Buckinghamshire Council Local Planning Support on Net Zero Carbon:

Literature Review

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Version 3

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Introduction, overview & navigation

Contents

Table of figures

Abstract: Introduction, purpose, overview & headlines

Introduction

Bioregional is appointed to provide Buckinghamshire Council (BC) with an assessment of options available within the local planning system to address climate change in Buckinghamshire.

Local planning authorities (LPA) have a legal duty to mitigate climate change (deliver carbon reductions) via the planning process, and national planning policy confirms these reductions should be in line with the Climate Change Act. The Climate Change Act includes both the 2050 goal for a net zero carbon UK, and sharply declining five-yearly carbon budgets until then.

Our current appointment to support Buckinghamshire in this effort comprises the following:

- Output 1: Literature review & position statement, covering:
  - Exploring definitions of 'net zero carbon' at different scales
  - Exploring planning duties, and powers, to act towards achieving net zero carbon
  - Exploring how those powers have been used in precedents from other local plans, and the success of these at examination (and where available, in practice)
  - Position statement on the role of the Local Plan for Buckinghamshire in achieving net zero.
- Output 2: Policy Risk Matrix, covering:
  - Identifying a range of potential policy options derived from the powers, precedents and definitions of 'net zero' buildings that were explored in Output 1
  - Evaluating the relative degree of risk involved in each of those potential policy options, in terms of differing risks in different criteria including climate mitigation effectiveness and consistency or divergence from national policy on buildings' energy performance, among other important issues.

This report comprises Output 1.

Navigating and using this document

This report is provided as one document split into several parts:

- **Abstract (2 pages):** Introduction, purpose, key insights, glossary, and contents table.
- **Executive summary (8 pages including copy of Position Statement)**: A detailed but relatively concise rundown of key insights, enabling busy readers to grasp the vital issues.
- **Full report (74 pages):** *Why* the local plan must act on this issue and how far; *what* net zero means; *how* the local plan could act on this issue, and *how* precedent plans elsewhere have acted (green boxes for adopted precedents; yellow for emerging ones).
- **Appendices (6 pages):** Extra detail on the UK Net Zero Carbon Buildings Standard, and on legal implementation to date of relevant parts of the Levelling Up & Regeneration Act
- **References (10 pages)** – the endnotes detailing the literature that was reviewed.

As this is a long report covering a lot of complex concepts, we advise familiarising oneself with the structure via the table of contents. Here in this abstract (overleaf) we also provide some of the headline points from this literature review report.

Purpose of this document

This literature review's purpose is to inform the Council on the extent to which local plans can and should act towards reducing carbon emissions, ultimately to 'net zero'. It has two functions:

- To enable the Council to make informed choices about policy that is aimed at carbon reduction (and ultimately net zero carbon) in the emerging Local Plan.
- To lay out the logical basis by which such policies can be justified at the Examination in Public, which will be necessary for the Planning Inspector to approve their adoption.

This report does this by reviewing the range of key literature available on the subject, including legislation, relevant national policies, planning sector expert organisation guidance, carbon accounting sector expert guidance and data at national and local level, sustainable construction industry analysis, open legal advice, and 'precedents' of various carbon-reducing policies in local plans elsewhere, including how Planning Inspectors have reacted to these.

The intent is that with this deeper and broader understanding, the Council will be enabled to proceed to the next stages of formulating robust policies towards carbon reduction and making the arguments necessary to demonstrate at Examination in Public (EIP) that its policies are sound. Insights from this document will eventually form part of the EIP evidence base.

This document's function is not to identify specific policy options (that is the role of the separate Risk Matrix report). Rather it is to inform the Council about the imperatives laid upon the local plan to act on carbon reduction, the ways in which this can be and has been done, and to ensure that the ongoing creation of local policy can be based on a consistent and logical understanding of the issues at hand. This last step is vital because key concepts such as 'net zero', 'climate mitigation', and so on, have been subject to differing interpretation by the range of stakeholders (industry, different parts of government, scientists, and the public), and at different scales from the building to the local plan area to the national and global pictures.

Understanding that diverse range of concepts and their relative merits is the first step towards establishing a logical and consistent approach to carbon reduction in the local planning function. That in turn enables the drafting of local plan policies that effectively fulfil the climate mitigation imperatives that are laid upon the local plan by legislation and national policy, while avoiding unwanted side-effects or conflicts with other priorities. All of this can also inform the arguments that will need to be made to the Planning Inspector to show that carbon policies are justified, effective and consistent with national policy (as per the 'tests of soundness') – especially where the future policies may go beyond national building regulations.

The document's conclusion is a Position Statement that establishes a recommended general stance towards policymaking on climate change mitigation, in light of the literature that has been reviewed. This includes defining what 'net zero' will be taken to mean and how local plan policy making in Buckinghamshire would ideally pursue that, to the extent of the powers available to the local planning authority. This Position Statement could be used in various ways: While it is intended primarily to guide the ongoing formulation of relevant local plan policy and spatial choices, it could also be inserted directly (fully or partly) into the plan itself, consultations, or examination statements (if policies are formulated in line with that Position Statement).

Coverage and topics of this document

To aid Buckinghamshire Council's decision-making on the approach to carbon reductions in the emerging local plan, and to assemble the justification for any such policy, this report explores:

- LPA duties to address carbon, as per the National Planning Policy Framework and Climate Change Act
- Defining 'net zero carbon' at different scales, and how these fit together
- The current status of carbon emissions in the local plan area and the Council's formal commitments towards emissions reduction as expressed in its published strategies
- LPA powers to address carbon and energy granted by key pieces of national legislation, and the mandates granted or limitations placed on how the LPA wields those powers by national policy and official national guidance
- Existing and emerging precedents of Local Plans that wield powers regarding energy and carbon of new development
- How potential policies may be justified in terms of necessity, feasibility and viability.

It then concludes in a position statement expressing the stance that a local plan for Buckinghamshire would take towards formulating and justifying carbon reduction policies, based on the logical conclusions of the literature that has been reviewed. .

Headline insights

The key driving force is the legal duty for the local plan to mitigate climate change, set by the Planning & Compulsory Purchase Act 2004 and Levelling Up & Regeneration Act 2023 (LURA). The extent to which that mitigation is to be taken is defined in the NPPF, i.e. it should be in line with the Climate Change Act 2008. This means action should be taken to achieve not only the 2050 net zero goal, but also the intermediate 5 yearly carbon budgets that are devised by the Committee on Climate Change and legislated by Parliament via that 2008 Act.

Data analysis shows that current national action is not going far or fast enough to meet those carbon budgets and net zero goal, including in many topics that the local plan could influence:

- Exemplary energy efficiency in new builds, especially in thermal fabric
- Clean heat in new buildings (not gas, oil, coal or other fossil fuel)
- Renewable energy provision on new buildings
- Other renewable energy capacity growth, whether standalone or on existing buildings
- Active travel / public transport
- Enabling energy retrofit of existing buildings (upgrading fabric to retain heat, switching from gas to heat pumps or waste heat, and adding renewable energy equipment).

The local plan has powers to act on these topic areas, stemming from the provisions in the Planning & Energy Act 2008 and Planning & Compulsory Act 2004 S106. This includes the power to set standards for energy efficiency, renewable energy provision and carbon reductions that exceed national building regulations Part L. Additionally, local plans can make spatial choices that minimise carbon emissions from transport. These powers have been used in various ways by other local authorities. This report focuses mainly on policy for low or zero-carbon buildings.

The definition of the carbon for which a building is responsible (thus a 'zero carbon building') is subject to differing approaches in the industry and therefore in the precedent policies from elsewhere. These broadly fall into two camps:

- Building regulations Part L – this defines a building's energy use and carbon by using the National Calculation Methodologies, named SAP (for homes) or SBEM (for other buildings). It sets limits per m^2 per year for carbon, heat demand, and "primary energy." These calculations only cover part of the operational carbon (energy use) but omit embodied carbon (materials/construction) and 'unregulated' energy use. As a result, the Part L definition of zero carbon building is not truly net zero.
- Industry professional bodies LETI, RIBA, UKNZCBS and others – all agree that Part L metrics and calculation methods are insufficient and that the metrics to be used instead are EUI (total energy use intensity), space heat demand per m^2, and that a 'net zero' building must have renewable energy to annually match the entirety of that energy use.

While the majority of 'net zero' policy precedents use Part L metrics, these are mostly older examples. A more recent vanguard (of which three adopted precedents to date) instead uses the EUI/SHD metrics. Despite the industry's general message that EUI/SHD are more effective, and necessary for the national carbon budgets, a previous Government 2023 policy statement purports to require the use of Part L metrics instead. This report discusses the extent to which that national policy is or is not binding in light of the legal obligation to mitigate climate change.

