



Monmouthshire County Council

Net Zero Carbon Homes Feasibility Study and Cost Assessment

Work Stage 1 Policy Review

Project Ref: 2774

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Architecture
Low Energy Consultancy
Civil Engineering
Structural Engineering
Urban Design

Contents

	Page
1. Introduction	
1.1 Introduction	2
1.2 Definitions	3
2. Net Zero Policy - National	
2.1 National Net Zero Policy	6
2.1.1 England	9
2.1.2 Scotland	10
2.1.3 Wales	11
3. Net Zero Policy - Local Authority	
3.1 Adopted	14
3.1.1 B&NES	16
3.1.2 Central Lincolnshire	18
3.1.3 Cornwall	19
3.1.4 Lake District National Park	20
3.2 Emerging	21
3.2.1 Bristol	22
3.2.2 Enfield	25
3.2.3 Essex	28
3.2.4 Forest of Dean	30
3.2.5 Merton	32
3.2.6 Newham	36
3.2.7 North Somerset	38
3.2.8 Oxford	40
3.2.9 Uttlesford	41
3.2.10 Wiltshire	43
4. Summary	
4.1 Summary	44
4.2 Evidence Base	45
5. Monmouthshire Net Zero Policy	
5.1 Review	46
5.2 Recommendations	48
5.3 Additional Evidence	51

Section 1: Introduction

1.1 Introduction

Spring Design Consultancy Limited are appointed to assist Monmouthshire County Council in developing an appropriate evidence base for the progressed Net Zero policy to guide, assess and determine applications for new-build residential development within the emerging [Replacement Local Development Plan 2018-2033](#).

This process has been divided into distinct work stages:

Work Stage 1. 1 Policy Review
2 Policy Approach
3 Evidence Base

Work Stage 2. 1 Methodologies
2 Technical Feasibility

Work Stage 3. 1 Cost Analysis

Work Stage 4. 1 Evidence
2 Cost Implications
3 Scrutiny Skillset

Work Stage 5 Examination

This report presents the outcomes of [Work Stage 1.1 Policy Review](#) and [Work Stage 1.2 - Monmouthshire Net Zero Policy](#).

1.2 Definitions

Clarity and consistency in the basic terminology used to discuss carbon and Net Zero is key to ensuring meaningful outcomes. *Carbon Definitions for the Built Environment, Buildings and Infrastructure: Improving Consistency in Whole Life Carbon Assessment and Reporting (2023)* is the result of extensive collaboration between CIBSE, ICE, IStructE, LETI, RIBA, RICS, UK GBC and WLCN and applies the following.

Carbon Definitions	
Term	Definition
Greenhouse Gases (GHG) <i>often 'carbon emissions' in general usage</i>	'Greenhouse Gases' are constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds.
Whole Life Carbon	'Whole Life Carbon' emissions are the sum total of all asset related GHG emissions and removals, both operational and embodied over the life cycle of an asset including its disposal (Modules: A0-A5; B1-B7; B8 optional; C1-C4, all including biogenic carbon, with A0 assumed to be zero for buildings). Overall Whole Life Carbon asset performance includes separately reporting the potential benefits or loads from future energy or material recovery, reuse, and recycling and from exported utilities (Modules D1, D2).
Embodied Carbon <i>or</i> Life Cycle Embodied Carbon	'Embodied Carbon' emissions of an asset are the total GHG emissions and removals associated with materials and construction processes throughout the whole life cycle of an asset (Modules A0-A5, B1-B5, C1-C4, with A0 assumed to be zero for buildings).
Upfront Carbon - Buildings	'Upfront Carbon' emissions are the GHG emissions associated with materials and construction processes up to practical completion (Modules A0-A5). Upfront carbon excludes the biogenic carbon sequestered in the installed products at practical completion.
Operational Carbon - Energy, Buildings	'Operational Carbon – Energy' (Module B6) are the GHG emissions arising from all energy consumed by an asset in-use, over its life cycle.

These definitions only address the GHGs with Global Warming Potential assigned by the Intergovernmental Panel on Climate Change (IPCC).

A0 is generally assumed to be zero for buildings, however infrastructure projects include ground investigations and activities associated with designing the asset in A0. Demolition of existing structures or buildings must be separately identified and included within the Module A5 calculations.

Net Zero Definitions	
Term	Definition
Net Zero (whole life) Carbon	A 'Net Zero (whole life) Carbon' Asset is one where the sum total of all asset related GHG emissions, both operational and embodied, over an asset's life cycle (Modules A0-A5, B1–B8, C1-C4) are minimized, which meets local carbon, energy and water targets or limits, and with residual 'offsets', equals zero. <i>To meet the requirements of 'Net Zero (whole life) Carbon' the definitions for 'Net Zero Upfront Carbon', Net Zero Embodied Carbon', 'Net Zero Capital Carbon', Net Zero operational Carbon - Energy', 'Net Zero Operational Carbon - Infrastructure', 'Net Zero In-Use Carbon Asset' and 'Net Zero Operational Carbon - Water' must also be individually met as applicable.</i>
Net Zero Carbon Embodied Carbon <i>or</i> Net Zero Life Cycle Embodied Carbon	A 'Net Zero Embodied Carbon' asset is one where the sum total of GHG emissions and removals over an asset's life cycle (Modules A0-A5, B1-B5 and C1-C4) are minimized, which meets local carbon targets or limits (e.g. kgCO₂e/m²), and with additional 'offsets', equals zero.
Net Zero Upfront Carbon	A 'Net Zero Upfront Carbon' asset is one where the sum total of GHG emissions, excluding 'biogenic carbon', from Modules A0-A5 is minimized, which meets local carbon targets or limits (e.g kgCO₂e/m²), and with additional 'offsets', equals zero.
Net Zero Operational Carbon - Energy	A 'Net Zero Operational Carbon – Energy' asset is one where no fossil fuels are used, all energy use (Module B6) has been minimized, meets the local energy use target or limit (e.g. kWh/m²/a) and all energy use is generated on- or off- site using renewables that demonstrate additionality. Direct emissions from renewables and any upstream emissions are 'offset'. <i>Direct emissions must include CH₄ and N₂O emissions from the combustion of biomass and biodiesel fuels. Upstream emissions include: direct and indirect emissions from energy generation and distribution, WTT emissions for energy consumed in the building and from energy generation and distribution.</i>
Net Zero Operational Carbon - Water	A 'Net Zero Operational Carbon - Water' asset is one where water use (Module B7) is minimized, meets local water targets or limits (e.g. litres/person/year) and where those GHG emissions arising from water supply and wastewater treatment are 'offset'.
Net Zero In-Use Asset	A 'Net Zero In-Use Carbon Asset' is one where on an annual basis the sum total of all asset related GHG emissions, both operational and embodied, (Modules B1-B8) are minimized, which meets local carbon, energy and water targets or limits, and with residual 'offsets', equals zero.

Additionality	Procurement of renewable energy for the asset's use which results in new installed renewable energy capacity that otherwise would not have occurred had the intervention not taken place.
Carbon Neutral	All carbon emissions are balanced with offsets based on carbon removals or avoided emissions.
Absolute Zero Carbon	Eliminating all carbon emissions without the use of credits.

Definitions pertaining specifically to infrastructure have been omitted as being beyond the scope of this project.

These definitions are designed to be technically robust and have been adopted by all collaborating organisations. They also reflect the assessment methodology outlined within *Whole Life Carbon Assessment for the Built Environment 2nd Edition (2023)*.

An additional metric used with increasing frequency to assess building performance is energy use intensity (EUI) expressed in kWh/m²/yr. EUI is the annual measure of the total energy consumed within a building including all regulated and unregulated energy: it does exclude the charging of electric vehicles.

LETI Climate Emergency Design Guide (2021) states:

"LETI believes that setting an EUI requirement for new buildings is fundamental to meeting our climate change targets. It is a good indicator for building performance as the metric is solely dependent on how the building performs in-use; rather than carbon emissions, which also reflect the carbon intensity of the grid.

EUI is a metric that can be estimated at the design stage and very easily monitored in-use as energy bills are based on kWh of energy used by the building. This metric can be used to compare buildings of a similar type, to understand how well the building performs in-use. It includes all of the energy consumed in the building, such as regulated energy (heating, hot water, cooling, ventilation, and lighting) and unregulated energy (plug loads and equipment e.g. kitchen white goods, ICT/AV equipment). It does not include charging of electric vehicles.

*EUI can be expressed in GIA (Gross Internal Area) or NLA (Net Lettable Area). In this document the EUIs are expressed in GIA unless specified. EUI should replace carbon emission reductions as the primary metric used in policy, regulations, and design decisions."*¹

¹ LETI (2021) *LETI Climate Emergency Design Guide* [online]. Available from: www.leti.uk/cedg [Accessed 19.08.2024]. Page 24.

Section 2: Net Zero Policy - National

2.1 National Net Zero Policy

The UK is required to achieve Net Zero by 2050 (Climate Change Act as amended 2019), and 78% reductions² by 2035 (Climate Change Act as amended 2021) with 68% reductions by 2030 (COP26 Nationally declared contribution). The core Climate Change Act 2008 established an interim emissions reduction target of 34% by 2020: by 2019, before the complexities associated with assessing progress during COVID, UK attributed CO₂e emissions were estimated to have fallen by 40%³.

While significant, emission reductions to date have been primarily driven by increased rates of efficiency and a relatively rapid decarbonisation of the electricity generation⁴. To achieve Net Zero by 2050 the built environment - representing approximately 25% of UK emissions⁵ - requires the same principles of efficiency and decarbonisation to be urgently implemented.

Emissions in the built environment are primarily targeted by Building Regulations in England and Wales and the Building Warrant process in Scotland.

The Planning and Energy Act 2008 states:

"A local planning authority in England may in their development plan documents, a corporate joint committee may in their strategic development plan, and a local planning authority in Wales may in their local development plan, include policies imposing reasonable requirements for—

- (a) a proportion of energy used in development in their area to be energy from renewable sources in the locality of the development;*
- (b) a proportion of energy used in development in their area to be low carbon energy from sources in the locality of the development;*
- (c) development in their area to comply with energy efficiency standards that exceed the energy requirements of building regulations."*⁶

This directive was contradicted by the Planning - Local Energy Efficiency Standards Update Written Ministerial Statement on 13th December 2023:

² Reductions are measured against the 1990 emission scenario.

³ Committee on Climate Change (2021) *Reducing UK emissions: 2021 Progress Report to Parliament* [online]. London: Committee on Climate Change. Available from: www.theccc.org.uk/publications [Accessed 19.08.2024]. Page 8.

⁴ *Ibid.*, Page 60.

⁵ UK Green Building Council (11 November 2021) *New report confirms that net zero is achievable for the built environment sector by 2050, but only with urgent government action* [online]. Available from ukgbc.org/news/new-report-confirms-that-net-zero-is-achievable-for-the-built-environment-sector-by-2050-but-only-with-urgent-government-action/. [Accessed 19.08.2024].

⁶ HM Government Planning and Energy Act 2008 [online]. Available from: www.legislation.gov.uk/ukpga/2008/21/contents [Accessed 19.08.2024].

