidance](#) in March 2021 as part of a growing suite of documents to supplement UKGBC's [Net Zero Carbon Buildings: A Framework Definition](#). As this new guidance will supersede some information contained within the April 2019 version of the Framework Definition, this primer document seeks to provide clarity on the levels of building performance expected for net zero claims, and acts as an initial foundation for future discussions on net zero verification.

Net zero carbon definitions

UKGBC's Framework Definition provides a set of consistent principles and metrics for the built environment to apply in the achievement of net zero carbon buildings. It sets out two definitions for net zero carbon, which should be considered of equal importance: one for construction and a second for operational energy.

These two definitions provide the foundation for net zero buildings claims:

Net zero carbon – construction

For new buildings and major renovations

“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.”¹

Net zero carbon – operational energy

For all buildings in operation

“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.”

The Framework Definition sets out a series of steps and criteria that should be met in order to achieve a net zero carbon outcome. These are outlined in Tables 1 and 2 on

the following pages. Note that this is only a high-level summary; for full details of the requirements, including any allowable exemptions, users should refer to the respective guidance as listed on the last page.

The 'baseline performance' is the minimum level that is acceptable for buildings wishing to claim that they are net zero carbon, but still marks a notable departure from business as usual. The minimum level for each 'step' to net zero carbon will become more ambitious with time, as guided by industry's response to market, policy, and supply chain advancements.

Building developers, owners and occupiers should strive to achieve more than the minimum level and seek continuous improvement in each Framework Definition step to 'future-proof' their net zero credentials. Throughout this journey, the data underlying this progression should be publicly disclosed for sustained, credible net zero claims.

Evolving performance standards

Further guidance will continue to be developed, in line with the Framework Definition principle of '*Encourage action today and tighten requirements over time.*' The pace of change within the industry means that acceptable parameters of net zero carbon buildings today may no longer be acceptable in five or ten years' time.

Since the publication of the Framework Definition, UKGBC has developed further supporting guidance, which have introduced more robust requirements for any net zero claims. Examples include the [Net Zero Carbon: Energy Performance Targets for Offices](#) and [Renewable Energy Procurement & Carbon Offsetting guidance](#).

[Tables 1](#) and [2](#) also highlight where third-party resources are available, such as energy performance targets for other sub-sectors beyond offices. However, it is recognised that with multiple sources of guidance available, it will be increasingly important that any performance targets and requirements are based on complementary data and assumptions to ensure a consistent decarbonisation transition for the UK. UKGBC's [Whole Life Carbon Roadmap project](#) seeks to provide this clarity ahead of COP26, through the development of a roadmap that clearly demarcate sector-based actions and targets. This will be developed in collaboration with stakeholders across the whole value chain to build widespread industry buy-in for the pathway laid out.

¹ As per 'Evolving performance standards' buildings seeking '[Net zero carbon - construction](#)' can no longer account for their upfront embodied carbon emissions through net export of on-site renewable energy. This change from the initial Framework Definition is in response to market and stakeholder feedback; the rationale has been provided within the [Renewable Energy Procurement & Carbon Offsetting guidance](#).

Table 1 Net zero carbon - construction

For new buildings and major renovations

Over time, the baseline performance will become more ambitious for each 'step'. This will be guided by industry's response to market and supply chain advancements, and innovations in technology. Those seeking to future-proof their net zero credentials should strive to increase their building's performance across each step.