In addition to energy metrics in new builds, this report explores many examples of how precedent local plans have sought carbon reductions via other standards expressed as:

- Carbon offsetting policies
- Energy offsetting policies
- Promotion of standalone renewable energy development
- Promotion of energy improvements in existing buildings
- Protection of specific mapped green landscape features that capture and store carbon

For further context, this report explores the recent carbon emissions of Buckinghamshire (the local plan area) and commitments made by Buckinghamshire Council to reduce those-- including an intent to make this geographic area net zero carbon by 2050, in line with the nationwide target date. To define this more clearly, this report explores how the term 'net zero carbon' can be defined for a geographic area, referring to the available methodologies for local area carbon accounting. Insights from those carbon accounting method help to explain how a local area's emissions relate to the national carbon account, emphasising the importance of action at all local levels in order to achieve the legally binding national goals. This is useful background for later choices about which emissions should be targeted by policy.

This report 'concludes' in a Position Statement which establishes a recommended logical stance from which policy can be developed. The statement includes the following:

- Acknowledgement of the national and local carbon reduction imperatives
- Definition of what a 'net zero carbon Buckinghamshire' should mean
- Definition of a 'net zero carbon building' via best practice criteria
- Commitment to realise those definitions through policy to the greatest extent possible

Please note that although the Position Statement serves as the conclusion, it appears early in the report at client request. The Position Statement is not a policy recommendation as such, but is a recommended logical stance to guide the direction in which policy can be developed. For a more explicit merit-based evaluation of policy options, see the separate Risk Matrix report.

Glossary of terms and acronyms

BREDEM	Buildings Research Establishment Domestic Energy Model. A methodology to estimate the energy use and fuel needs of a home based on its characteristics. BREDEM is the basis for SAP, but BREDEM retains more flexibility by allowing the user to tailor some assumptions made in the calculations to better reflect the project.
Carbon, or carbon emissions	Short for 'carbon dioxide emissions' but can also include several other gases with a climate-changing effect, that are emitted to the atmosphere from human activities (see 'GHG', below).
Carbon budget	Amount of greenhouse gas that can be emitted by an individual, organisation or geographic area. Usually set to reflect a 'fair share' of the global amount that can be emitted before reaching a level of atmospheric carbon that causes severely harmful climate change.
Carbon intensity/ carbon factors	A measure of how much carbon was emitted to produce and distribute each kWh of grid energy at a certain point in time. For electricity, this has been falling as coal-fired power stations have been phased out over years. It also varies on an hourly basis: at times of high renewable energy generation, the carbon intensity is lower than at points where gas-fired electricity dominates the generation mix.
CIBSE	Chartered Institution of Building Services Engineers.
CO_2	Carbon dioxide. Often shortened to 'carbon'.
CO_2e	Carbon dioxide equivalent. The sum of a mixture of gases, in terms of their climate-changing impact in a 100-year period expressed as the amount of CO_2 that would have the same effect. Often shortened to 'carbon'.
Embodied carbon	Carbon that was emitted during the production, transport and assembly of a building, infrastructure, vehicle or other product, before the product is in use. As opposed to 'operational carbon' which is emitted due to energy use when operating the building / infrastructure / vehicle / other product.
EUI	Energy use intensity, a measure of how much energy a building uses per square metre of floor. Expressed in kilowatt-hours per square metre of floor space per year.
FHS / FBS	Future Homes Standard / Future Buildings Standard. These are updated versions of Part L of Building Regulations, expected to be implemented from 2025.
GHG	Greenhouse gas (CO_2 and several other gases: methane, nitrogen dioxide, and fluorinated refrigerant gases). Often collectively referred to as 'carbon'; see above.
ICROA	International Carbon Reduction and Offset Alliance.
ICVCM	Integrity Council for Voluntary Carbon Markets.
IPCC	Intergovernmental Panel on Climate Change. An international entity set up via the United Nations, of which the UK is one of the 195 member states. The IPCC's role is to assess the consensus within the global scientific studies on climate change, including the extent and effects of climate change and future predictions about how much climate change will occur depending on how much greenhouse gas is emitted.
LETI	Low Energy Transformation Initiative. A coalition of built environment professionals working to establish and achieve the energy performance needed for net zero.
LPA	Local Planning Authority.
MVHR	Mechanical Ventilation with Heat Recovery
NPPF	National Planning Policy Framework. A central government document laying out how the planning system should function, including plan-making and decisions.
Part L	Building regulations section that sets basic legal requirements regarding buildings' energy and CO_2 emissions, for a certain scope of buildings' energy use.
Performance gap	The difference between the amount of energy a building is predicted to use during design, versus the actual amount of energy it uses. The gap is due to poor prediction methodologies, errors in construction, and unexpected building user behaviour.
PV	Photovoltaics: solar panels that generate electricity.
PHPP	Passivhaus Planning Package: A tool to accurately predict a building's energy use. It is used to design buildings that seek Passivhaus certification, but can equally be used to improve any building design process even without pursuing certification.
Regulated energy or carbon	Carbon emissions associated with energy uses that are 'regulated' by Building Regulations Part L. This covers permanent energy uses in the building, (space heating, space cooling hot water, fixed lighting, ventilation, fans, and pumps).
RIBA	Royal Institute of British Architects.
SAP	Standard Assessment Procedure – the national calculation method for residential buildings' energy and carbon, used to satisfy building regulations Part L. SAP is based on the BREDEM model, but with fixed assumptions and thus less flexibility.
SAP Appendix L	An appendix to the SAP (explained above) which estimates unregulated energy use, whereas the main body of SAP estimates only regulated energy use. Appendix L was created when it was anticipated that national regulations would require fully zero carbon homes from 2016, which in fact never was enacted. As Appendix L has not since been updated, it overestimates unregulated energy demand because it was based on older data about the energy efficiency of household appliances.
SBEM	Simplified Buildings Energy Model – the national calculation method for non-residential buildings' energy and carbon, used to satisfy building regulations Part L.
Sequestration	Removal and storage of greenhouse gases from the atmosphere, to prevent their harmful climate-changing role. Currently only achieved at scale by trees/plants/soil.

Space heat demand	Amount of energy needed to heat a building to a comfortable temperature. Expressed in in kilowatt-hours per square metre of floor space per year.
TER	Target Emission Rate – a limit set by Part L of building regulations on CO_2 emissions per square metre of floor, from regulated energy use in the building.
TPER	Target Primary Energy Rate – limit set by Part L of building regulations on 'primary energy' use per square metre of floor. Unlike metered energy, 'primary energy' takes into account energy lost to inefficiencies during power generation and distribution.

TFEE	Target Fabric Energy Efficiency – limit on space heat energy demand per square metre of floor, set by Part L of building regulations. Based only on fabric; not affected by building services like heating system, lighting, ventilation[i].
TM54,	A method to accurately calculate buildings' energy use. Devised by CIBSE (as above).
Unregulated energy or carbon	Carbon associated with energy use in a building or development but which is not covered by Building Regulations Part L. Includes plug-in appliances, lifts, escalators, external lighting, and any other use not covered by Part L.

Executive summary

Defining net zero carbon buildings

The term 'net zero' is often used differently by different people or entities, depending on their focus and the scale (global, national, local, building-level; organisational). This executive summary focuses at building scale as that is where vital nuances arise for plan policy purposes (the full report also covers larger scales). However, we first note that 'net zero' is sometimes mistakenly interchanged with 'carbon neutral'. Instead, the Intergovernmental Panel on Climate Change[ii] essentially explains that:

- **'Net zero carbon'** typically means a balance of emissions and removals under direct control or territorial responsibility of the entity reporting them (such as a country, district, or sector)
- **'Carbon neutral'** can also apply to a firm or commodity, and typically also includes emissions and removals beyond the entity's direct control or territorial responsibility.

There are several ways to define a 'net zero carbon building'. These definitions rely on **calculations** that cover some or all of the following scopes (varying by the definition chosen), on an annual basis:

- Use of different types of fuels and grid energy at the building: These cause carbon emissions.
- Renewable energy use at the building: Usually from on-site generation, but some definitions/calculations of 'net zero carbon buildings' also allow off-site sources.
- Amount of renewable energy that the building *exports to the grid* at times when the building produces more than it is using: This counts as a *negative* amount of carbon emissions, because it actively reduces the amount of fuel burned in power stations to supply grid energy to others.
- Embodied carbon: Carbon emitted to produce/transport and use of the construction materials. Can also include emissions from maintenance/replacement and eventual demolition/disposal.