" The proliferation of multiple, local standards by local authority area can add further costs to building new homes by adding complexity and undermining economies of scale. Any planning policies that propose local energy efficiency standards for buildings that go beyond current or planned buildings regulation should be rejected at examination if they do not have a well-reasoned and robustly costed rationale that ensures:

- That development remains viable, and the impact on housing supply and affordability is considered in accordance with the National Planning Policy Framework.*
- The additional requirement is expressed as a percentage uplift of a dwelling's Target Emissions Rate (TER) calculated using a specified version of the Standard Assessment Procedure (SAP).*

*Where plan policies go beyond current or planned building regulations, those policies should be applied flexibly to decisions on planning applications and appeals where the applicant can demonstrate that meeting the higher standards is not technically feasible, in relation to the availability of appropriate local energy infrastructure (for example adequate existing and planned grid connections) and access to adequate supply chains."*⁷

A legal challenge against the WMS led by campaign groups was dismissed by the High Court in July⁸. Despite this setback, it is understood local authorities in England progressing Net Zero policy on the basis of the earlier parliamentary position are still considering a legal challenge. As WMS are issued by parliament in Westminster this does not have status in Wales unless the same position is adopted by the Senedd.

The [National Design Guide \(2021\)](#) reinforces this advice, communicating a clear energy hierarchy for local authorities to consider when developing policy:

- reduce the need for energy through passive measures including form, orientation and fabric;
- use energy efficient mechanical and electrical systems, including heat pumps, heat recovery and LED lights; and
- maximise renewable energy especially through decentralised sources, including on-site generation and community-led initiatives⁹.

⁷ Minister of State for Housing, (2023) [Planning - Local Energy Efficiency Standards Update](#) [online]. London: The Stationery Office. (UIN HCWS123). Available from: questions-statements.parliament.uk/written-statements/detail/2023-12-13/hcws123 [Accessed 19.08.2024].

⁸ Planning Resource (3 July 2024) [High Court dismisses legal challenge to government's decision to limit councils' ability to set stricter new home energy efficiency standards](#) [online]. Available from www.planningresource.co.uk/article/1879490/high-court-dismisses-legal-challenge-governments-decision-limit-councils-ability-set-stricter-new-home-energy-efficiency-standards. [Accessed 19.08.2024].

⁹ Ministry of Housing, Communities and Local Government (2021) [National Design Guide: Planning practice guidance for beautiful, enduring and successful places](#) [online]. London: The Stationery Office. Available from: www.gov.uk/government/publications/national-design-guide [Accessed 19.08.2024]. Paragraph 138.

This document also identifies that well-designed places and buildings employ the principles of whole life carbon assessment and the circular economy to reduce embodied carbon and construction waste¹⁰.

¹⁰ *Ibid.*, Paragraph 142.

2.1.1 England

Approved Document L Volume 1 - Dwellings and 2 - Buildings other than dwellings - Conservation of fuel and power 2021 align with the policy objectives of reducing emissions, mandating reductions of 31% for dwellings and 27% for non-domestic builds. Consultation documents for the 2025 Building Regulations - the Future Homes Standard - suggest a 75% reduction in operational carbon emissions beyond 2013 standards: at present there are no details on whether embodied carbon will be assessed or regulated.

Current SAP methodology has been identified as unfit for purpose, failing to adequately predict or represent the actual performance of new buildings in operation¹¹. RICS explicitly disqualify AD L calculations for energy modelling within whole life carbon assessments, stating that "*[...] they are not a prediction of energy consumption.*"¹²

Making SAP and RdSAP 11 fit for Net Zero: A report for the Department for Business, Energy and Industrial Strategy (2021) is the result of an extensive review by a consortium led by Etude and draws much the same conclusion as RICS. This report makes 25 key recommendations that are necessary to improve the quality of output and align SAP with the drive toward Net Zero.

It is unclear how many of these recommendations will be incorporated within SAP 11 - rebranded as the Home Energy Model (HEM) and due for implementation in 2025¹³ - and how successful it will therefore be in addressing these shortcomings.

¹¹ UK Green Building Council (2021) Net Zero Whole Life Carbon Roadmap: A Pathway to Net Zero for the UK Built Environment [online]. London: UK Green Building Council. Available from: ukgbc.org/our-work-types/technical-report/ [Accessed 20.08.2024]. Page 40.

¹² RICS (2023) Whole life carbon assessment for the built environment 2nd edition [online]. London: Royal Institute of Chartered Surveyors (RICS). Available from: www.rics.org/profession-standards/rics-standards-and-guidance/sector-standards/construction-standards/whole-life-carbon-assessment [Accessed 20.08.2024]. Page 95.

¹³ HM Government (20 December 2022) Guidance: Standard Assessment Procedure [online]. Available from: www.gov.uk/guidance/standard-assessment-procedure#future-developments--sap-11 [Accessed 20.08.2024].

2.1.2 Scotland

The [Climate Change \(Scotland\) Act 2009](#) set a target of reducing greenhouse gas emissions, attributable to human activity, by at least 80% by 2050, with an interim target of a reduction of at least 42% by 2020. This was amended with the [Climate Change \(Emissions Reduction Targets\) \(Scotland\) Act 2019](#) to increase the emission reduction targets to Net Zero by 2045.

Section 44 of the Act places a duty on every public body to act:

- in the way best calculated to contribute to the delivery of emissions targets in the Act;
- in the way best calculated to help deliver the Scottish Government's climate change adaptation programme; and
- in a way that it considers is most sustainable.

In response to Alex Rowley MSP [Proposed Domestic Building Environmental Standards \(Scotland\) Bill \(2022\)](#), Scottish Government committed to developing a Scottish equivalent of the Passivhaus standard that will apply to all building warrant applications received after 1st January 2025¹⁴.

Consultation for this Passivhaus equivalent standard opened on 31st July 2024 with the publication of [Building regulations - energy and environmental standards: consultation on proposed changes](#). One proposal within the consultation is for Passivhaus certification to offer an alternative route to compliance - be considered deemed to satisfy - for new build dwellings in recognition of its holistic and technically robust approach to delivering low energy buildings¹⁵.

¹⁴ Scottish Government (2023) [Energy Standards Review - Scottish Passivhaus Equivalent: Working Group](#). Available from: www.gov.scot/groups/energy-standards-review-scottish-passivhaus-equivalent-working-group/ [Accessed 20.08.2024].

¹⁵ Scottish Government (2024) [Building regulations – energy and environmental standards: consultation on proposed changes](#). Available from: www.gov.scot/publications/building-regulations-proposed-changes-energy-environmental-standards/ [Accessed 20.08.2024].

2.1.3 Wales

The [Well-being of Future Generations \(Wales\) Act 2015](#) recognised that, in order to prevent persistent issues such as poverty, health inequalities and climate change, it was essential to consider the long-term implications of decisions. By planning for future generations, it would be possible to create a cohesive, prosperous and resilient Wales that is more equitable and healthier, enjoys a vibrant culture in which the Welsh language can thrive and is recognised as globally responsible.

The [Environment \(Wales\) Act 2016](#) had enshrined in law the requirement to reduce net Welsh emissions by 80% of the baseline by 2050 and the requirement to determine interim emissions targets to reflect the success of implemented measures.

In response to the IPCC [Special Report on Global Warming of 1.5°C - October 2018](#), Wales became the first nation to declare a Climate Emergency in April 2019. Accordingly, 2020-2030 was identified as a decade of action: more progress is required within these ten years than was achieved in the last thirty. Estimates showed that from 2020, greenhouse gas emissions would need to decline by 7.6% every year to 2030 to limit global warming to 1.5°C. Overall, emissions in Wales have fallen by 25% since 1990; however, dramatic reductions will be needed in the next decade, with Welsh Government targeting a 45% reduction by 2030.

[Future Wales: The National Plan 2040 \(2021\)](#) positions the planning system to deliver a prosperous and fairer Wales by normalising efficient use of resources to achieve sustainable lifestyles. It identifies the need for urgent action on carbon emissions with planning mechanisms geared toward helping Wales lead the way in delivering a competitive, sustainable decarbonised society. Decarbonisation commitments and renewable energy targets are promoted as opportunities to build a more resilient and equitable low-carbon economy: however, Net Zero targets are not enshrined in any of the 36 policies.

Most national carbon emission reduction strategies and plans, such as Welsh Government's [Net Zero Wales Carbon Budget 2 \(2021-2025\)](#), recognise that new build homes need to be energy efficient, use non-fossil fuelled energy sources and systems of operation. Buildings are responsible for almost half of the UK's carbon emissions, half of water consumption and about a quarter of all raw materials used in the economy, therefore reducing the impact of new development through planning policy can contribute towards sharp carbon reductions.

[Planning Policy Wales Edition 12 \(2024\)](#) incorporates 'The Energy Hierarchy for Planning' as a direct response to this analysis, mandating the reduction of energy demand as the highest priority for development. This clearly outlines Welsh Government's target of securing zero carbon buildings and the responsibility of the planning system to support development with high energy performance that supports decarbonisation, tackles the causes of the climate emergency and adapts to current and future effects of climate change.

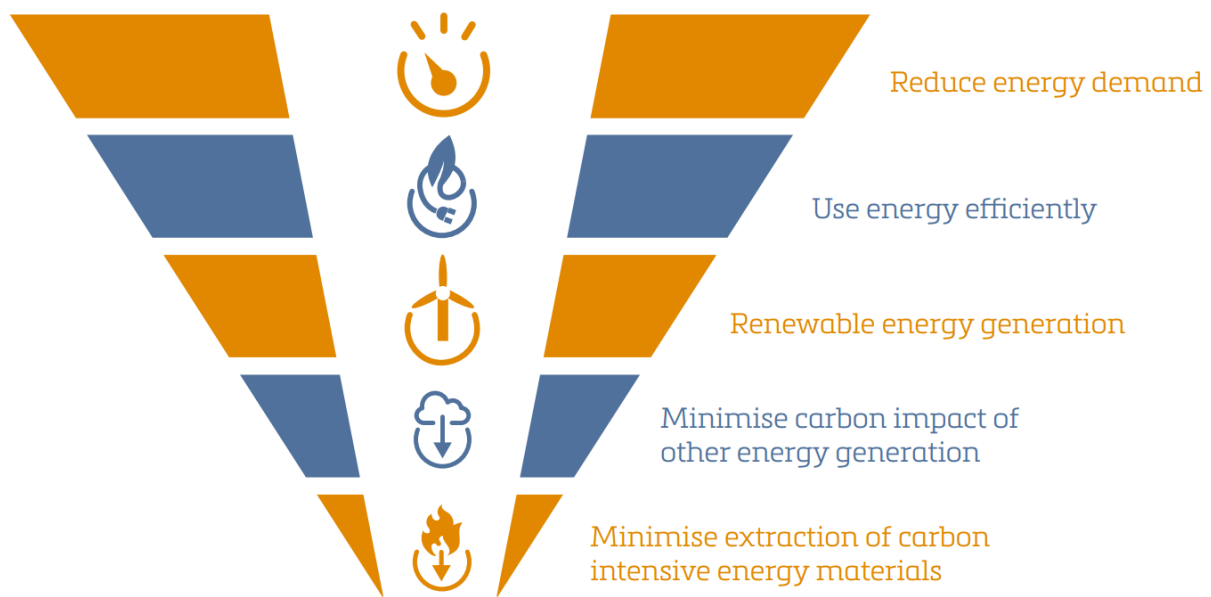


Fig. 1: The Energy Hierarchy for Planning¹⁶

For local and regional authorities, PPW12 suggests adopting an active leadership role with clearly established visions for decarbonisation. It also suggests Major Developments might require an Energy Report to outline how policy objectives could be successfully achieved. While recommending the impacts of both operational and embodied carbon emissions are given due consideration, policy currently leaves the assessment metrics and methodologies at the discretion of local authorities.

However, this is contradicted by a letter from June 2014 by then Minister for Housing and Regeneration Carl Sargeant AC / AM (SF/CS/1694/14) notifying local authorities of his intention to withdraw TAN 22: Planning for Sustainable Buildings upon implementation of Approved Document L (Wales) 2014 and return the setting of building standards to central government¹⁷. Given the age of this letter and evolution of the policy context in the interim, as outlined above, this is considered to hold little weight. In early representations to Welsh Government proposing local energy standards, Vale of Glamorgan Council have received positive feedback.