Baseline performance

From 2021

Increased leadership

Steps to achieving 'Net Zero Carbon - Construction'		Cannot claim net zero if any one of these statement applies to the project	Can claim 'Net Zero Carbon - Construction'	
Reduce construction impacts	All buildings	Whole Life Carbon assessment not undertaken	Whole Life Carbon assessment undertaken for all construction projects to drive carbon reductions	
			Design achieves, or goes beyond, the interim upfront embodied carbon target	Design achieves, or goes beyond, the 1.5°C aligned upfront embodied carbon target
Reduce operational energy use	Offices	Design does not prioritise reduction in energy demand and consumption over all other measures	Design meets, or goes beyond, the interim energy performance target based on modelled data	Design meets, or goes beyond, 1.5°C aligned energy performance targets based on modelled data
	All other sectors		Design meets, or goes beyond, the interim energy performance target based on modelled data	Design meets, or goes beyond, the 1.5°C aligned energy performance target
Increase renewable energy supply	All buildings	Heating, hot water or cooking designed to be powered using fossil fuel for the primary energy source	Heating, hot water and cooking designed to be powered using non-fossil fuel primary energy sources	All energy systems designed to be fully powered by non-fossil fuel sources
		Feasibility for on-site/off-site renewable energy generation capacity not assessed	Design includes on-site/off-site renewable energy generation capacity	Design includes on-site/off-site renewable energy capacity, energy storage and smart controls
Offset any remaining carbon	Approach	Residual carbon emissions not offset through an approved international or domestic carbon offset standard	Offsets upfront embodied carbon emissions using market-based prices → Uses the 'Transition Fund' approach with a £/tCO ₂ e more commensurate with societal cost of unabated emissions	Uses the 'Transition Fund' approach with a £/tCO ₂ e ≥ HMT Green Book non-traded central scenario
	Offset type	Uses 'ex-ante' offsets, i.e., offsets that are not verified savings but instead promises savings in future, to compensate for residual emissions	Portfolio of offsets a mix of emission reductions and removals projects	Portfolio of offsets focussed on long-term storage and/or long-lived removals ¹
Public disclosure	All buildings	Minimum reporting requirements not publicly disclosed on an accessible platform and/or third-party verification not undertaken	Public disclosure using the Minimum Reporting Template hosted on an accessible platform, with third-party verification. Key information disclosed includes: <ul style="list-style-type: none"> - Whole Life Carbon assessment - Total embodied carbon up to practical completion in tCO₂e and kgCO₂e/m² - Carbon offset approach taken 	

New buildings and major refurbishments targeting net zero carbon for construction should be designed to achieve net zero carbon for operational energy

UKGBC does not currently have specific guidance / targets in these areas. Users are encouraged to review third-party resources that are available which includes, but is not limited to: CRREM, RIBA and LETI. However, it is recognised that with multiple sources available it can be difficult to navigate which targets or guidance is the most appropriate or applicable. Moving forward, UKGBC aims to help provide clarity on a common direction that has buy-in from across the industry. This will be through collaborating with other industry bodies and consortiums, including those listed, on future verification discussions and through the Whole Life Carbon Roadmap project. This Roadmap seeks to outline a unified science-based trajectory for the built environment and its respective sub-sectors. This will help ensure that targets for each sub-sectors are based on a consistent set of assumptions and on complementary methodologies, such that the industry as a whole moves towards a consistent 1.5°C aligned society.

¹ Note however, that it is not yet known how finite global capacity for GHG removals are, and how this relates to the scale of unavoidable emissions for the built environment sector

Table 2 Net zero carbon - operational energy

For all buildings in operation

Over time, the baseline performance will become more ambitious for each 'step'. This will be guided by industry's response to market and supply chain advancements, and innovations in technology. Those seeking to future-proof their net zero credentials should strive to increase their building's performance across each step.

Baseline performance
From 2021

Increased leadership

Steps to achieving 'Net Zero Carbon - Operational Energy'		Cannot claim net zero if any one of these statement applies to the project	Can claim 'Net Zero Carbon - Operational Energy'		
 Reduce operational energy use	Offices	Interim energy performance targets not met and no action plan in place to achieve this	Does not yet meet interim energy performance target, but has an action plan to achieve this	Achieves, or goes beyond, the interim energy performance target	Achieves, or goes beyond 1.5°C aligned energy performance target
	All other sectors	Operational strategy does not prioritise reduction in energy demand and consumption over all other measures	Achieves, or goes beyond, the interim energy performance targets ¹		Achieves, or goes beyond, 1.5°C aligned energy performance target
 Increase renewable energy supply	Existing buildings	Heating, hot water or cooking powered using fossil fuel as the primary energy source, but no trajectory plan set for phase out	Trajectory plan to phase out fossil fuel use as primary energy source for heating, hot water and cooking by next system replacement cycle. Non-additional renewable power procurement	Mix of additional and non-additional renewable energy procurement	100% additional, bundled renewable energy procurement only, with no indirect fossil fuel use.
	New buildings	Heating, hot water or cooking powered using fossil fuel as the primary energy source	Non-additional renewable energy procurement		Inclusion of energy storage, smart controls and/or flexibility strategies to operate on, and not just procure, renewable energy.
 Offset any remaining carbon	Scope	Residual carbon emissions to offset not calculated using the NZCB Framework Approach	Carbon offsetting required to account for fossil fuel and/or non-additional energy consumption	Carbon offsetting required to account for non-additional energy consumption	No carbon offsetting required
	Approach	Residual carbon emissions not offset through an approved international or domestic carbon offset standard	Offsets upfront embodied carbon emissions using market-based prices	Uses the 'Transition Fund' approach with a £/tCO ₂ e more commensurate with societal cost of unabated emissions	
	Offset type	Uses 'ex-ante' offsets, i.e., offsets that are not verified savings but instead promises savings in future, to compensate for residual emissions	Offsets portfolio a mix of emission reductions and removals projects		Offsets portfolio focussed on long-term storage and/or long-lived removals ²
 Public disclosure	All buildings	Minimum reporting requirements not publicly disclosed on an accessible platform and/or third-party verification not undertaken	Public disclosure using the Minimum Reporting Template hosted on an accessible platform, with third-party verification. Key information disclosed includes: <ul style="list-style-type: none"> - Total energy consumption in kWh/m²/year - Total annual CO₂e for Scope 1 and 2 emissions (using Framework Definition approach, and dual reporting) - Carbon offset approach taken 		