The 'National Calculation Methodologies' for buildings' energy use and carbon emissions are called **SAP (for homes)** or **SBEM (for other buildings)** (glossary). These are **used in the Building Regulations Part L**, which sets limits per m^2 per year for carbon, heat demand, and 'primary energy'[1] use. However:

- They only cover operational carbon (energy use), not embodied carbon (materials/construction)
- They do not include 'unregulated' energy uses like plug-in appliances, which can be 50% of total operational energy and carbon (for example see pie charts in Figure 9, full report).
- They provide inaccurate predictions because they are based on a theoretical model instead of specific conditions, and their predictions do not get validated in practice. They are compliance tools and not designed to accurately assess building energy performance; buildings typically use two or three times the amount of energy predicted by SAP or SBEM (see *Figure 1*).

Thus a 'net zero carbon' building defined by the Building Regulations is not actually net zero carbon. Updates to Building Regulations Part L, SAP and SBEM are due in 2025 (the 'Future Homes Standard' and 'Future Buildings Standard'). However, even the 2025 update will not deliver[iii] the very low space heat demand that the UK needs for its legislated carbon budgets. This is partly because SAP and SBEM underestimate energy demand and are not verified in operation (as there is no regulatory requirement for the building to actually perform to the SAP/SBEM predictions) and partly because Part L sets energy and carbon targets that vary by the building's form (shape and size), not the absolute targets that are needed for UK carbon budgets. For example, we need[iv] new homes' space heat demand to be ≤15-20kWh/m^2/year. Space heat demand is affected by building form not just insulation and airtightness, but Part L does not require better insulation and glazing to counter inefficient form.

Other calculation methods and definitions are available. The three leading alternatives are:

- **LETI operational net zero:** A building that annually generates as much renewable energy as it uses (even if this is sometimes exported to the grid). The building must be gas-free and meet set energy efficiency targets that match the performance needed for national carbon budgets.
- **UKGBC Framework Definition of Net Zero Carbon:** This has two parts:
  - **Operational:** When the carbon associated with a building's energy use is zero, by use of renewable energy (from onsite or offsite sources) or purchasing verified carbon offsets.
  - **Embodied:** When the carbon associated with a building's construction up to the point of completion is zero or negative, through the purchase of verified carbon offsets.
- **"UK Net Zero Carbon Buildings Standard" (UKNZCBS):** Building on the LETI and UKGBC work, a unified industry standard has been drafted by a coalition that includes LETI, UKGBC, BRE, RIBA, RICS, and other relevant standard-setting entities. A draft for beta testing was released in late 2024; finalisation dates are uncertain. Using the same metrics as LETI and UKGBC, it sets mandatory targets for energy use, renewable energy generation, and embodied carbon. These targets align with science-based trajectories needed for UK-wide net zero by 2050 and 78% reduction by 2035 but do not necessarily make the building 'net zero'. It therefore offers two different levels of 'claim' depending on whether a building has also offset residual emissions.

Because the LETI, UKGBC and NZCBS definitions are for *actual* operational performance, meeting them will need the use of *accurate* energy calculation methods during design, specifically PHPP or TM54 (glossary). PHPP and TM54 account for total energy, not just the share that is 'regulated' by Part L.

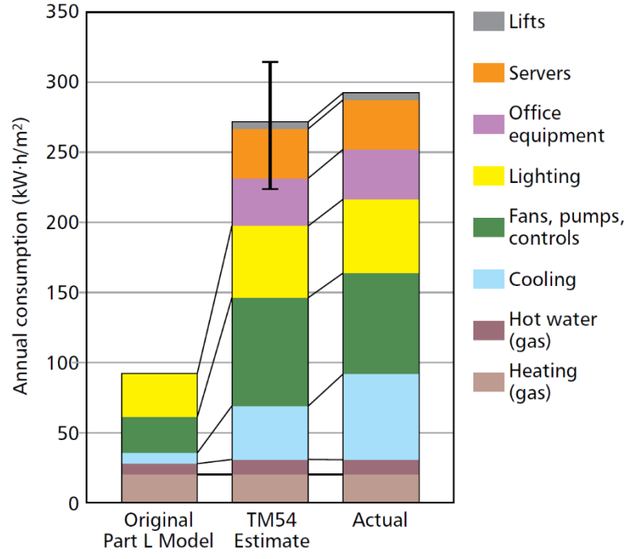


Figure 1: CIBSE graph revealing the inaccuracies of Part L SBEM prediction of energy use, compared to a prediction using the CIBSE TM54 method, and this office building's actual metered energy use.

[1] 'Primary energy' is the energy from renewable and non-renewable sources which has not undergone any conversion or transformation process. This metric is meant to show the total amount of energy or fuel that must be put *in*to a system in order to get one unit of useful energy *out* at the other end, accounting for the losses that occur in (for example) converting fossil fuel to electricity or heat, or in distributing power through the grid.

About the local plan and what it does

While the local plan is obliged to act to reduce carbon (see overleaf), it is firstly vital to consider the local plan's role, its scope of influence, and the tests it must pass in order to be adopted.

A local plan is a land use or spatial plan that responds to identified issues and needs. Preparation of a local plan must conform with specific legal requirements and national planning policy. It must be evidence-based and informed by community engagement, and co-operation with certain third parties.

The local plan sets out policies for change in the type, quality and location that will be considered acceptable for a range of land uses in the area and includes a strategy for delivering future required growth. Its policies are used to determine planning applications. It identifies appropriate areas and sites for development, such as new homes, offices, shops, and community facilities. It also identifies circumstances where development is not appropriate, and can set certain conditions on changes to existing buildings or other land uses.

The local plan is separate from Building Regulations. Building Regulations apply nation-wide and define the national *minimum* standards that new buildings must meet in order to be legal. These cover a wide range of technical topics including materials, structure, drainage, contaminants, fire and electrical safety, acoustics, ventilation, sanitation, water use, overheating, electric vehicle charging, and energy efficiency/ carbon emissions. Building Regulations apply not just to new developments, but also extensions and alterations. As Building Regulations standards are a 'floor' not a 'ceiling', a local plan can require more stringent standards to be met, subject to certain conditions set by national policy.

The local plan must be in accordance with the National Planning Policy Framework (NPPF), which is set by central government (December 2024 version). The NPPF sets out principles and aims that the planning system should aim to fulfil. The NPPF establishes that the overarching purpose of the planning system is "the achievement of sustainable development". After a local plan is drafted and consulted upon, the local authority must then submit the draft plan to the Planning Inspectorate for independent examination before it is adopted and becomes part of the development plan. The Planning Inspectorate will assess the draft local plan to see if it is 'sound'. The NPPF's four 'tests of soundness' are:

- **The plan must be positively prepared:** It should respond to 'objectively assessed needs' (in particular, needs for housing), and should deliver sustainable development.
- **The plan must be justified:** Its approach should be appropriate based on evidence and consideration of reasonable alternative approaches
- **The plan must be effective:** It should be based on effective joint working on cross-boundary strategic matters (cooperation between local authorities), and 'deliverable in the plan period' (e.g. often taken to mean that the policies should not make it impossible to deliver the required amount of housing within the plan period).
- **The plan must be consistent with national policy:** This means it is in accordance with the other policies in the NPPF and other relevant statements of national policy.

Some decisions relevant to climate and carbon are out of scope for the local plan. For example, large infrastructure projects – such as major road/rail, major renewable energy and airports – are considered 'nationally significant'. Such projects require national rather than local consent. The local plan's influence on existing buildings and other existing land uses is also limited, as the local plan cannot force changes to existing buildings where none have been proposed, and there are many typical changes to existing buildings or land use that are 'permitted development' (that is, they do not require planning permission).

About the local plan

- **Has a duty to deliver 'sustainable development'** that meets environmental, social, and economic needs – housing delivery targets are a key part of this
- **Separate from Building Regulations** (which set minimum technical standards for buildings nationwide)
- **Has powers to require new development to do better than some of the standards set by Building Regulations** – including for energy efficiency and carbon emissions
- **Must be based on proportionate evidence** showing that the plan policies are justified, effective, deliverable, and consistent with national policy
- **Must pass an examination by the national Planning Inspectorate** – who will check it is in accordance with the National Planning Policy Framework, including that it proactively enables 'sustainable' development.