Heat strategy for Wales (2024) reviews the policy context for affordable warmth and decarbonisation of heating across the built environment. This document recognises heat pumps as the most suitable pathway for the decarbonisation of heat and, alongside supporting local authorities in preparing Local Area Energy Plans with statutory weight, commits to review permitted development rights to facilitate their widespread adoption.

¹⁶ Welsh Government (2024) Planning Policy Wales Edition 12 [online]. Cardiff: Welsh Government. Available from: www.gov.wales/planning-policy-wales [Accessed 21.08.2024]. Page 93.

¹⁷ Welsh Government (2014) SF/CS/1694/14 Planning for Sustainable Buildings [online]. Cardiff: Welsh Government. Available from: www.gov.wales/sites/default/files/publications/2018-11/cl0314-planning-for-sustainable-buildings.pdf [Accessed 21.08.2024].

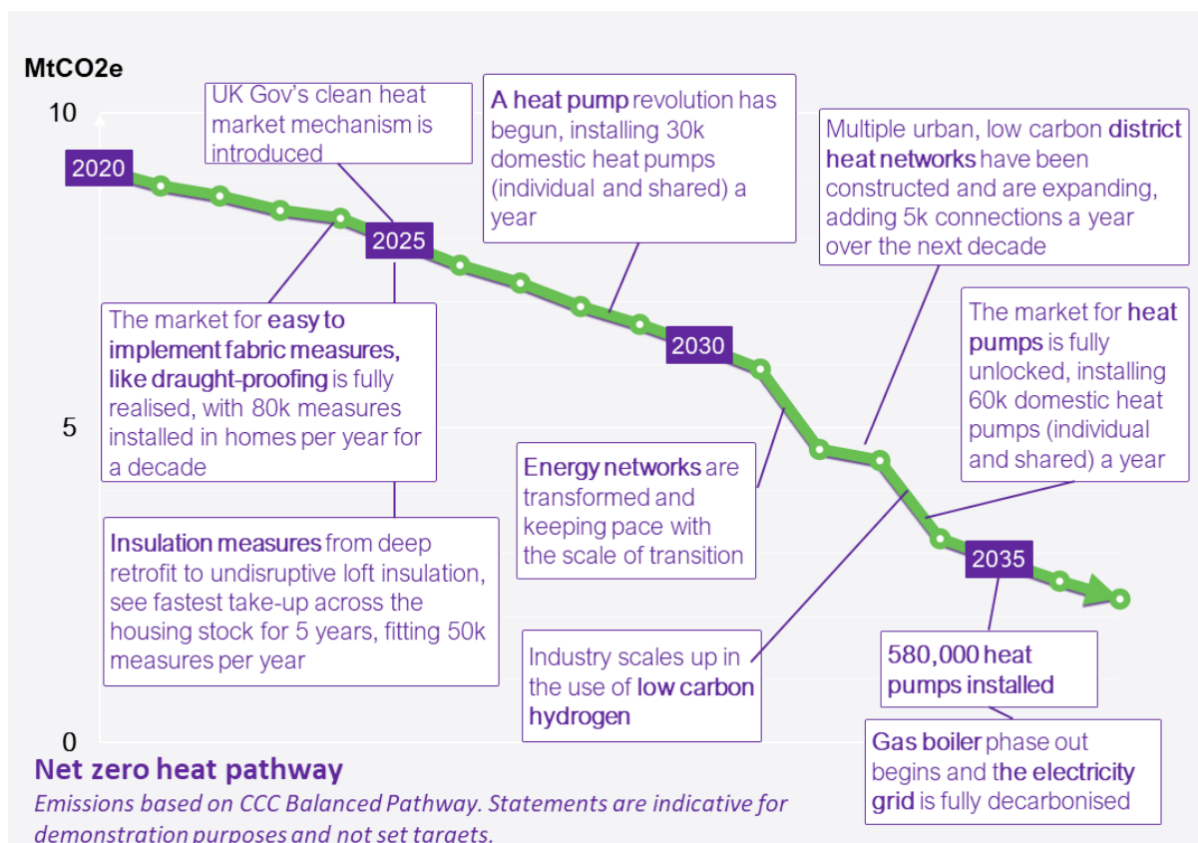


Fig. 2: Emissions pathway for heat in Wales up to 2035 with milestones¹⁸

Approved Document L (Wales) Volume 1 - Dwellings and 2 - Buildings other than dwellings - Conservation of fuel and power 2022 contain emission reduction targets to align with the policy objectives, mandating reductions of 31% for dwellings and 27% for non-domestic builds. While consultation documents for the proposed 2025 standards are not yet public, these suggest a 75% reduction in operational carbon emissions beyond 2014 standards.

¹⁸ Welsh Government (2024) Heat strategy for Wales [online]. Cardiff: Welsh Government. Available from: www.gov.wales/sites/default/files/publications/2024-07/heat-strategy-wales.pdf [Accessed 21.08.2024]. Page 65.

Section 3: Net Zero Policy - Local Authority

3.1 Adopted

Since the IPCC [Special Report on Global Warming of 1.5°C - October 2018](#), over 300 local authorities throughout England and Wales have declared a climate emergency¹⁹. Many are in the process of developing new policies to reduce carbon emissions, mitigate the impacts of anthropogenic climate change and build resilience into their communities.

While carbon reduction targets have been in place for years at a national level - primarily applied through Building Regulations and assessed via SAP methodology - it is only very recently that local authorities have adopted policies to explicitly target decarbonisation. This reflects an evolving understanding of the severity and urgency of the climate crisis and perceived inaction by government and uncertainty in satisfactorily addressing the issue.

Despite the clear wording of the [Planning and Energy Act 2008](#), local authorities had previously been reluctant to implement energy performance targets with the perceived cause being a Written Ministerial Statement dating from 2015²⁰ that thwarted West Oxfordshire's attempt to mandate performance standards at Salt Cross Garden Village²¹.

A Ministerial letter of confirmation in 2021 clarified:

*"Local planning authorities have the power to set local energy efficiency standards through the Planning and Energy Act 2008. In January 2021, [the government] clarified in the Future Homes Standard consultation response that in the immediate term [the government] will not amend the Planning and Energy Act 2008, which means that local authorities still retain these powers."*²²

As described in [2.1 National Net Zero Policy](#) this issue has been further confused by the WMS of 13 December 2023 (which has no legal status in Wales) which contradicts the [National Model Design Code \(2021\)](#) requirement for local authorities to outline Net Zero targets within emerging design code and design guides.

¹⁹ Local Government Association (07 June 2023) [Councils sound alarm on local climate threats](#). Available from: www.local.gov.uk/about/news/councils-sound-alarm-local-climate-threats#:~:text=Over%20300%20councils%20have%20declared,public%20health%2C%20and%20social%20care. [Accessed 21.08.2024].

²⁰ Secretary of State for Communities and Local Government, (2015) [Planning Update](#) [online]. London: The Stationery Office. (UIN HCWS488). Available from: questions-statements.parliament.uk/written-statements/detail/2015-03-25/HCWS488 [Accessed 21.08.2024].

²¹ Donnelly, M., (2022) [Planning Resource: Inspectors back 2,200-home garden village plan but block 'unjustified' net zero development policy](#). Available from: www.planningresource.co.uk/article/1791638/inspectors-back-2200-home-garden-village-plan-block-unjustified-net-zero-development-policy [Accessed 21.08.2024].

²² Pincher, C., (2021) Rt Hon Christopher Pincher MP Minister of State for Housing in reply to Cllr Richard Millard of East Hampshire District Council, 24th January. [Letter]. Available from: [220124 response - Minister of State for Housing.pdf \(dropbox.com\)](#) [Accessed 21.08.2024].

Local authorities have taken different approaches to implementing Net Zero policies. The following have, within their adopted Local Development Plans or Supplementary Planning Documents/ Guidance, been identified as incorporating Net Zero emission targets and/ or mandated targets for operational and embodied energy/ emissions substantially beyond basic levels of compliance with building control.

Local Authority	Policy Document	Date
Bath and North East Somerset	Core Strategy and Placemaking Plan incorporating the Local Plan Partial Update	2023 (Jan.)
Central Lincolnshire	Local Plan	2023 (Apr.)
Cornwall Council	Climate Emergency Development Plan Document	2023 (Feb.)
Lake District National Park	Design Code: Sustainable Design SPD	2023 (Sep.)

How each local authority has implemented Net Zero policies is explored within [3.1.1 Bath & North East Somerset](#), [3.1.2 Central Lincolnshire](#), [3.1.3 Cornwall](#) and [3.1.4 Lake District National Park](#). These sections of the review will present the quantitative targets and thresholds applied: the below summarises the relevant policies.

Local Authority	Operational Emissions
Bath and North East Somerset	SCR6: Sustainable Construction Policy for New Build Residential Development
	SCR7: Sustainable Construction Policy for New Build Non-Residential Buildings
Central Lincolnshire	S7: Reducing Energy Consumption - Residential Development
	S8: Reducing Energy Consumption - Non-Residential Buildings
Cornwall Council	SEC1: Sustainable Energy and Construction
Lake District National Park	Code 2.99: Sustainable Design, Embodied Energy and Construction

Other local authorities have been identified that have adopted policy with less ambitious or specific targets and these are deliberately excluded from this discussion. While well-intentioned, less ambitious targets fail to achieve Net Zero; when quantitative metrics and/ or suitable assessment methodologies are not identified the policies fail to provide clarity to Council Officers or developers as to what is required to demonstrate compliance.

The author acknowledges that, while extensive, not every local authority was researched in the course of this work and it cannot therefore be considered exhaustive: other local authorities may have adopted or be developing similar policy that has not been identified.

3.1.1 Bath & North East Somerset

B&NES were the first local authority to adopt explicit Net Zero strategies, citing uncertainties surrounding the Future Homes Standard as a primary motivation²³ within its *Core Strategy and Placemaking Plan incorporating the Local Plan Partial Update (2023)*.

SCR6: Sustainable Construction Policy for New Build Residential Development mandates targets of:

- Space heating target of 30 kWh/m²/yr;
- Total energy use less than 40 kWh/m²/yr;
- Renewable energy generation equal or greater than the annual electricity demand of the dwelling including all energy use with roof-mounted photovoltaics preferred;
- Connection to a low- or zero-carbon district heating network where available.

SCR7: Sustainable Construction Policy for New Build Non-Residential Buildings requires new build non-residential major development to achieve 100% reduction of regulated operational carbon emissions from *Approved Document L (England) 2013*.

An exclusion clause for major residential and non-residential development facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - and in such scenarios mandates that renewable energy generation must be maximised and the residual on-site renewable generation offset by a financial contribution paid to the Council.

These policies establish clear quantitative thresholds for compliance. B&NES explicitly state that energy use was selected as the assessment metric because it is standalone and does not rely on a baseline derived from Approved Document L, therefore won't require updating with revisions to AD: L, and because energy metrics are considered more technically robust and designed to lead to better building outcomes with an improved focus on fabric²⁴.

This justification for moving away from assessment via SAP is repeated by most local authorities progressing operational Net Zero policy, presumably informed by the analysis of *Making SAP and RdSAP 11 fit for Net Zero: A report for the Department for Business, Energy and Industrial Strategy (2021)*. It has proven particularly prescient considering the commentary within *Whole Life Carbon Assessment for the Built Environment 2nd Edition (2023)* and the proposed replacement of SAP with HEM.