 UKGBC does not currently have specific guidance / targets in these areas. Users are encouraged to review third-party resources that are available which includes, but is not limited to: CRREM, RIBA and LETI. However, it is recognised that with multiple sources available it can be difficult to navigate which targets or guidance is the most appropriate or applicable. Moving forward, UKGBC aims to help provide clarity on a common direction that has buy-in from across the industry. This will be through collaborating with other industry bodies and consortiums, including those listed, on future verification discussions and through the Whole Life Carbon Roadmap project. This Roadmap seeks to outline a unified science-based trajectory for the built environment and its respective sub-sectors. This will help ensure that targets for each sub-sectors are based on a consistent set of assumptions and on complementary methodologies, such that the industry as a whole moves towards a consistent 1.5°C aligned society.

¹ There is no specific allowance for any 'action plan' as third-party requirements and timeframes for interim targets vary, e.g. CRREM provides interim targets for every year up to 2050, compared to UKGBC's office guidance which sets an interim target for every 5-year period

² Note however, that it is not yet known how finite global capacity for GHG removals are, and how this relates to the scale of unavoidable emissions for the built environment sector

Supporting information

Verification of net zero buildings

Buildings seeking net zero claims must disclose a minimum level of data and performance, as per the Framework Definition's [Minimum Reporting Templates](#). The information should be publicly disclosed by the organisation making these claims on an easily accessible medium, e.g. clearly presented on the developer's website if verifying 'Net zero carbon - construction'. A third-party audit of the information is also required to provide assurance on the sources and processes to determine the net zero carbon balance.

This is intended to promote a culture of transparency and help equip the industry to collectively decarbonise at a much faster pace through shared learning. Buildings claiming net zero should inform UKGBC of their achievement via ANZ@ukgbc.org. Those that have been independently verified as net zero in line with the Framework Definition are listed on UKGBC's [Verifying Net Zero Carbon Buildings webpage](#).

Moving forward, UKGBC is supporting the exploration of a more formal net zero verification mechanism in 2021/22, which is likely to build on existing reporting and certification schemes, such as NABERS UK and BRREAM, to avoid further complicating energy and carbon reporting. This will be in close collaboration with other industry bodies, and ensure alignment with the WLC Roadmap outcomes.

Similarly, it is recognised that the 'net zero carbon - operational energy' definition is not applicable for buildings being built or renovated for sale as it is based on the annual reporting of in-use energy consumption. For these circumstances, a 'net zero ready' approach is required; this has not yet been defined by UKGBC or the broader industry, but would require defining a set of requirements for design and in-use performance guarantees using [Table 1](#) as a basis.

With thanks to

UKGBC Advancing Net Zero Programme Partners:

Lead Partner: The Redevco Foundation
Programme Partners: BAM Construct UK, Berkeley Group, Grosvenor Britain & Ireland, Hoare Lea and JLL

Reference: UKGBC Guidance for buildings

- [Net Zero Carbon Buildings: A Framework Definition](#)
- [Energy Performance Targets for Offices](#)
- [Renewable Energy Procurement & Carbon Offsetting](#)
- [Verifying Net Zero Carbon Buildings](#)
- [Building the case for Net Zero Buildings](#) - office and residential
- [Unlocking the Delivery of Net Zero Carbon Buildings](#)
- [Advancing Net Zero - Case Studies](#)

For other guidance relating to corporate net zero strategies, please refer to the [Advancing Net Zero webpage](#).