About Building Regulations Part L

- **Sets basic targets for new builds' energy and carbon using specific metrics:**
  - Fabric Energy Efficiency in kWh/m^2/year – this is a measure of the building's need for space heating and cooling
  - Carbon emissions in $kgCO^2/m^2$/year
  - Primary Energy Demand in kWh/m^2/year
- **Building must use specific calculation methods to fulfil these targets:** SAP for homes; SBEM for other buildings. However, these do not accurately reflect actual performance.
- **Since 2022, requires 'energy forecasting' in non-residential buildings** – which can use CIBSE TM54 calculation method
- **Forms a minimum standard nation-wide, not a limit to the standards that a local plan can require** – i.e. it is a floor, not a ceiling – but some local plans borrow the Part L *metrics and calculations* to express a higher standard that improves on that set by Part L.

Why must the Local Plan for Buckinghamshire take action towards net zero carbon?

The **Planning & Compulsory Purchase Act 2004** imposes a legal duty for every local development plan to have "policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of … climate change".

Mitigation of climate change means reduction in the impact of human activity on the climate[v] by reducing greenhouse gas in the atmosphere[vi,vii]. It therefore logically cannot just mean 'minimising the additional emissions from *new* development' – rather it would mean an overall reduction in the net amount of emissions from all activities in Buckinghamshire (to the extent that the local plan can influence these). This has two parts: reduction of emissions, and increase of sequestration (removal and storage of carbon by trees, other natural features, or future technology).

The **National Planning Policy Framework** clarifies the extent of mitigation, i.e. the local plan should:

- Take a proactive approach in line with the Climate Change Act 2008
- Shape places in ways that contribute to radical reductions in greenhouse gas emissions
- Support the transition to net zero by 2050 (a new stipulation in the NPPF 2024 edition)
- Provide a positive strategy to increase the use and supply of renewable and low-carbon energy.

The **Climate Change Act 2008** (referred to by the NPPF, above) contains the following legislated carbon reduction targets for the whole UK, therefore in order to be in line with the Act the local plan would need to be designed to take the necessary local action to achieve these:

- Net zero carbon by 2050 (based on a 1990 baseline)
- Steeply reducing 'carbon budgets' for each five-year period up to 2050 (see Figure 2, to right)

The carbon budgets place a limit on the amount of carbon that can be emitted before the net zero goal. This is a vital action towards the UK's commitment to the international Paris Agreement 2015, in which 174 countries worldwide agreed to limit climate change to no more than a 2°C rise on pre-industrial temperatures – above which the global impacts would be catastrophic due to 'tipping points'. For context, the world has already passed a 1°C rise and is on track for a 3-4°C by the end of the century.

These carbon budgets are devised by the Committee on Climate Change, before being legislated every few years by Parliament as per its duties in the Climate Change Act. The Committee also identifies the necessary sectoral changes to deliver those carbon budgets, of which most relevant to the local plan are:

- All new homes from 2025 to have low carbon heat (not gas), and very low space heat demand
- Rapid and large-scale roll-out of heat pumps to existing homes, and expansion of heat networks
- No installation of new fossil fuel boilers from 2033
- Fully decarbonise the electricity grid by 2035 (to be 80% renewable and 20% nuclear by 2050)
- Reduce travel mileage by car, and ensure all new cars/vans are electric from 2032
- Increase woodland cover to 18%, up from today's 13%, and restore peatlands
- All sectors net zero carbon by ~2045 except aviation, waste, & agriculture (most or all of the UK's capacity for carbon removals will be needed to balance these sectors' remaining emissions).

Committee on Climate Change analysis[viii,ix,x] shows that national government plans are insufficient to deliver all these necessary changes. The government's Net Zero Strategy was (2022) found unlawful[xi] as it failed to deliver on the Climate Change Act obligation to produce sufficiently detailed policies that show how the carbon budgets will be met. The Committee's most recent report (July 2024) again found many shortcomings in national policy up to that date. Although the new national Government recently set an interim target[xii] of 81% reduction in national emissions by 2035, in line with the Committee's overarching recommendations[xiii], there has still been little progress in national policies needed in specific sectors in order to achieve that target (and even some policy regression – for example it is reported[xiv] that government will scrap the previously planned 2035 ban on fossil fuel boiler sales, despite that any weakening of that ban "could seriously undermine the UK's ability to reach its [carbon] targets"[xv]).

Therefore, in order to mitigate climate change in line with the Climate Change Act, the local plan would logically need to act beyond or ahead of current national government action where possible. In the next section we explore how this can be done, using the powers available to local planning authorities.

The legal and policy mandate

- **Planning & Compulsory Purchase Act 2008** establishes that the local plan has a legal duty to mitigate climate change (reduce carbon)
- **National Planning Policy Framework (2021)** states the mitigation should be in line with the Climate Change Act 2008
- **Climate Change Act 2008** sets the 2050 net zero carbon goal, and also interim 'carbon budgets' that reduce every 5 years
- **Committee on Climate Change analysis and a High Court Ruling (2022)** shows that national government's current policies & plans will not deliver the Climate Change Act goals – so the local plan would need to take further action to fulfil its duty to mitigate climate change in line with that Act.

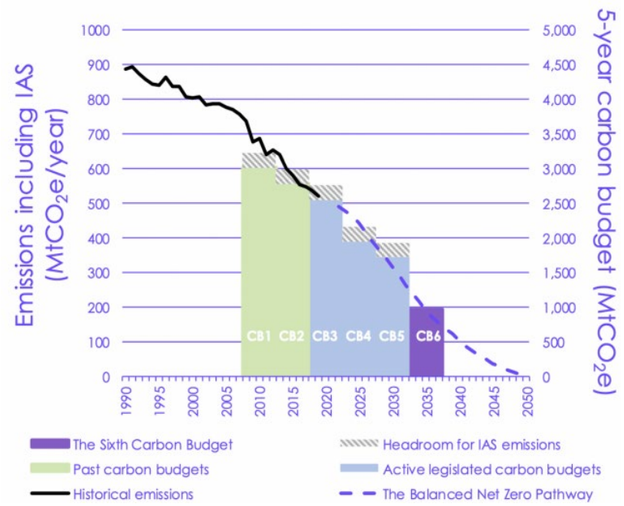


Figure 2: UK legislated carbon budgets under the Climate Change Act. From Committee on Climate Change (2020), The Sixth Carbon Budget: The UK's Path to Net Zero. "IAS" = international aviation & shipping.

How can the Local Plan for Buckinghamshire take action towards net zero carbon?

The main sources of emissions (and removals) that a local plan can affect are:

- New buildings – energy efficiency, energy supply / on-site generation, and embodied carbon
- Transport – enabling the right type and location of new development to reduce new and existing communities' car dependence, and bringing forward sustainable transport infrastructure
- Existing buildings – encouraging carbon-reducing renovations where permission is needed
- Renewable energy – encouraging new standalone renewable energy generation and distribution
- Natural environment – protecting and expanding landscape features that capture or store carbon
- Using the planning permission process to raise funds for the above, (see "Section 106", below).

This report focuses mainly on planning powers for net zero carbon in the *buildings* and *energy* sectors.
The Planning and Energy Act 2008 gives the local plan the power to set 'reasonable requirements' for:

- Energy efficiency standards higher than those set by building regulations
- Renewable or low-carbon sources to supply a proportion of energy used at the development.

The Act defines 'energy efficiency standards' as ones that are set out or endorsed by the Secretary of State. This may imply the methods used in Part L of Building Regulations (SAP or SBEM), despite their aforementioned shortcomings. However, the non-residential Part L 2021 endorses the more accurate 'CIBSE TM54' method for the purpose of energy forecasting (a new requirement to give the building owner a prediction of total metered energy use). Thus, it appears the local plan could require energy efficiency standards based on TM54, which accounts for *total* energy use, not just regulated (glossary).

The Act does not define 'reasonable' nor 'energy used at the development'. It thus seems to empower local plans to require renewable energy to meet a proportion of a new build's *total* energy, not just the 'regulated' share (glossary). Such a policy would need a method to estimate unregulated energy; ideally one that works alongside the regulated energy calculation (SAP/SBEM). Such methods include: TM54; BREDEM; SAP Appendix L. PHPP could also be used but may not be compatible with SAP/SBEM (glossary).

The Town & Country Planning Act 1990 gives two key local plan powers often used to reduce carbon:

- Section 106[xvi] enables the local planning authority to require payments from developers where necessary to make development acceptable. This has been used as a mechanism to offset developments' carbon, where local plan policy requires a carbon reduction. Payments can also be sought for necessary infrastructure/services, which can include carbon-saving items such as public transport. S106 charges must be reasonable and proportional to the development.
- Section 61[xvii] enables creation of Local Development Orders. This is a tool used to achieve specific objectives by granting certain types of development fast-track planning permission (or at least certainty of permission). These have been used to promote renewable and low-carbon energy.