²³ Bath and North East Somerset Council (2023) *Bath and North East Somerset Local Plan: Core Strategy and Placemaking Plan incorporating the Local Plan Partial Update: Volume 1 District-wide Strategy and Policies* [online]. Bath: Bath and North East Somerset Council. Available from: beta.bathnes.gov.uk/policy-and-documents-library/development-plan-core-strategy-placemaking-plan-and-local-plan-partial [Accessed 21.08.2024]. Page 61.

²⁴ *Ibid.*, Page 61.

Since adoption in January the University of Bath in partnership with B&NES Council, Chapter2 Architects and the South West Net Zero Hub compiled a report²⁵ assessing industry reaction to these new policies in the first six months. Key findings were:

- 54% of eligible planning applications did not comply with the new operational energy policy, primarily due to a lack of awareness;
- Compliant applications can be lacking in transparency, hindering scrutiny;
- Providing sufficient renewable generation to match total energy use appears to be the most challenging policy requirement;
- Applicants expressed concern about cost impacts;
- Most applicants believed the policy will be effective in reducing operational and embodied carbon emissions and many signalled their support for the policy intention.

This provides valuable insight into the potential hurdles facing such policies in their current forms. However, as the first local authority to introduce such metrics, the lack of awareness and subsequent number of non-compliant applications should not be considered reflective of the wider industry response.

²⁵ Simaitis, J., Hawkins, W., Shea, A., Allen, S., Marsh, E., Phelps, P., Barnes, A. Daone, R., McCann, A., Bell, A. & Nikolaidou, E. (2023) *Pioneering Net Zero Carbon Construction Policy in Bath & North East Somerset: Investigating the industry's response to the introduction of novel planning policies* [online]. Bath: University of Bath. Available from: doi.org/10.15125/BATHRO-29738880 [Accessed 22.08.2024]

3.1.2 Central Lincolnshire

Central Lincolnshire acknowledge existing buildings are responsible for 43% of greenhouse gas emissions within the locale²⁶. Like B&NES, they also cite the uncertainties surrounding the robustness and timescales for implementation of the Future Homes Standard²⁷ in their reasoning for developing Net Zero policy within the [Central Lincolnshire Local Plan \(2023\)](#).

Policy S7: Reducing Energy Consumption - Residential Development mandates Energy Statements accompany all new residential development to establish compliance with the mandated targets of:

- Renewable energy generation equal or greater than the annual electricity demand of the property including all energy use;
- Space heating target of 15-20 kWh/m²/yr;
- Site average total energy demand of 35 kWh/m²/yr and no dwelling unit to exceed 60 kWh/m²/yr irrespective of on-site renewable energy production.

Policy S8: Reducing Energy Consumption - Non-Residential Buildings requires Energy Statements for all new non-residential development to demonstrate:

- Renewable energy generation: equal or greater than the annual electricity demand of the property including all energy use;
- Space heating target of 15-20 kWh/m²/yr;
- Site average total energy demand of 70 kWh/m²/yr and no unit to exceed 90 kWh/m²/yr irrespective of on-site renewable energy production.

In both instances this must be calculated using a methodology proven to accurately predict building's actual energy performance and captured in the Energy Statements with positive weighting where it can be demonstrated there is a deliverable commitment to post-occupancy evaluation and ongoing monitoring of actual building energy use. Certification to the Passivhaus standards is also considered a route to demonstrating compliance.

Exclusion clauses are included to facilitate development contrary to these measures should it be demonstrated that compliance is unfeasible due to extraordinary site constraints.

These operational emission policies establish clear quantitative thresholds for compliance with exclusion clauses available should they be necessary.

²⁶ Central Lincolnshire Joint Strategic Planning Committee (2023) [Central Lincolnshire Local Plan](#) [online]. Lincoln: Central Lincolnshire Joint Strategic Planning Committee. Available from: www.lincoln.gov.uk/downloads/file/1423/central-lincolnshire-local-plan-2023 [Accessed 22.08.2024]. Page 29.

²⁷ *Ibid.*, Page 30.

3.1.3 Cornwall

Cornwall Council introduced the [Climate Emergency Development Plan Document \(2023\)](#) to address the urgency of the climate crisis. This sets out the requirement for all new development proposals to align with the energy hierarchy and improve fabric standards, energy efficiency and minimise space heating demand before installing renewable energy and then offset residual energy if required: fabric first measures to reduce energy demand must be prioritised. It recognises this is the most sustainable approach that can also contribute to addressing fuel poverty and improving social equity²⁸.

SEC1: Sustainable Energy and Construction requires all new build residential development to target zero operational emissions and low embodied carbon by mandating targets of:

- Space heating target of 30 kWh/m²/yr;
- Total energy use less than 40 kWh/m²/yr;
- Renewable energy generation to match the annual electricity demand of the dwelling including all energy use with roof-mounted photovoltaics preferred.

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised and/ or connection to a low carbon district energy network sought. Once these options have been exhausted, residual on-site renewable generation is to be offset by a financial contribution.

New build non-residential major development (floor space exceeding 1000m²) is to achieve BREEAM 'Excellent' or an equivalent or better methodology.

Where economic viability or technical constraints prevent policy compliance, developments must prioritise fabric-first strategies to target space heating and total energy consumption thresholds. Renewable energy generation must then be maximised and/ or connection to a low carbon district energy network sought: finally, residual on-site renewable generation is to be offset by a financial contribution paid to the Council.

By defining quantitative operational energy targets for residential development, Cornwall Council facilitate a straightforward route to assessing compliance for Council Officers and demonstrating compliance for developers. Major non-residential development has more flexibility with BREAAAM 'Excellent' or an "equivalent or better methodology" but also introduces uncertainty as to what could be considered an equivalent or better methodology.

²⁸ Cornwall Council (2023) [Climate Emergency Development Plan Document](#) [online]. Truro: Cornwall Council. Available from: www.cornwall.gov.uk/planning-and-building-control/planning-policy/adopted-plans/climate-emergency-development-plan-document/ [Accessed 22.08.2024]. Page 37.

3.1.4 Lake District National Park

Lake District National Park applies Net Zero policies through [Design Code: Sustainable Design SPD \(2023\)](#). This supports [Living Lakes, Your Local Plan: Lake District National Park Local Plan 2020-2035 \(2021\)](#).

Code 2.99: Sustainable Design, Embodied Energy and Construction requires all new build residential development to (in order of priority):

- Repair, re-purpose and re-use existing buildings, structures, boundary features and infrastructure in order to capture their embodied carbon;
- Re-use, strengthen or introduce landscape features that will improve the building's energy efficiency by improving its microclimate;
- Use locally-sourced and non-toxic building materials with low embodied carbon that can be recycled or repurposed at the end of the building's life;
- A 'whole house' approach to energy efficiency that considers levels of insulation; orientation; airtightness; natural ventilation and achieving comfortable conditions in periods of warmer and drier weather;
- Design in anticipation of future adaptation;
- Include on-site renewable energy generation that can be easily altered or upgraded;
- Anticipate the need for landscaping, roofing, rainwater goods, etc. to be resilient and capable of dealing with more extreme weather events.

Additional information is then supplied via diagrams of embodied energy (materials and form factor), energy efficiency as impacted by orientation, sustainable design principles and renewable energy placement.

The Energy Hierarchy requires all new development to have a Life Cycle Assessment completed at the design stage and comply with clearly defined operational and embodied thresholds that align with the LETI guidance:

- Energy Use Intensity target of 35 kWh/m²/yr (ex. renewable energy contribution);
- Space heating demand target of 15 kWh/m²/yr;
- Embodied carbon target of <500 kgCO₂e/m².

By defining clear quantitative operational and embodied energy targets for residential development the Lake District National Park facilitates a straightforward route to assessing compliance for Council Officers and demonstrating compliance for developers.

3.2 Emerging

The following table summarises proposed policies by local authorities within emerging plans that incorporate Net Zero emission targets or mandated operational energy/ emissions thresholds substantially beyond nationally mandated standards.

Local Authority	Operational Emissions
Bristol	NZC1: Climate Change, Sustainable Design and Construction
	NZC2: Net Zero Carbon Development - Operational Carbon
Enfield	SE4: Reducing Energy Demand
	SE5: Greenhouse Gas Emissions and Low Carbon Energy Supply
Essex	NZ1: Net Zero Carbon Development (in Operation)
Forest of Dean	Policy LP.1 Sustainable Development
	Policy LP.2 Construction and Use of Buildings
Merton	CC2.2 Minimising Greenhouse Gas Emissions
	CC2.3 Minimising Energy Use
Newham	CE2: Zero Carbon Development
North Somerset	DP6: Net zero construction
Oxford	R1: Net Zero Buildings in Operation
Uttlesford	Core Policy 22: Net Zero Operational Carbon Development
Wiltshire	Policy 85: Sustainable Construction and Low Carbon Energy

The proposed quantitative thresholds for these policies are explored within [3.2.1 Bristol](#), [3.2.2 Enfield](#), [3.2.3 Essex](#), [3.2.4 Forest of Dean](#), [3.2.5 Merton](#), [3.2.6 Newham](#), [3.2.7 North Somerset](#), [3.2.8 Oxford](#), [3.2.9 Uttlesford](#) and [3.2.10 Wiltshire](#).

In Wales, Vale of Glamorgan are also progressing Net Zero operational and embodied policy within the emerging replacement Local Development Plan. While the policy position is not yet resolved enough to include within this assessment, progression of such policy within the Welsh context - in addition to the nearby Bristol, Forest of Dean and North Somerset that build upon implementation by Bath and North East Somerset - suggests the potential for policy alignment throughout the Severn region.

The author acknowledges that, while extensive, not every local authority was researched in the course of this work and it cannot therefore be considered exhaustive: other local authorities may have adopted or be developing similar policy that has not been identified.

3.2.1 Bristol

The [Bristol Local Plan Review: Draft Policies and Development Allocations \(2022\)](#) was drafted to tackle the Climate Emergency and propose ambitious zero carbon reduction targets by 2030. The original policy proposals are presented below.

NZC1: Climate Change, Sustainable Design and Construction provides a broad overview of Bristol's ambition to respond to the climate crisis and directly references **NZC2** and **NZC3**. All new development is required to demonstrate adherence to policy through Sustainability Statements; major non-residential development is expected to achieve BREEAM Excellent and residential or mixed-use development comprising more than 100 residences will require a BREEAM Communities Excellent rating.

Adoption of quality assurance methods such as Passivhaus certification is supported.

NZC2: Net Zero Carbon Development - Operational Carbon will require all new development to target zero operational emissions and submit an Energy Statement demonstrating compliance with proposed targets of:

- Space heating target of 15 kWh/m²/yr;
- Energy use intensity of 35 kWh/m²/yr for new homes;
- Operational energy/ carbon consistent with BREEAM Excellent for major non-residential development;
- Renewable energy generation to match the annual electricity demand of the development including all energy use.

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised with a target of 105 kWh/m²fp/yr. Residual on-site renewable generation is to be either offset by a financial contribution to fund Council-approved renewable energy, low-carbon energy and energy efficiency schemes or agreeing acceptable directly linked or near-site provision.

Passivhaus Classic, Plus and Premium are all offered as alternative routes to compliance that remove the need to meet on-site generation targets or submit a full Energy Strategy.

Development should also, through the Energy Strategy, demonstrate proposals for smart and flexible technologies to reduce peak load and how the most sustainable heating and - only when all passive routes have been exhausted - cooling systems have been selected. Where available, development should prioritise connection to a classified heat network and thereafter employ renewable individual or communal heating systems: no fossil fuels.