The National Planning Policy Framework reaffirms ways the local plan can mitigate climate change:

- **Paragraph 164b**: "New development should be planned for in ways that … reduce greenhouse gas emissions, such as … its location, orientation and design. Any local requirements for [buildings'] sustainability should reflect the Government's policy for national technical standards".
- **Paragraph 165a-b**: "Plans should [have] a positive strategy for [renewable/low carbon] energy … [and] consider identifying suitable areas for [these] and supporting infrastructure".
- **Paragraph 203**: "Plans should set out a positive strategy for the conservation and enjoyment of the historic environment, including … putting [such assets] to viable uses consistent with their conservation".

Local plan powers for net zero carbon development

- **Energy & Planning Act 2008:** The local plan can require new builds to provide / use renewable energy and improved energy efficiency.
- **National Planning Policy Framework (2024)**
  - Policies should 'reflect national technical standards' – this may influence the performance metrics or calculation methods that can be used in local policy on energy efficiency & renewables (*albeit some local plans have successfully adopted alternative metrics, justified by their effectiveness in delivering on national carbon reduction targets – see precedents*)
  - It is appropriate to seek carbon reductions via new development's location, orientation and design, and to plan for renewable energy
- **Building Regulations (Part L 2021) exceed the supposed previous limit on how far the local plan carbon and energy requirements could go** (the limit was expressed in Planning Practice Guidance and a 2015 Ministerial Statement),
  - Therefore it can be assumed that the limit is obsolete and that local plans can go as far as necessary to fulfil their duty to mitigate climate change
  - … so long as the requirement is shown to be 'reasonable' and does not stop the plan passing the four tests of soundness (justified, effective, consistent with national policy, and positively prepared to deliver development that meets needs)
- **Town & Country Planning Act 1990** allows the local plan to:
  - Seek payments from development (sometimes used to offset new developments' carbon emissions, or for carbon-reducing infrastructure)
  - Make 'local development orders' to fast-track desirable development e.g. renewable energy
- **A new Written Ministerial Statement on 13th December 2023** attempts to limit energy efficiency policies to be expressed as a percentage reduction on the Building Regulations Target Emission Rate. However, this faces an ongoing legal challenge as it inhibits local plans' ability to meet their climate mitigation duty.

How have local plans used their powers towards carbon reductions?

Most adopted local plan example policies on net zero carbon buildings have been based on metrics from Building Regulations, taking the following approach:

- A minimum reduction in carbon emissions compared to the standard sent by Building Regulations Part L (the Target Emission rate), and
- The remainder of the Building Regulations 'regulated carbon' (Building Emission Rate) to be offset by a payment per tonne of regulated carbon emissions.

However, newer pioneering examples are taking a potentially more effective route of energy use limits and/or 100% renewable energy. Examples are given below, outlining their differences:

Some example policies require energy efficiency improvements to deliver a certain amount of the carbon savings, as this is the first step of the 'energy hierarchy' (the industry best practice term for the generally agreed series of design improvements to be pursued in order of most to least preferred):

- London Plan (adopted 2021): Energy efficiency measures should deliver the following minimum improvements in the carbon emissions rate (within the overall minimum 35% on-site):
  - Residential: 10%
  - Non-residential: 15%.

  These levels were set to reflect the technically feasible energy efficiency improvements identified by analysing the Building Regulations Part L figures of recent development.

Some examples require a minimum contribution of renewable energy, either as a percentage of the building's energy use, or as a percentage reduction on the carbon emissions rate. For example:

- Milton Keynes (adopted 2019): Renewable energy to contribute a further 20% reduction in the carbon emissions rate, *after* an initial 19% reduction has been made by other measures (applies to schemes of 11 or more homes or 1,000m^2 or more floorspace).
- Solihull (Emerging): Provide at least 15% of energy from renewable or low carbon sources, in major residential and non-residential over 1,000m^2 floorspace (however please note that this plan was withdrawn from examination in late 2024 for reasons unrelated to this policy).
- West Berkshire (adopted 2012): Renewable/low carbon energy to achieve net zero total carbon emissions (regulated and unregulated) from 2016 for homes, or 2019 for other buildings, in all major proposals, unless demonstrated unviable/ unfeasible. We note that this requirement was upheld by the planning inspector at appeal in 2022, although other parts of the same policy that were based on the now-withdrawn Code for Sustainable Homes were deemed inapplicable.

Where carbon offsetting is one of the mechanisms within the net zero carbon policy approach, the cost per tonne of carbon is set by various rationales. London's £95/tCO_2 rate matched a previous national carbon value, set annually by BEIS (as of 2023 this national value has risen to £378/tCO_2). By contrast, some other plans have used a per-home payment (see Central Lincolnshire in this table) with lower and upper bounds reflecting the amounts of funding that would be needed to install renewable energy sufficient to offset the typical new building's emissions.

However, there is a vanguard of newer pioneering local plans that are moving away from Building Regulations metrics and taking a more effective route of energy use limits and/or 100% renewable energy. Examples are given in the table here, outlining their differences and comparing them to the London Plan 2021 which is based on Building Regulations as previously noted.

Residential new-build requirement	London Plan (2021)	Milton Keynes (2019)	Central Lincolnshire (2023)	B&NES and Cornwall (2023)
Scope of emissions that must be 'net zero'	Regulated carbon as per Part L (some boroughs also include unregulated)	Regulated carbon as per Part L	Total operational carbon emissions from all energy use (regulated and unregulated)	Total operational carbon emissions from all energy use (regulated and unregulated)
Minimum reduction in on-site carbon emissions (vs Building Regulations Part L 2013)	35%	39% (19%, plus a further 20% by renewable energy)	n/a	n/a
Energy use limits in homes (EUI = Energy Use Intensity; see glossary)	n/a	n/a	35-60 kWh/m^2/year (EUI) 15 kWh/m^2/year (space heating demand)	40 kWh/m^2/year (EUI) 30 kWh/m^2/year (space heating demand)
On-site net zero (i.e. 100% on-site renewable energy supply)	No	No	Yes, through 100% renewable energy, but with exceptions for feasibility	Yes, through 100% renewable energy
Offset price	Recommend £60-£95/tCO_2, but decision by borough (e.g. Lewisham, £104/tCO_2)	£200/tCO_2	£5-15k/dwelling, or direct provision of offsite renewable energy equivalent to dwelling usage	£373/tCO_2 (B&NES) 10p/kWh (Cornwall)
Years' worth of emissions to be offset	30	1	n/a	30

This table shows that some recent successfully adopted local plans now go well beyond the Building Regulations approach, and instead require absolute energy use limits and on-site renewable energy generation capacity to reach net zero carbon. All of the examples in this table require standards better than the legal minimum set by Building Regulations, but the colour coding indicates ones that use Building Regulations metrics (blue) to express this required improvement, versus ones that use more accurate metrics for 'true net zero' (green).

These ‘accurate metrics’ policies (blue columns in the table above) are inspired by LETI and UKGBC net zero carbon buildings definitions (previously explained) and are considered a more effective and reliable approach to energy and carbon reduction as opposed to policy approaches that rely on an improvement relative to the Part L regulated baseline. Key examples include:

- Bath & North East Somerset (B&NES) Council, and Cornwall Council (2023):
  - 40 kWh/m^2/year (EUI; see glossary) and 30 kWh/m^2/year (space heating demand) limits.
  - On-site renewable energy generation requirement to match total energy use.
- Central Lincolnshire Council (2023):
  - Residential: 35 kWh/m^2/year (EUI) and 15-20 kWh/m^2/year (space heating demand) limits.
  - Non-residential: 70 kWh/m^2/year (EUI) and 15-20 kWh/m^2/year (space heating demand).
  - Residential and non-residential development: on-site renewable energy generation to at least match total energy demand.
- London Borough of Merton (2024): Space heat demand 15-20kWh/m^{2}year and a requirement to *report* EUI, although all EUI *targets* are advisory rather than mandatory.

There are also several other local authorities that aim to follow this net zero carbon development approach by not relying on the Building Regulations Part L carbon emissions rate as the basis for the improvements that must be made. Examples include:

- Greater Cambridge Emerging Local Plan
- Bristol City Council Emerging Local Plan
- Leeds City Council Emerging Local Plan
- Winchester Emerging Local Plan
- Uttlesford Emerging Local Plan
- South Oxfordshire & Vale of the White Horse Emerging Joint Local Plan 2041

Common features of these emerging pioneering plans include performance targets that reflect the performance identified by the Committee on Climate Change to be necessary in new builds to help deliver the UK’s legislated carbon budgets:

- Limiting space heat demand to 15-20kWh/m^2/year (sometimes up to 30kWh where this is found to be more cost-effective).
- Limiting total energy use intensity in kWh/m^2/year – the target varies by building type but is always set to a level that rules out gas boilers and requires a heat pump or other efficient low carbon heat (as heat pumps use about one-third of the energy of gas boiler or direct electric).
- Use of an accurate energy prediction calculation to demonstrate the building’s compliance with these metrics, such as PHPP or TM54 (glossary), not the methods used in Building Regulations.