Proposed development must address and minimise the performance gap between design aspiration and completed development by implementing a recognised quality regime.

Following inspection the following modifications were made to the operational Net Zero policies, motivated by the WMS of 13 December 2023, and published on 5 July 2024²⁹.

NZC2: Net Zero Carbon Development - Operational Carbon expects all new development to observe the energy hierarchy:

- Minimise demand through energy efficiency measures; then
- Meet its remaining heating and/ or cooling demand sustainably; then
- Maximise on-site renewable energy generation; then
- Meet sector-specific standards and offset any outstanding regulated CO₂ emissions.

New development should demonstrate through an energy strategy set out as part of its Sustainability Statement how these requirements will be met.

Development will be expected to:

- For residential and non-residential development, achieve a 100% reduction in regulated CO₂ emissions from the Target Emission Rate calculated using the appropriate national calculation methodology at point of submission.
- For major non-residential development, achieve the mandatory operational energy and carbon requirements of BREEAM 'Excellent' consistent with policy NZC1.
- Maximise on-site renewable energy to generate > 105 kWh/m²fp/yr.

Where the requirements for CO₂ emission reduction cannot be met by on-site measures, any remaining CO₂ emissions will be met by either financial contribution towards the council's energy offset fund or securing the provision of acceptable directly linked or near-site new additional renewable electricity generation. The latter provision is extended to cover failure to meet the minimum on-site renewable energy generation targets.

Passivhaus Classic, Plus and Premium are all offered as alternative routes to compliance that remove the need to meet on-site generation targets or submit a full Energy Strategy. The Sustainability Statement must still demonstrate that the residual heating/ cooling demand has been sustainably.

Development should also, through the Energy Strategy, demonstrate proposals for smart and flexible technologies to reduce peak load and how the most sustainable heating and -

²⁹ Bristol Council (2024) EXA002 - Local Plan - Schedule of Suggested Main Modifications. Version 1 - Published 05/07/24 [online]. Bristol: Bristol Council. Available from: www.bristol.gov.uk/files/documents/7925-exa001-brief-responses-to-main-issues-raised-in-representations-to-local-plan-publication-version-november-2023-1/file [Accessed 22.08.2024]. Pages 5-11.

only when all passive routes have been exhausted - cooling systems have been selected. Where available, development should prioritise connection to a classified heat network and thereafter employ renewable individual or communal heating systems: no fossil fuels. Major development will be expected to minimise the potential performance gap between design aspiration and completed development by implementing a recognised quality regime from design through to handover. Major development should calculate and report predicted energy use using an energy performance model.

Removal of absolute space heating demand and energy use intensity targets should be understood to be a significant weakening of the policy as it reduces the emphasis on assessment and optimisation of proposals through the design process. As referenced earlier in the document, [Making SAP and RdSAP 11 fit for Net Zero: A report for the Department for Business, Energy and Industrial Strategy \(2021\)](#) and [Whole Life Carbon Assessment for the Built Environment 2nd Edition \(2023\)](#) have demonstrated how current national calculation methodologies are tools for compliance rather than design that are therefore unsuited to delivering Net Zero.

3.2.2 Enfield

The [Enfield Local Plan: Main issues and preferred approaches \(2021\)](#) was drafted to tackle the Climate Emergency and to set an exemplar precedent. The original policy proposals are presented below.

SE4: Reducing energy demand will require all developments resulting in the creation of one or more dwellings or more than 500m² non-residential GIA to achieve the quantitative space heating and operational energy use (energy use intensity: EUI) targets in the table below.

	1 st January 2023 (or Local Plan adopted)	1 st January 2025	1 st January 2030
Space heating	30 kWh/m ² /yr	20 kWh/m ² /yr	15 kWh/m ² /yr
EUI (domestic)	105 kWh/m ² /yr	70 kWh/m ² /yr	35 kWh/m ² /yr
EUI (non-domestic)	170 kWh/m ² /yr	110 kWh/m ² /yr	55 kWh/m ² /yr

Passivhaus equivalent certification will also be considered to demonstrate compliance.

Major developments resulting in the creation of ten or more dwellings or more than 1,000m² non-residential GIA will be required to evaluate operational energy use using realistic information on the intended use, occupancy and operation of the building to minimise the performance gap. This will be demonstrated through compliance with the above targets using a methodology such as PHPP or CIBSE TM54 Operational Energy. There is an additional requirement for major developments to monitor energy usage in the first 5 years of operation for submission to the local authority for their scrutiny.

SE5: Greenhouse gas emissions and low carbon energy supply will require all developments resulting in the creation of one or more dwellings or more than 500m² non-residential GIA to provide an Energy Statement to demonstrate how emissions savings have been maximised at each stage of the energy hierarchy and achieve carbon reductions as outlined below.

	Minimum on-site total reduction in CO ₂	Residual emissions carbon offset fund contribution
Major residential development of ten or more dwellings	Net-zero with minimum 45% on-site reduction	Tiered offset
Minor new build residential development of one or more dwellings	45% minimum on-site reduction with	£1,500 flat fee per dwelling
Minor residential change of use and conversions resulting in the creation of one or more dwellings	35% minimum on-site reduction with	£1,500 flat fee per dwelling

Non-residential development > 500m ² GIA	Net-zero with minimum 45% on-site reduction	Tiered offset
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All major residential developments resulting in the creation of ten or more dwellings and non-residential development of more than 500m² GIA will be required to be Net Zero. A cash in lieu contribution to meet Net Zero will be acceptable only where it has been clearly demonstrated that no further savings are feasible on site due to constraints or limitations.

All new developments resulting in the creation of one or more dwellings or 500m² or more non-residential GIA will be required to install low carbon heating and hot water. New developments should not be connected to the gas grid, except for in exceptional circumstances, and there should be no on-site combustion of fossil fuels.

If connection to a decentralised energy network is not possible, large-scale major developments proposals comprising 200 or more dwellings or 10,000m² or more non-residential GIA will be expected to consider the integration of new energy networks in the development with consideration for future connection to the boroughs heat network. This consideration shall form part of the development proposals and take into account site characteristics and the existing cooling, heat and power demands on adjacent sites where readily available.

All developments will be required to install on-site renewable energy generation equating to a minimum 120 kWh/m²fp/yr unless it can be clearly demonstrated that this is not viable.

Enfield's New Local Plan 2019-2041: Regulation 19 - for consultation (2024) followed to formalise the proposals for examination and was submitted to the Secretary of State on Tuesday 6 August 2024. Within this the two operational Net Zero policies previously proposed were amalgamated into one.

SE4: Reducing energy demand and increasing low carbon energy supply will require all developments resulting in the creation of one or more dwellings or more than 500m² non-residential GIA to:

- Install low carbon heating and hot water with no on-site combustion of fossil fuels for heating. New developments should not connect to the gas grid except in exceptional circumstances.
- Provide an Energy Statement demonstrating how emissions savings have been maximised on site at each stage of the energy hierarchy.
- Achieve carbon reduction, as far as possible on-site meeting minimum reductions as set out in policy, London Plan or subsequent national policy, whichever is higher.

All developments resulting in the creation of one or more dwellings or more than 500m² non-residential GIA should maximise energy efficiency in alignment with the 'Be Lean' stage of the energy hierarchy and achieve the quantitative space heating and operational energy use (energy use intensity: EUI) targets in the table below.

Sector	Space heating demand	Energy use intensity (EUI)
Domestic buildings	15 kWh/m ² /yr	35 kWh/m ² /yr
Industrial buildings		35 kWh/m ² /yr
Schools		65 kWh/m ² /yr
Hotels		160 kWh/m ² /yr
Offices, retail, HE facilities, GP surgeries		70 kWh/m ² /yr

Passivhaus equivalent certification will also be considered to demonstrate compliance.

All major residential developments resulting in the creation of ten or more dwellings and non-residential development of more than 500m² GIA will be required to have a Net Zero energy balance. To deliver this objective a minimum 80 kWh/m²fp/yr on-site renewable energy generation, rising to 120 kWh/m²fp/yr for industrial buildings, should be proposed unless it can be demonstrated this is not practically viable. Roof space should be optimised for photovoltaic, heat pump and/ or green roof installations.

Any shortfall in the Net Zero energy balance is to be either offset by commitment to deliver off-site provision or a financial contribution to the Council.

Major developments resulting in the creation of ten or more dwellings or more than 1,000m² non-residential GIA will be required to evaluate operational energy use using realistic information on the intended use, occupancy and operation of the building to minimise the performance gap. This will be demonstrated through compliance with the above targets using a methodology such as PHPP, CIBSE TM54 Operational Energy or any updating successors.

There is an additional requirement for major developments to monitor energy usage in the first 5 years of operation for submission to the local authority for their scrutiny.

Retaining absolute space heating demand and energy use intensity targets ensures design proposals are informed and optimised through the energy modelling process to deliver technically feasible Net Zero solutions.

3.2.3 Essex

The [Planning Policy Position for Net Zero Carbon Homes and Buildings in Greater Essex \(2023\)](#) has been prepared by the Climate and Planning Unit in response to government's inaction on the Climate Emergency. Policy and evidence prepared centrally by Essex County Council is anticipated to be adopted by all 15 LPAs within Essex.

NZ1: Net Zero Carbon Development (in Operation) will require all new build development resulting in the creation of one or more dwellings or 100m² or more non-residential area to be Net Zero in operation.

Defined space heating targets are:

- 15 kWh/m²/yr for all residential and non-residential typologies except bungalows;
- 20 kWh/m²/yr for bungalows.

All buildings must be fossil-fuel free in operation with no connections to the gas grid. No fossil fuels must be used on-site for heating, hot water and cooking.

Defined energy use intensity targets are:

- 35 kWh/m²/yr for Class C3 and C4 residences;
- 65 kWh/m²/yr for schools;
- 70 kWh/m²/yr for offices;
- 35 kWh/m²/yr for light industrial;
- All other use classes must report EUI.

Renewable energy generation to deliver the greater of: matching the annual electricity demand of the development including all energy use or generating at least 80 kWh/m²fp/yr for all building types and at least 120 kWh/m²fp/yr for industrial.

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised. Residual on-site renewable generation is to be either offset by a financial contribution to fund Council-approved renewable energy schemes in the plan area.

All developments must submit as-built performance information at completion and prior to occupation. In-use energy monitoring is required on a minimum of 10% of dwellings for development proposals of 100 dwellings or more for the first 5 years of operation.

Proposals that are built and certified to the Passivhaus Classic or higher Passivhaus standard are deemed to have met space heating and energy use intensity targets. Developments that

achieve these standards must still be fossil fuel free, demonstrate appropriate renewable energy generation and provide in-use monitoring data.

Absolute space heating demand and energy use intensity targets ensures design proposals are informed and optimised through the energy modelling process to deliver technically feasible Net Zero solutions. Essex are known to be pursuing legal advice on the status of the WMS to ensure the adoption of robust and well-evidenced policy.

3.2.4 Forest of Dean

Forest of Dean District Draft Local Plan: Regulation 18 Consultation Version 2021-2041 (2024) has been developed to promote the move to net zero carbon emissions and enable development to do this while being able to adapt to climate change.

Policy LP.1 Sustainable Development outlines the general requirement for all new development to be sustainable and bring a net positive impact on the environmental, social and economic conditions of the area. Development must contribute to carbon reduction in a manner that supports FoDD being a zero carbon district from 2030 and should be carbon neutral as a minimum.

Small scale development such as domestic extensions and other minor changes will be required to show how they broadly comply with the policy objectives and why any the specific requirements cannot be met. Exceptions may made where a particular location is essential or the development concerned is otherwise acceptable and related to an existing use. These should be considered in the energy assessment.