These policies also require on-site renewable energy generation equal to the building’s energy use. The aim is that although the building may use grid energy at times when its own renewable generation is not sufficient, there will be other times when it generates more than it is currently using and exports the excess to the electricity grid, resulting in a net ‘zero energy balance’ over the year.

These emerging policies are all supported by evidence bases showing feasibility and viability in new building types typical to the local area, using highly accurate specialist energy modelling and analyses of build cost uplift compared to the existing building regulations.

‘Energy offsetting’ (rather than ‘carbon offsetting’) is permitted in the case of technical non-feasibility, in these emerging policies. Developers would have to pay an amount per kWh of energy use not matched with on-site renewables. Funds would be used to install renewable energy elsewhere in the local plan area and priced accordingly per kWh. The aim is to simplify the offsetting process by avoiding the need for complicated calculations about the changing amount of carbon related to use of different fuels and electricity over time linked to grid carbon reductions.

It must be noted that not all plans following the energy-based net zero approach are receiving positive reactions from the Inspectorate at examination. While Cornwall, B&NES and Central Lincolnshire have now adopted such policies receiving positive feedback in the Inspector’s examination report, by contrast West Oxfordshire (Salt Cross Area Action Plan) was instructed by its Inspectors in 2022 to remove similar policy requirements.

In the case of the West Oxfordshire Salt Cross AAP, the Inspector removed the absolute energy requirements, to instead suggest them ‘as guidelines only’. The Inspectors’ main reasoning was their view that the proposed local energy targets (in Policy 2 – Net Zero Carbon Development) were not sufficiently justified by evidence and conflicted with a specific national policy (a Written Ministerial Statement of 2015 which had placed a restriction on how far local energy performance standards could go – a limit which was in fact overtaken by national building regulations Part L 2021). However, the Salt Cross case was successfully challenged in the High Court in November 2023, focusing on that interpretation of the policy’s soundness.. On 20th February 2024 a decision was passed down that the Planning Inspectors “erred in law in their approach by finding that Policy 2 of the AAP was inconsistent with the WMS[2015]” because the limit placed by the WMS[2015] had been overtaken by the introduction of Part L 2021 and had been contradicted by subsequent expressions of national policy[xviii].

The Salt Cross AAP returned to examination in 2024 for that policy specifically, but this is paused since May 2024 to respond to a new hurdle it now faces: the Written Ministerial Statement of 13th December 2023. The WMS2023, unlike the WMS2015, does not limit *how far* a policy can go in requiring carbon reductions, but instead prescribes a specific (and in our view, highly inappropriate) carbon metric to be used to express any *energy efficiency policy* that goes beyond building regulations. Still, any future argument to overcome the new WMS may be bolstered by the comment in the Salt Cross High Court decision that a WMS “cannot restrict the legal powers of the LPA under the 2008 [Energy and Planning] Act”[xix]. A further indication in favour of the Salt Cross draft policies is pre-action legal correspondence between the Secretary of State and a coalition of local authorities who had posited that the WMS2023 would be unlawful if it sought to restrict the exercise of local planning authorities’ primary powers stemming from the Energy & Planning Act 2008. The Secretary of State’s response was that the WMS2023 did not intend to do that and is only a *material consideration* to be taken into account, not a fixed constraint on how policy is expressed, despite the forceful language .

However, other emerging ‘net zero’ policies had also been rejected by their inspectors in 2023 even where they were expressed using building regulations metrics – for example, Lancaster (due to a perceived inconsistency with national policy in that it diverged from national policy[xx] including the WMS2015, which as above is now obsolete) and Bracknell Forest (because[xxi] its evidence base did not demonstrate sufficient local circumstances to justify going further than building regulations).

Conclusion: Draft position statement

In light of the wide range of literature reviewed, this report's conclusion is to recommend a particular stance towards the 'net zero carbon' mandate that should guide the formulation of relevant policies, the evaluation of policy options, and ideally also the spatial choices made in the process of devising the Local Plan for Buckinghamshire. This stance is internally logically consistent and responds thoroughly to the climate mitigation mandate set out in legislation and national policy, taking into account the local and national existing emissions and commitments, and acknowledging the fact that there are certain limitations on the influence and powers available to the local plan.

That stance is expressed in the draft Position Statement provided overleaf.

In addition to guiding the creation of relevant parts of the local plan, this Position Statement can also underpin the evidence-based argument that will be necessary at Examination in Public to justify policies for carbon reduction.

Draft Position Statement on the pursuit of net zero carbon in the Local Plan for Buckinghamshire

To meet its legal duty to mitigate climate change, the Local Plan for Buckinghamshire will be designed to do all within the local plan's power to ensure that development and land usein this area is compatible with, and actively helps to realise, the following:

- The nationally legislated carbon budgets and Net Zero 2050 goal of the Climate Change Act 2008,
- The Council's commitment to working towards a net zero carbon Buckinghamshire by 2050,
- And the local and national carbon budgets needed to keep climate change below 2°C as per the UK's commitment to the Paris Agreement.

This local plan policies and approaches to carbon should be taken in light of Buckinghamshire's characteristics as they relate to carbon emissions and the net zero carbon imperative. Specifically:

- Buckinghamshire's two highest-emitting sectors are transport and homes (40% and 26% respectively as of the latest data in 2024). Fortunately, these are well within the influence of the local plan.
- This prosperous part of the country is experiencing significant growth (circa 90,000 homes in the next 20 years), which may cause increased emissions in the absence of further intervention. Sited at the confluence of three existing motorways and major forthcoming rail infrastructure (HS2 and East West Rail), and having a climate with great potential for renewable energy while containing important landscapes (the Chilterns National Landscape), Buckinghamshire has potential to play a pivotal role in the carbon trajectory not just of its own geographic area but also the wider region (and vice versa).
- Through the Climate Change and Air Quality Strategy (2022) and the Local Plan Draft Vision & Objectives, the Council has set many specific intentions in aid of the net zero carbon goal. These include embedding climate change into policy and decision-making, exploring carbon offsetting funds and clean energy generation, improving infrastructure for active travel and EV charging, exploring how heritage assets can address climate change, a local plan that reduces carbon, seeking the highest standards of buildings energy efficiency, increasing low-carbon energy, and directing growth to sustainable locations. These commitments will need local plan policy to actively facilitate them. For example, planning obstacles are cited as a key barrier to carbon improvements for local homes, and evidence shows that incoming national building regulations will not deliver the 'highest' energy efficiency standards (i.e. standards that are necessary for national carbon budgets, yet feasible).
- The committed goal of a 'net zero carbon Buckinghamshire' needs defining in context of the national 'net zero' goal and carbon budgets, as do the criteria for development in line with those goals.

Based on the evidence (on climate change, best practice in carbon accounting, and low-carbon development), for the local plan policy to strive towards this goal, it is considered that:

- A Net Zero Carbon UK is one that (as per the Committee on Climate Change, and Climate Change Act 2008 regarding legislated targets) …
  - Stays within its legislated carbon budgets
  - By 2050, has net zero carbon emissions in the UK's scope 1 + 2 (as defined by the Global Greenhouse Gas Protocol)
  - Achieves both of the above without resorting to the use of non-UK offset credits
  - Strives to do all in its power to reduce its scope 3 emissions to a level compatible with a safe climate as per the UK's commitment to the Paris Agreement 2015.
- A Net Zero Carbon Buckinghamshire will be one that …
  - Has net zero carbon emissions in its scope 1+2 (recognising that this will require growth in renewable energy and a shift towards sustainable transport, in this area as well as the rest of the UK)
  - Achieves this without the use of carbon offset credits from outside the local area, and never from outside the UK
  - Keeps within the local area's fair share of the UK's legislated carbon budgets.
- In Buckinghamshire, a Net Zero Carbon Building (operational) is one that …
  - Has net zero carbon emissions associated with its total energy use (regulated + unregulated) across the course of each year, by
    - Meeting best-practice energy efficiency targets that are in line with the performance needed for the UK's carbon reduction trajectory, as established by industry thought-leading bodies
    - Annually generating renewable energy equal to the building's energy demand over the course of each year, achieving a balance of renewable energy export and grid energy import
      - Achieving this renewable generation on site, or, where this is demonstrably unfeasible, contributing to off-site renewable energy directly or through an energy offsetting fund implemented within Buckinghamshire
    - Does not use fossil fuels on site whether for heating, cooking or other
    - Evidences all of the above at planning stage with a calculation methodology proven to be accurate in forecasting the energy use of the proposed building.
- Development should also strive for optimal embodied carbon targets reflecting evidence of what is both feasible and aligned with the UK's carbon commitments (such as the analysis by professional bodies or alliances such as LETI, RIBA and the UKNZCBS), albeit accepting that embodied carbon will not be zero in most cases.

The Local Plan for Buckinghamshire will therefore seek to develop policy that brings forward development that meets the above criteria.

Where a national policy presents a contradictory constraint against the creation of local plan policies that fulfil national policy carbon goals and climate legislation, we consider that the local plan should exert efforts to overcome that constraint – using the best available justification evidence and arguments – on the grounds of the need to fulfil its climate duty and the national policy goals of net zero carbon by 2050 and the Paris Agreement. If it proves impossible to create policies that directly ensure the above goals – whether due to viability, feasibility, or obstacles set by national policy – the Local Plan for Buckinghamshire will be designed to pursue the above goals to the greatest possible extent within the constraints.

Full report

Why must the Local Plan for Buckinghamshire take action towards net zero carbon?

The legal duty to mitigate climate change through the local plan

The local plan's role to facilitate dramatic carbon reductions and a net zero carbon future is not only a political choice and a scientific need, but also a legal duty.

This section will explain the key pieces of legislation and national government policy, as well as setting out where in national planning policy and guidance these legal duties are reaffirmed, that impose this duty, providing context for the level of ambitious carbon reduction that the policies should pursue.

Planning and Compulsory Purchase Act 2004

This is the key foundational legislation that enshrines the local plan's duty to act on climate change. Section 19, paragraph 1a, states that:

> "Development plan documents must (taken as a whole) include policies designed to secure that the development and use of land in the local planning authority's area **contribute to the mitigation of, and adaptation to, climate change**".

Mitigation of climate change means reduction in the impact of human activity on the climate system[xxii], primarily by reducing the level of greenhouse gas in the atmosphere[xxiii],[xxiv]. This has two parts: reduction of carbon emissions, and action to increase the sequestration of carbon (removal and storage of carbon by trees, grassland, other green infrastructure, or future technologies).

As outlined elsewhere in the current report, if the global average temperature warms more than 2°C above the pre-industrial average, the planet will hit 'tipping points' where various natural systems will be damaged to the point where they begin to release even more greenhouse gases and result in runaway climate change that may be unmitigable after that point.

Therefore to truly "contribute to the mitigation of climate change", the local plan's policies should facilitate the required carbon budget that would be compatible with staying below a 2°C future. As noted elsewhere in the current report (see 'National and international commitments' and 'Carbon accounting methodologies'), this essentially means there is no room for new development to add to the overall carbon emissions of the UK, given the existing vast challenge of reducing existing emissions. The RTPI and TCPA assert also that "This means that Annual Monitoring Reports should [assess] carbon performance against the carbon budget regime set out in the Climate Change Act".

Levelling Up and Regeneration Act 2023 (LURA)

The legal duty to mitigate climate change, which the Planning & Compulsory Purchase Act 2004 already applies to the local plan, is repeated in the Levelling Up & Planning Act 2023. The LURA also applies that same climate duty to spatial development strategies, neighbourhood plans, minerals/waste plans, and supplementary plans. It also requires that Government must 'have regard to the need to mitigate climate change' when creating 'national development management policies'.

Additionally, the LURA (Schedule 12) empowers national government to bring in a new 'Infrastructure Levy' that local plans may levy on development similarly to how Community Infrastructure Levy and Section 106 payments have been used until now. Within the conditions that the LURA places on these new Infrastructure Levy, it includes that they must be spent on infrastructure, whose definition includes "facilities and spaces for the mitigation of, and adaptation to, climate change.".

What degree of mitigation is justifiable?

National Planning Policy Framework (NPPF) (December 2024)

This document[xxv] is the framework by which the whole planning system is guided, and by which the soundness of local plans (and planning appeals) is judged by the planning inspectorate. Its following paragraphs reaffirm the duty of local plans (and whole planning system) to mitigate climate change:

- 161: "The **planning system should support the transition to net zero by 2050** … shape places in ways that **contribute to radical reductions in greenhouse gas** emissions … [and] encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure".
- 162: "Plans should **take a proactive approach to mitigating** and adapting to climate change … **In line with the objectives and provisions of the Climate Change Act 2008**".
- 164: "New development should be planned for in ways that … help to reduce greenhouse gas emissions, such as through its location, orientation and design".
- 165: "To help **increase the use and supply of renewable and low carbon energy** and heat, plans should … **provide a positive strategy for energy from these sources** … consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development … [and] identify opportunities for development to draw its energy supply from … renewable or low carbon energy".

To comply with the above imperative for carbon reductions 'in line with the Climate Change Act' would have to mean taking action to achieve the intermediate 5-yearly carbon budgets that the Committee on Climate Change devises and parliament legislates, as well as the eventual net zero goal in 2050 that is now explicitly referred to in paragraph 161 as of the 2024 version of the NPPF, as quoted above.

Importantly, the **December 2024 NPPF no longer contains the insurmountable barriers to onshore wind power**, that had been enforced since 2015 (whereby onshore wind turbine development could not be permitted if there were even a single local objection, nor if it were outside specific pre-identified suitable areas). The current NPPF only states that once a local plan has identified suitable areas for *any* renewable energy development, any applications outside those areas should demonstrate that the proposed location meets the same criteria that were used to identify those suitable locations.

Relatedly to this change in the NPPF, the new national government's July 2024 Policy Statement on Onshore Wind[xxvi] explicitly states the Government's intent that onshore wind should be on the same footing as other energy development. Part of this, as expressed in a December 2024 consultation response[xxvii], is that onshore wind power developments of 100MW or greater will be brought back into the Nationally Significant Infrastructure Project (NSIP) consenting regime, meaning that they would be subject to national planning consent rather than being a local planning decision. That consultation also proposes that solar power development projects would be classed as NSIP when they are sized at 150MW or more, as opposed to the current threshold of 50MW.

Planning Practice Guidance (PPG)

The National Planning Practice Guidance is an online resource that adds further context and interpretation to the NPPF. It is separated into a series of topics, including climate change, renewable energy, planning obligations and viability. It makes several points about the duty and expectation for local plans to address carbon reductions.

Its climate change section[xxviii] confirms that:

> "Addressing **climate change is one of the core land use planning principles** which the National Planning Policy Framework expects to **underpin both plan-making and decision-taking**. To be found sound, Local Plans will need to reflect this principle and enable the delivery of sustainable development in accordance with the policies in the National Planning Policy Framework. These include the **requirements for local authorities to adopt proactive strategies to mitigate and adapt to climate change in line with the … Climate Change Act**".

This section reiterates local plans' climate mitigation duty per the Planning & Compulsory Purchase Act 2004, and that plan makers should be aware of the 2050 net zero goal and carbon budgets set via the Climate Change Act 2008. The section on renewable and low carbon energy[xxix] confirms that:

- All communities have a responsibility to help increase the use and supply of green energy, albeit not overriding other environmental protections
- Local planning authorities hold decisions over renewable energy development of 50 megawatts or less and that the Government intended[xxx] (at the time when this section of the PPG was written, seemingly pre-2016) to amend legislation so that local planning authorities would also hold decisions over onshore wind energy development of any size, including those over 50MW

However: It is important to note that at the time of writing the current report (November 2024), the PPG web page states that the climate change section was last updated in March 2019. Meanwhile the renewable energy section was last updated in August 2023 purely to add a section on battery storage systems, but all other content on that page remains unchanged since 2015.

This illustrates how the PPG is not always the most relevant and up-to-date expression of national government policy in that its contents in this case have not been updated to reflect several years' worth of NPPF changes, legislative changes and other statements of national government policy (such as Written Ministerial Statements) that may contradict or supersede the statements on with the PPG was originally written. Examples of potentially significant national policy or legislative changes that have occurred since the climate change section of the PPG was last updated include:

- The June 2019, July 2021, September 2023 and December 2023 versions of the NPPF (albeit none of these brought particularly significant changes to the climate change mandate)
- The 2020 legislative instrument 'The Infrastructure Planning (Electricity Storage Facilities) Order 2020, which now means that energy storage of over 50MW is now the domain of the local planning authority, except pumped hydro[xxxi]
- The Written Ministerial Statement (WMS) on Energy Efficiency in Local Planning, 13th December 2023, which replaces and supersedes a previous WMS made in 2015 (whereas the PPG section redundantly still echoes that 2015 statement despite the fact that that WMS2023 expressly stated that the PPG would be updated to reflect it)
- The passing of the Levelling Up & Regeneration Act, which replicates and cements the duty to mitigate climate change that was originally enshrined in the Planning & Compulsory Purchase Act (albeit the Planning & Compulsory Purchase Act remains relevant and is cited in the PPG).