Policy LP.2 Construction and Use Of Buildings considers delivery of Net Zero Development (operational carbon) and Sustainable Design and Construction (embodied carbon).

To achieve the operational objectives, applications for major developments (10 dwellings or more) must include an Energy Statement to demonstrate how operational net zero will be achieved. This should be done by modelling the proposal's regulated energy consumption and overall renewable energy (electricity and heat) generation using a recognised industry calculation method. Numerical figures for both space heating demand and total regulated energy use should be provided.

Proposals should aim to achieve:

- < 15 kWh/m²/yr space heating demand;
- < 35 kWh/m²/yr EUI; and
- > 120 kWh/m²/yr on-site renewable electricity generation.

***N.B.** The precise wording of the document states on-site electricity generation should amount to "120 kWh/m²/annum or less". This is assumed to be a typographical error.*

Developers would be required to notified the LPA of any significant difference between modelled outputs between the planning application and building completion. Fabric energy efficiency is prioritised as far as possible in accordance with the energy hierarchy.

It is stated that building to Passivhaus standard or equivalent will be regarded favourably.

Where Net Zero emissions are not achieved through fabric energy efficiency, proposals will demonstrate how remaining energy demand will be supplied through on-site renewable energy generation (e.g. photovoltaics, heat pumps, etc.) unless demonstrated that these are economically unviable or technically unfeasible at point of construction. Proposals should not inhibit the future integration of zero and low carbon technologies.

An exclusion clause allows any outstanding emissions to be balanced through an allowable off-site renewable energy solution or via an LPA approved Offset Fund, in agreement with the LPA, through a planning obligation.

All buildings must be fossil-fuel free in operation with no connections to the gas grid unless it can be demonstrated to be the only viable means of heating buildings.

Non-major development (fewer than 10 dwellings) will be expected to demonstrate how they have endeavoured to achieve Net Zero and provide valid justifications if they are unable to do so. Non-residential buildings will be expected to achieve a rating of BREEAM excellent or equivalent.

To achieve the embodied objectives, applications for major developments (10 dwellings or more) will have to demonstrate through the Design and Access Statement - starting at pre-application stage - how associated environmental impacts have been minimised through building design and specification of construction materials and methods.

New development should aim for a benchmark of 500 kgCO₂e/m² for embodied carbon. All major non-residential development will be expected to demonstrate sustainability through attaining BREEAM Excellent or equivalent.

***N.B.** The precise wording of the document states a benchmark of "500 kgCO₂e/m²/yr". Addition of the yearly basis is assumed to be a typographical error, erroneously carried from operational metrics.*

While the proposed space heating demand, energy use intensity and renewable generation targets are laudable, the current language of the proposals suggests they are advisory rather than strictly compulsory. This uncertainty this could generate regarding the necessity of achieving these targets could undermine successful implementation of the policy. Similarly, two errors were identified in the targets/ metrics.

3.2.5 Merton

The [Merton Local Plan: Publication Stage 3 \(2021\)](#) aims to achieve net-zero carbon by 2050 by reducing greenhouse gas emissions and increasing local resilience to the impacts of a changing climate through sustainable design. Original policy proposals are presented below.

CC2.2 Minimising Greenhouse Gas Emissions establishes the general principles to be adopted in alignment with [The London Plan \(2021\)](#). These are to:

- Be lean: use less energy and manage demand during operation;
- Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly;
- Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site;
- Be seen: monitor, verify and report on energy performance.

All new developments resulting in the creation of one or more dwellings or 500m² or more non-residential GIA will be required to provide an Energy Statement to demonstrate how emissions savings have been maximised at each stage of the energy hierarchy and achieve carbon reductions as outlined below.

Development Type	Minimum on-site total CO ₂ reduction
Major residential development of ten or more dwellings	60%
Minor new build residential development of one or more dwellings	60%
Minor residential change of use and conversions resulting in the creation of one or more dwellings	35%
Non-residential development > 500m ² GIA	50%

CC2.3 Minimising Energy Use will require all developments resulting in the creation of one or more dwellings or more than 500m² non-residential GIA to achieve the space heating targets in the table below.

	31 st December 2022	1 st January 2023 - 31 st December 2024	1 st January 2025
Blocks of flats and mid-terrace houses	43 kWh/m ² /yr	39 kWh/m ² /yr	15 kWh/m ² /yr
Semi-detached and detached houses	52 kWh/m ² /yr	46 kWh/m ² /yr	20 kWh/m ² /yr
Non-residential	15% uplift on BR	15% uplift on BR	15 kWh/m ² /yr

There is an additional requirement for major developments to monitor energy usage in the first 5 years of operation for submission to the local authority. Discussion highlights:

"It is widely accepted that there is a significant performance gap between the energy use and carbon emissions estimated at design stage and the actual in-use performance of buildings using the current Building Regulations Part L methodology, and that this needs to be addressed in order to genuinely make our buildings net-zero carbon. The Part L methodology uses carbon emissions as the main performance metric which is dependent on the carbon factor of the electricity grid and does not necessarily reflect good operational performance. The UK Passivhaus Trust found that new build houses have an average performance gap of 40% between the actual overall energy use compared to the EPC modelling carried out at design stage which means that buildings are emitting significantly more carbon than predicted using the SAP methodology."

[...]

"In addition, current Building Regulations (2013) do not address unregulated emissions associated with cooking, white goods and other equipment which can represent up to 50% of a building's operational emissions. Operational performance of buildings therefore cannot be verified using the Part L methodology. The CCC has highlighted the importance of improving building performance monitoring and focussing on 'as built' performance in order to close this performance gap which could deliver £70-260 in annual bill savings per household."

[...]

"In order to improve our understanding of energy demand and drive more energy efficient design of buildings, Merton Council requires all developments resulting in the creation of 1 or more dwellings or 500sqm or more non-residential GIA to determine their anticipated EUI, at planning and pre-occupation stage. Major schemes will need to calculate the anticipated regulated and unregulated energy demand, and combined EUI, using the CIBSE TM54 methodology, Passive House Planning Package (PHPP) methodology or equivalent, or successor methodologies. Minor residential schemes resulting in the creation of one or more dwellings will need to estimate the expected regulated and unregulated energy demand, and combined EUI, using the Part L methodology or equivalent, or successor methodologies."

[...]

"Developments are also encouraged to adopt recognised and successful fabric first approaches such as Passivhaus which is seen as the most stringent low 'energy in use' standard and is consistent with LETI's Climate Emergency Design Guide. This standard also relies on a more accurate energy demand assessment methodology

using the Passive House Planning Package (PHPP). ”³⁰

Following consultation and examination a round of modifications were made to the operational Net Zero policies. Amended proposals were published in February with schedules of modifications in May^{31 32}.

CC2.2 Minimising Greenhouse Gas Emissions establishes the general principles to be adopted in alignment with [The London Plan \(2021\)](#). These are to:

- Be lean: use less energy and manage demand during operation;
- Be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly;
- Be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site;
- Be seen: monitor, verify and report on energy performance.

All new developments resulting in the creation of one or more dwellings or 500m² or more non-residential GIA will be required to provide an Energy Statement to demonstrate how emissions savings have been maximised at each stage of the energy hierarchy and achieve carbon reductions as outlined below.

Development Type	Minimum on-site total CO ₂ reduction	Benchmark reduction in total CO ₂
Major residential development of ten or more dwellings	35%	50%+
Minor new build residential development of one or more dwellings	35%	50%+
Minor residential change of use and conversions resulting in the creation of one or more dwellings	35%	-
Office buildings of 500m ² GIA or more (including new build, change of use and major refurbishments)	25%	-
School buildings of 500m ² GIA or more (including new build, change of use and major refurbishments)	35%	-
Industrial buildings of 500m ² GIA or more (including new build, change of use and major refurbishments)	35%	-

³⁰ Merton Council (2021) [Merton Local Plan: Publication Stage 3](#) [online]. London: Merton Council. Available from: www.merton.gov.uk/planning-and-buildings/planning/local-plan/newlocalplan/climate-change [Accessed 22.08.2024]. Pages 54-56.

³¹ Merton Council (2024) [LBM39 - Schedule of Main Modifications May 2024](#) [online]. London: Merton Council. Available from: www.merton.gov.uk/system/files/lbm44_schedule_of_main_modifications_with_lbms_suggested_post_consultation_changes_may_2024.pdf [Accessed 22.08.2024]. Pages 6-13.

³² Merton Council (2024) [LBM40 - Schedule of Additional Modifications May 2024](#) [online]. London: Merton Council. Available from: www.merton.gov.uk/system/files/lbm45_schedule_of_additional_modifications_merton_may_2024.pdf [Accessed 22.08.2024]. Pages 7-9.

Hotel of 500m ² GIA or more (including new build, change of use and major refurbishments)	10%	-
All other non-residential development of 500m ² GIA or more (including new build, change of use and major refurbishments)	35%	-

Compliance with the Mayor's net-zero carbon target must be demonstrated. Where clearly demonstrated that the net-zero carbon target cannot be fully achieved on site beyond the minimum requirements the policy allows for cash in lieu contribution to Merton's offset fund or appropriate off-site provision where additionality and certainty of delivery are proven.

CC2.3 Minimising Energy Use will require all developments resulting in the creation of one or more dwellings or more than 500m² non-residential GIA to achieve the space heating targets in the table below.

	Zero Carbon Hub Interim FEES until 31 st December 2022	Zero Carbon Hub Full FEES between 1 st January 2023 - 31 st December 2024	Space Heating Demand Target from 1 st January 2025
Blocks of flats and mid-terrace houses	< 43 kWh/m ² /yr	< 39 kWh/m ² /yr	< 15 kWh/m ² /yr
Semi-detached and detached houses	< 52 kWh/m ² /yr	< 46 kWh/m ² /yr	< 20 kWh/m ² /yr
Non-residential	-	-	< 15 kWh/m ² /yr

Applicants must demonstrate how energy demand for both regulated and unregulated uses has been minimised on site through passive measures and maximising the efficiency of the building form, fabric and systems with EUI to be disclosed at design and pre-occupation.

There is an additional requirement for major developments to monitor energy usage in the first 5 years of operation for submission to the local authority.

Retaining absolute space heating demand targets ensures design proposals are informed and optimised through the energy modelling process, despite conflict with the WMS. Disclosure of EUI prior to occupation provides transparency on delivered developments so Merton can assess how successfully approved proposals are delivered. Monitoring of major development enables Merton to assess the margin of any potential performance gap.

3.2.6 Newham

The [Newham Draft Local Plan \(Regulation 18\) \(2022\)](#) was drafted to tackle the Climate Emergency to meet commitments to be carbon neutral by 2030 and carbon zero by 2045.

CE2: Zero Carbon Development will require all new development to achieve space heating, energy use intensity and renewable generation targets to be Net Zero in operation. New development must not use fossil fuels for heating or energy, must not connect to the gas grid and should meeting the following standards for space heating demand, energy use intensity and on-site renewable generation.

Metric	Compliance Threshold
Space heating demand	• 20 kWh/m²/yr for dwellings and non-domestic ex. industrial buildings • 15 kWh/m²/yr for industrial buildings
Energy use intensity	• 35 kWh/m²/yr for dwellings and student accommodation • 55 kWh/m²/yr for offices, retail, higher education teaching facilities, GP surgeries and hotels • 65 kWh/m²/yr for schools • 100 kWh/m²/yr for leisure, warehouses and light industrial units (additional 20 kWh/m²/yr budget for units operating 24 hours a day)
On-site renewable generation	At least the predicted annual energy demand and: • 80 kWh/m²/yr per building footprint of all typologies ex. industrial • 120 kWh/m²/yr per building footprint of industrial buildings

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised with residual on-site renewable generation offset by funding renewable energy generation elsewhere in the borough through a financial contribution to the Council.

New development must demonstrate delivery of the approved performance and minimise the 'performance gap' by demonstrating and committing to use of an assured performance method. There is an additional requirement for major developments to monitor energy usage in the first 5 years of operation for submission on an annual basis to Newham.

Following consultation, a round of modifications were made to the operational Net Zero policies with amended proposals were finalised and published in June within [Newham Draft Submission Local Plan \(Regulation 19\) \(2024\)](#). It should be highlighted that the revised policy remains substantially unchanged from the original, despite conflict with the WMS, reflecting the commitment of the local authority to deliver technically robust Net Zero policy.

CE2: Zero Carbon Development will require all new development to achieve space heating, energy use intensity and renewable generation targets to be Net Zero in operation. New development must not use fossil fuels for heating or energy, must not connect to the gas grid and should meeting the following standards for space heating demand, energy use intensity and on-site renewable generation.

Metric	Compliance Threshold
Space heating demand	• 20 kWh/m²/yr for dwellings and non-domestic ex. industrial buildings • 15 kWh/m²/yr for industrial buildings
Energy use intensity	• 35 kWh/m²/yr for dwellings and student accommodation • 55 kWh/m²/yr for offices, retail, higher education teaching facilities, GP surgeries and hotels • 65 kWh/m²/yr for schools • 100 kWh/m²/yr for leisure, warehouses and light industrial units (additional 20 kWh/m²/yr budget for units operating 24 hours a day)
On-site renewable generation	At least the predicted annual energy demand and: • 80 kWh/m²/yr per building footprint of all typologies ex. industrial • 120 kWh/m²/yr per building footprint of industrial buildings

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised. Residual on-site renewable generation is to be offset by funding renewable energy generation elsewhere in the borough through a financial contribution to the Council.

New development must demonstrate delivery of the approved performance and minimise the 'performance gap' by demonstrating and committing to use of an assured performance method (e.g. AECB or Passivhaus). There is an additional requirement for major developments to monitor energy usage in the first 5 years of operation for submission on an annual basis to Newham.

Despite the conflict with the WMS, retaining absolute space heating demand, EUI and on-site renewable generation targets ensures design proposals are informed and optimised through the energy modelling process.

3.2.7 North Somerset

The [North Somerset Local Plan 2039: Pre-submission Plan \(2023\)](#) has been developed in response to the declared climate emergency. Proposed policies aim to respond to an impending cultural transformation which reflects a more responsible attitude to climate change and the use of resources.

DP6: Net Zero Construction will require all new development to target zero operational emissions. Adherence to the energy hierarchy ensures building design prioritises energy reduction through highly energy efficient fabric measures, lighting, ventilation and orientation. Once energy demand is minimised and efficiency design measures in place, renewable energy technologies can then be used to meet residual energy demand.

All new development will be required to minimise embodied carbon in respect of both upfront (emissions associated with raw materials, transportation, manufacturing and construction) and whole life carbon. For development of more than 50 dwellings, or in excess of 5,000m² non-residential floorspace, proposals must be accompanied by an embodied carbon assessment which demonstrates upfront embodied carbon emissions do not exceed 900 kgCO₂e/m².

Additionally, retaining existing buildings is to be given preference to demolition. Retrofitting energy efficiency measures in existing buildings will be supported and significant weight given to the benefits of development resulting in considerable improvements to energy efficiency. All proposals must demonstrate high standards of insulation with the EnerPhit standard encouraged.

All new residential development must submit an Energy Statement demonstrating compliance with proposed targets of:

- No fossil fuels;
- Space heating demand of 15 kWh/m²/yr;
- Energy use intensity of 35 kWh/m²/yr;
- Renewable energy generation to match the annual electricity demand of the development including all energy use.

Passivhaus Plus is offered as an alternative means of demonstrating compliance.

All new non-residential development must submit an Energy Statement demonstrating compliance with proposed targets of:

- No fossil fuels;
- Energy use intensity minimised appropriate to the end use;

- Renewable energy generation is maximised, equivalent to at least the annual electricity demand of the development including all energy use;
- End users report actual energy use in operation for five years post-completion.

BREEAM Excellent is offered as an alternative means of demonstrating compliance with particular emphasis on achieving Outstanding level for energy use (Ene01). Other suitable alternatives may be allowed subject to prior agreement.

An exclusion clause facilitates approvals where meeting renewable generation targets on-site is technically unfeasible - due, for example, to the typology (i.e. apartments) - and in such scenarios mandates that renewable energy generation must be maximised with any residual generation met off-site.

The policy ends by reiterating that energy use intensity and space heating targets should be prioritised regardless of any district heating connection and all reasonable efforts made to meet these requirements prior to buildings connecting to a district heating network.

Due to publication in October 2023 this policy cannot be considered to reflect the position of North Somerset in response to the WMS.

3.2.8 Oxford

The [Oxford Local Plan 2040: Submission Draft \(2023\)](#) has been developed in response to the declared climate emergency. Policies aim to prepare the city for a net zero carbon future and the commitment to be net zero city by 2040.

R1: Net Zero Buildings in Operation will require all new development to target zero operational emissions and submit an Energy and Carbon Statement demonstrating compliance with proposed targets of:

- Designing in accordance with the energy hierarchy;
- Energy use intensity of 35 kWh/m²/yr for residential;
- Energy use intensity of 70 kWh/m²/yr for non-residential;
- Space heating portion of EUI no greater than 20 kWh/m²/yr;
- No fossil fuels;
- Renewable energy generation to match the annual electricity demand of the development including all energy use;
- Specified approach for post-occupancy evaluation to ensure operational performance aligns with calculated predictions.

An exclusion clause facilitates approvals where meeting targets is unfeasible. In such scenarios, development proposals will have to demonstrate:

- Full details of where criterion cannot be met must be provided and justified with explanation of the reasonable attempts to meet it;
- Clarification that all other criteria are met or exceeded;
- The proposal is overall net zero carbon in operation, using no fossil fuels and with offsets employed as a last resort to achieve the standard.

All energy calculations required for this policy will need to be undertaken using an approved methodology. CIBSE TM54 is identified as the most appropriate methodology with the [Energy and Carbon Technical Advice Note \(TAN\)](#) expanding on this with additional guidance.

This document was submitted to the Secretary of State for Levelling Up, Communities and Housing on 28th March to commence public examination. Oxford City Council are awaiting a written response from the Inspectors' to outline how to progress the Examination.

3.2.9 Uttlesford

Uttlesford District Council's [Uttlesford Draft Local Plan 2021-2041 \(Regulation 18\) \(2023\)](#) outlines the strategic objectives for addressing climate change and meeting future development needs. It should be noted that Uttlesford is in Essex and as such Net Zero operational carbon policy has been informed by that introduced in [3.2.3 Essex](#).

Core Policy 22: Net Zero Operational Carbon Development will require all new build development resulting in the creation of one or more dwellings or 100m² or more non-residential area to be Net Zero in operation. They must be fossil-fuel free in operation with no connections to the gas grid. No fossil fuels must be used on-site for heating, hot water and cooking.

Defined space heating targets are:

- 15 kWh/m²/yr for all residential and non-residential typologies except bungalows;
- 20 kWh/m²/yr for bungalows.

Defined energy use intensity targets are:

- 35 kWh/m²/yr for Class C3 and C4 residences;
- 65 kWh/m²/yr for schools;
- 70 kWh/m²/yr for offices;
- 35 kWh/m²/yr for light industrial;
- All other use classes must report EUI.

In exceptional circumstances on larger residential developments the 35 kWh/m²/yr requirement for EUI may be met as a site-wide residential average provided no single dwelling exceeds 60 kWh/m²/yr.

Renewable energy generation to deliver the greater of: matching the annual electricity demand of the development including all energy use or generating at least 80 kWh/m²fp/yr for all building types and at least 120 kWh/m²fp/yr for industrial.

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised. Residual on-site renewable generation is to be either offset by a financial contribution to fund Council-approved renewable energy schemes in the plan area.

All developments must submit as-built performance information at completion and prior to occupation. Major development should submit a recalculation of energy performance using the as-built specification and minor development should reconfirm the specification to which

it has been built. In-use energy monitoring is required on a minimum of 10% of dwellings for development proposals of 100 dwellings or more for the first 5 years of operation.

Proposals that are built and certified to the Passivhaus Classic or higher Passivhaus standard are deemed to have met space heating and energy use intensity targets. Developments that achieve these standards must still be fossil fuel free, demonstrate appropriate renewable energy generation and provide in-use monitoring data as necessary.

Absolute space heating demand and energy use intensity targets ensures design proposals are informed and optimised through the energy modelling process to deliver technically feasible Net Zero solutions. For the avoidance of doubt, Uttlesford explicitly define energy use intensity within the wording of the policy as including both regulated and unregulated energy but excluding electric vehicle charging.

3.2.10 Wiltshire

The [Wiltshire Local Plan Pre-Submission 2020-2038 \(Regulation 19\) \(2023\)](#) is designed to help mitigate and adapt to climate change by contributing to the delivery of sustainable development, helping ensure communities are resilient to the unavoidable consequences of climate change.

Policy 85: Sustainable Construction and Low Carbon Energy requires all new build residential development to target zero operational emissions and low embodied carbon by mandating targets of:

- Space heating target of 30 kWh/m²/yr;
- Total energy use less than 40 kWh/m²/yr;
- Renewable energy generation to match the annual electricity demand of the dwelling including all energy use with roof-mounted photovoltaics preferred;
- Connection to a district heating network where available.

Major non-residential development is to achieve BREEAM Excellent and Net Zero in operational emissions following the hierarchy of minimising energy use; connecting to a heat network where available; maximise opportunities for renewable generation.

An exclusion clause facilitates approvals where meeting renewable generation targets is unfeasible - due, for example, to the typology (i.e. apartments) - or unviable and in such scenarios mandates that renewable energy generation must be maximised. Once these options have been exhausted, residual on-site renewable generation is to be offset by developer contributions paid to the Council.

Absolute space heating demand and energy use intensity targets ensures design proposals are informed and optimised through the energy modelling process to deliver technically feasible Net Zero solutions. Due to publication in October 2023 this policy cannot be considered to reflect the position of Wiltshire Council in response to the WMS.

Section 4: Summary

4.1 Summary

The policies reviewed within this report demonstrate a wide range of ambitions. Most pertinent to developing an appropriate policy approach is identifying the most appropriate and technically robust metrics and methodologies for assessment.

Quantitative operational energy metrics establish clear thresholds for compliance that are considered technically robust and are designed to lead to better building outcomes with an improved focus on fabric. Baselines derived from Approved Document L inevitably fall out of step with revisions to the document and quickly fail to accurately reflect current regulations. Calculations through SAP for Building Regulations compliance are explicitly forbidden as a WLCA energy assessment methodology: the replacement Home Energy Model (HEM), while intended to overcome the shortcomings of SAP, remains an unknown quantity that has not been finalised and may still operate without local weather data.

Heating demand is considered the most appropriate operational energy metric to ensure the prioritisation of a fabric first approach. Energy use intensity as a secondary metric motivates the specification of high efficiency heating and hot water systems.

Incremental improvements to these standards through the lifecycle of the plan could enable Monmouthshire County Council to onboard the local supply chain at a relatively deliverable point and subsequently leverage increasing levels of building performance as the knowledge and skills within the local ecosystem improve. However, it is understood that pent-up local demand is likely to result in the majority of applications being made immediately following adoption, in which case this could unintentionally increase overall emissions by committing the policy position at the time to a lower standard.

Alternative routes to compliance that introduce additional quality assurance methodologies to bridge the performance gap - such as AECB CarbonLite or Passivhaus certification - should be considered.

Exclusion clauses should be considered to facilitate approvals where compliance is unfeasible or unviable and in such scenarios proposed development should adhere to the Energy Hierarchy with residual emissions offset by financial contributions as the last resort.

4.2 Evidence Base

In addition to the summaries presented within this report and the excerpts of relevant policy supplied in the Appendix, the evidence base for each local authority is available to access via the following hyperlinks.

Adopted
B&NES
Central Lincolnshire
Cornwall
Lake District National Park

Emerging
Bristol
Enfield
Essex
Forest of Dean
Merton [Delivering Net Zero evidence base]
Newham
North Somerset
Oxford
Uttlesford
Wiltshire

Section 5: Monmouthshire Net Zero Policy

5.1 Review

Monmouthshire County Council have developed the following draft policy position for the emerging [Replacement Local Development Plan 2018-2033](#).

Policy NZ1 - Monmouthshire Net Zero Carbon Homes

All new build residential development will be required to demonstrate that the standards outlined below are met through the submission of an appropriate energy assessment with any planning application for a new home.

Development proposals for new homes must demonstrate that the new home/s meets the following:

- Space heating demand less than 15/20/30 kWh/m²/annum;
- Evidence and achieve an energy performance rating of 'A' EPC or appropriate equivalent;
- Energy consumption generated by heating, hot water and lighting (regulated energy) must be generated by renewables on the dwelling or via the overall development (generated energy balance – net zero);
- New homes should not connect to the gas grid and all heating should be provided through low carbon heating systems. No fossil fuels are to be used onsite;
- ULEV charging infrastructure.

All developments must submit an as built performance survey following construction and prior to occupation of the home/s to demonstrate that they have been built to the standards outlined above.

Establishing an absolute space heating demand is the most technically robust way to align development with Welsh Government's Energy Hierarchy for Planning and deliver Net Zero. By establishing a maximum threshold, development teams are required to engage with energy modelling during the design process to quantify the impact of decisions on building performance. This enables - and promotes - the optimisation of buildings prior to planning to deliver appropriately energy efficient dwellings in the most cost-effective manner.

Fixed targets for space heating demand will be determined by the outcome of both [Work Stage 2.2 Technical Feasibility](#) and [Work Stage 3.1 Cost Analysis](#) in consultation with the development industry.

While aspirational space heating demand targets prioritise fabric and ventilation efficiencies, EPC A has a less clear emphasis. This is in part because SAP calculates different reportable

outputs using either local or UK average climate data³³ but primarily because all calculations are made with reference to a notional building. The notional building has identical geometry and orientation to the assessed dwelling, applying a set of reference values to the building specification including fabric and glazing u-values, heating and ventilation systems and renewable provisions. As such, no benefit is recognised by optimising orientation or form factor - the notional building shifts with the proposal - but adding additional photovoltaics substantially elevates ratings.

As an example of the limitation of this assessment methodology, flatted development with three or more floors of apartments can represent a highly efficient form factor with greatly reduced space heating demand. However, because of the limited roof space available on which to install photovoltaics it is often highly problematic - if not technically unfeasible - to achieve EPC A.

EPC ratings are not absolute: if it were appropriate to do so, re-evaluating a property using SAP³⁴ would result in different ratings under each revision of the Approved Documents and each version of SAP. Further, Home Energy Model (HEM) was published for consultation in Spring 2024 with the expectation it will supersede SAP in 2025. The precise methodology for how the new software will assess priorities and confer ratings is not yet confirmed.

Annual generation of at least the annual regulated energy consumption of a dwelling using on-site renewables could leverage utilisation of heat pump and similar technologies to reduce the energy required for heating and hot water needs. However, it is unlikely to achieve the same overall reductions in consumption as prescriptive EUI targets and, if only extended to regulated energy, cannot be correctly termed Net Zero in operation: it is at best Net Zero-ready, relying upon full decarbonisation of the electricity grid.

Mandating against connection to the gas network and use of fossil fuels champions Welsh Government's position on decarbonising heat, initially introduced in [Welsh Development Quality Requirements 2021](#). Such policy actively supports the uptake of heat pump and associated technologies, increasing demand for such installations to upskill local supply chains and facilitate a transition to decarbonised heat.

ULEV/ EV charging infrastructure will be a critical component of every development as private transport continues to decarbonise via electrification. Current wording does not clarify if charging points are to be provided - or at what rate - or if developers would only need to install duct runs to accommodate future installation.

Submission of as-built surveys provides transparency on delivered developments so MCC can assess how successfully approved proposals are delivered.

³³ EPC rating, energy use and energy cost are calculated using local climate data. SAP and Environmental Impact ratings, Target Fabric Energy Efficiency (TFEE), Target Emission Rate (TER), Target Primary Energy Rate (TPER) and the dwelling specific outputs are calculated using UK average climate data.

³⁴ rdSAP must be used for completed dwellings. Full SAP assessment is counter to approved methodology.

5.2 Recommendations

As the first local authority in Wales to propose policy targeting operational Net Zero within a Local Development Plan, Monmouthshire County Council only have precedents to study from English local authorities. While Vale of Glamorgan Council are developing similar policy they have not progressed as far through the LDP process. Recommendations are therefore based upon the successful elements of the adopted and emerging policies.

Quantitative operational energy metrics establish clear thresholds for compliance that are considered technically robust and are designed to lead to better building outcomes with an improved focus on fabric.

Heating demand is considered the most appropriate operational energy metric to ensure the prioritisation of a fabric first approach and can be supported by energy use intensity (EUI) as a useful secondary metric to promote the specification of high efficiency heating and hot water systems. Thresholds should be informed by modelling of residential archetypes to establish technical feasibility and viability.

Assessment of the metrics should be undertaken by appropriate calculation methodologies. RICS [Whole Life Carbon Assessment for the Built Environment 2nd Edition \(2023\)](#) identifies suitably robust energy performance assessment procedures developed by and used within industry. Alignment with expert guidance is readily justifiable and would ensure the validity of the policy throughout the life of the LDP.

EPC A or equivalent could be removed from the assessment criteria as the future of the SAP/ HEM landscape beyond 2025 is unclear: compliance with heating demand, EUI and renewable energy generation targets is more easily quantified. A further benefit is that the energy assessment methodologies identified by RICS are integrated design tools which can facilitate optimisation of building design and add value.

Consideration of regulated energy in isolation only delivers Net Zero-ready buildings which rely on the full decarbonisation of the grid and does not align with UK WLCA operational energy use calculations. As with regulated energy, unregulated usage can vary significantly from household to household: however, appropriate assessment methodologies will provide representative figures based on average consumption rates. As defined at the start of the document, EUI is commonly used and understood to capture all building/ occupant-related energy consumption excluding the charging of electric vehicles.

Balancing on-site energy consumption with an equivalent amount of on-site renewable energy generation does not technically achieve Net Zero unless production can be coordinated to coincide with demand - energy cannot be stored without incurring losses and further emissions and losses arise from exporting to and importing from the grid - however,

it is the precedent that has been set by other local authorities and compliance is relatively straightforward to assess.

Balancing EUI (regulated and unregulated) versus regulated only is a matter of increasing on-site renewable provisions, most commonly achieved by increasing the size of proposed photovoltaic arrays. Minimum renewable generation requirements could be introduced to complement this policy.

If the policy ambition is to deliver Net Zero-ready buildings that only account for regulated energy use - or technical feasibility and cost analysis resolve this as the only viable option - this should be clearly articulated in its naming and wording.

Exclusion clauses could be considered for all discussed metrics to facilitate approvals where compliance is unfeasible or unviable. In such scenarios, proposed development would need to demonstrate application of the Energy Hierarchy to the highest degree with residual emissions offset by financial contributions to fund additional renewable installations as the last resort.

The position proposed by Monmouthshire regarding fossil fuels is consistent with both that proposed by many other local authorities and the position adopted by Welsh Government in 2021 for the delivery of grant funded social housing.

ULEV/ EV charging requirements should be developed in more detail to clarify if charging points or infrastructure is required and what rate of charging points should be provided (unless addressed within a separate policy).

Alternative routes to reporting compliance with energy performance targets that introduce additional quality assurance methodologies to bridge the performance gap - such as AECB CarbonLite or Passivhaus certification - could be considered to improve the quality of delivered development. This could be delivered within the supporting text.

Developed in alignment with these recommendations the following page presents a revised policy wording for discussion. All performance thresholds are highlighted yellow as they will need to be determined by the outcomes of technical feasibility, viability and consultation with the local development industry.

Policy NZ1 - Monmouthshire Net Zero Carbon Ready Homes

All new build residential development will be required to demonstrate compliance with the standards outlined below through the submission of an appropriately detailed, RICS-aligned operational energy assessment with any planning application resulting in the creation of 1 or more dwellings.

Development proposals for new homes must demonstrate the following:

- Space heating demand less than 25 kWh/m²/yr;
- EUI to be reported with regulated energy identified;
- On-site renewable energy generation to deliver at least the annual regulated electricity demand of the development;
- EPC A or equivalent in accordance with the current version of the National Calculation Methodology for assessing the energy performance of dwellings;
- New homes must not connect to the gas grid and all heating and hot water needs should be met by low carbon heating systems. No fossil fuel systems are to be used on-site;
- ULEV charging infrastructure must be provided to every dwelling with a minimum 1x 3.7/7/22 kW EV charger installed for every 1/2/5/10 dwellings.

All developments must submit an as built performance survey following construction and prior to occupation of the home/s to demonstrate that they have been built to the applicable standards and minimise the 'performance gap.'

5.3 Additional Evidence

As has been established by the overarching policy context and precedents from England, robust evidence exists for the validity of including Net Zero operational carbon policy within Local Development Plans. Policy proposals should be informed by local assessment of the technical feasibility and cost analysis complemented by developer engagement.

Technical feasibility should be established by modelling a representative selection of building archetypes using a RICS approved energy assessment methodology. Modelling should be based on common open market and social rent typologies emulating the worst-case scenario to provide conservative guidance on what would be required to achieve the agreed operational standards.

Strategic housing sites identified by the LDP should be scrutinised and the most difficult of these selected to 'host' the modelling exercise. In practical terms this will translate into the site at the highest altitude where external temperatures will be lower, increasing space heating demand versus lower-lying sites.

Typologies should be modelled facing East-West and account for units of the same scale 15.0m from the front elevation and 21.0m from the rear to represent delivery within a residential neighbourhood. East-West orientation is the least favourable for solar gains: in winter it excludes the majority of sunlight, limiting the free heat gains that could otherwise offset space heating demand; in summer it exposes buildings to low angle solar gain that is difficult to control and can exacerbate issues with overheating.

Positioning similarly scaled units to the East and West establishes horizon shading objects and ensures the assessment remains conservative: unshaded building models would overestimate the potential of solar gains to offset space heating demand.

East-West facing roofs have lower generation potential than an equivalent South facing roof. This provides a conservative kWp array sizing. However, East-West oriented photovoltaics can help reduce grid stress as output peaks are different to South-facing arrays.

Various operational specifications should be defined and modelled across the archetypes to establish the resulting standard of building performance and demonstrate the relationship between improving fabric and reducing photovoltaic provisions. This will be used to inform cost analysis and establish the implications of building to higher standards to ensure the viability of the policy position. Developer engagement should follow to ensure the supply chain is aware of the policy aspirations, anticipated build specification and cost implications. This will also provide the opportunity to identify any potential hurdles to successful adoption including perceived skill gaps.



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