This list is not exclusive; there may also be various other relevant policy evolutions with which the PPG is not up to date.

Potential tension with other duties

These carbon reduction duties are often in tension with the other expectations laid upon the local plan – e.g. to enable economic growth and delivery of government-mandated housing targets. It is often assumed or argued that these other objectives could be inhibited if the carbon reduction provisions are so onerous as to present technical challenges or put at risk the developers' anticipated minimum profit margin of 15-20%.

Nevertheless, the NPPF explicitly states that the goal of the planning system is '*sustainable* development' which it defines as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (as per the United Nations definition).

Given that the continued existence of life across much of the Earth is at risk if the planet exceeds 2˚C of climate change (as discussed elsewhere in this report) – or at least a good quality of life – there is a strong argument to make that carbon emissions should be treated as the fundamental bottom line for what we can define as 'sustainable' development.

The UK's national and international commitments to address climate crisis

Local plans are expected to be in line with national policy, and the NPPF (previously cited) explicitly instructs plans to "take a proactive approach" to climate mitigation "in line with the objectives and provisions of the Climate Change Act". We therefore here lay out what those objectives and provisions are, the UK's international commitments that they support, what it would take to achieve them, and whether it appears they will be achieved without local policy intervention. This is a key basis for local plan policy design and justification, especially on how stringent the local standards should be.

Paris Agreement 2015

The UK is a signatory to the international Paris Agreement 2015, brokered via the United Nations. This commits all signatories to limit global average temperatures to 2˚Celsius on pre-industrial levels, and to pursue a limit of 1.5˚C. This would require very fast and drastic cuts to global emissions, as there is a limited 'carbon budget'[xxxii] to be emitted before the 1.5C and 2C limits will be reached – and a rise of 1˚C has already happened. If the 1.5˚C or 2˚C limits are breached, climate change impacts will be devastating worldwide, and the world is currently on track to breach 3˚C by the end of the century[xxxiii].

The Paris Agreement also commits that the extent of each country's carbon reductions is related to wealth and technological ability. As a rich and technologically advanced country, the UK is responsible for faster and deeper cuts. Given the speed and scale of carbon cuts needed in existing buildings, transport and other energy use, we cannot afford for new buildings to add to the burden.

Climate Change Act 2008 and 2019 update

In 2019 the UK Government declared a climate emergency and updated the legally binding carbon reduction goal for 2050 enshrined in the **Climate Change Act 2008**. The new goal is to achieve a **net zero carbon UK by 2050**, rather than the original goal of an 80% reduction on the carbon emissions of 1990. The Act also comes with **legislated interim 5-yearly carbon budgets** that are devised by the independent Committee on Climate Change (CCC) and then passed into law by Parliament.

The latest legislated five-yearly carbon budgets[xxxiv] legally commit the UK to achieve a 78% reduction by 2035 compared to the 1990 baseline. That would be roughly equivalent to a 65% reduction compared to current levels, which would require an average drop of about 4.3% a year[2].

Those carbon budgets also show that the sectors of buildings, energy and land transport should all achieve steep and rapid reductions and reach zero or near-zero emissions on their own terms (see *Figure 5* overleaf), not relying on offsetting.

The Committee on Climate Change explains that "a little more or a little less may be achieved in any area, or alternative low carbon options could be used, but the overall level of ambition and delivery must match" the proposed carbon budgets. Given that all sectors face a huge challenge in achieving their own required reductions, this means there is **very little room to offset emissions in one sector by reductions or removals in another sector**. For example, even highly ambitious levels of tree planting would barely be enough to offset unavoidable emissions from agriculture – see *Figure 5* overleaf - thus the buildings and energy sectors should not rely on tree planting to make up for insufficient reductions in their own emissions.

[2] For context, the UK's carbon emissions fell by 9.5% in 2020 due to the COVID pandemic but rebounded by about half that figure in 2021, while global carbon emissions fell by about 5% in 2020, but then in 2021 rebounded to even higher levels than before COVID.

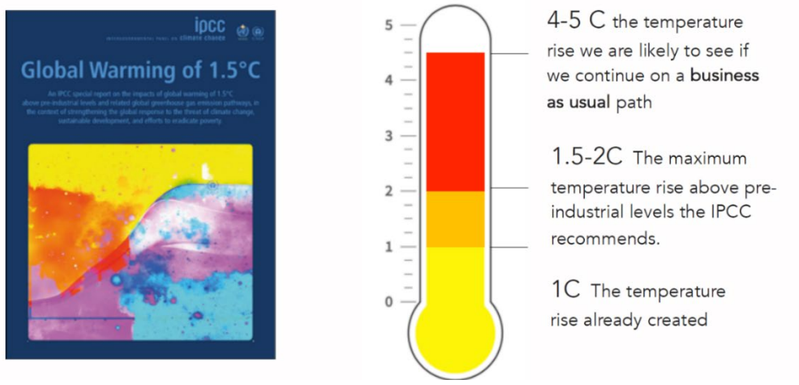


Figure 3: Special Report on 1.5C by IPCC, and diagram of the potential range of climate change to 2100 (Diagram credit: Etude, 2021).

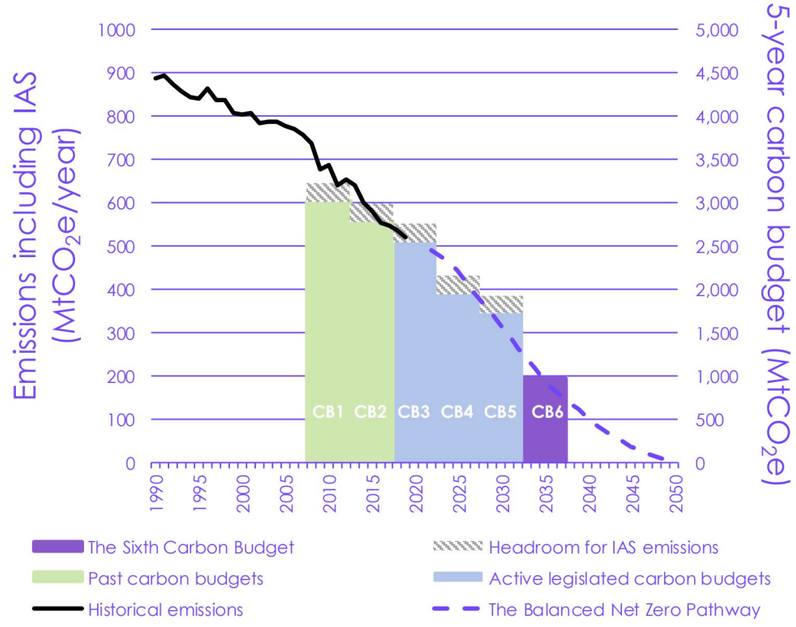


Figure 4: UK legislated carbon budgets under the Climate Change Act. From Committee on Climate Change (2020), The Sixth Carbon Budget: The UK's Path to Net Zero. "IAS" = international aviation & shipping.

The UK's five-yearly carbon budgets also come with **progress reports**, and analysis detailing a **combination of actions necessary to stay within the budgets**[3]. These include wide-reaching and ambitious changes to buildings (new and existing), the energy system and transport, as well as agriculture/forestry, industry and waste. Most relevant to local planning are:

- **No new homes connected to the gas grid from 2025** at the latest[xxxv] (and ideally be zero carbon[xxxvi]), instead using low-carbon heat such as heat pumps or gas-free heat networks
- **New homes to have a very low space heat demand of only 15-20kWh/m²/year** (a 60-70% reduction on a new home that just complies with the previous 2013 building regulations[xxxvii])
- **Accelerate and scale-up rollout of low carbon heat to existing buildings**, with 3.3. million heat pumps installed in existing homes by 2030, expansion of low carbon heat networks in the 2020s, and a limited role for hydrogen in the existing gas grid in some locations after 2030
- **End the installation of any fossil fuel boilers by 2033 for all existing buildings** including homes, commercial and public buildings, unless in hydrogen gas grid areas
- **Rapid rollout of insulation and other energy efficiency measures to existing buildings**, so that all existing homes for sale from 2028 have EPC rating of C or better, and 15 million homes to receive insulation to their walls, floors or roofs by 2050, to include by 2025:
    - Loft insulations to reach 700,000 per year (from current level of just 27,000/year)
    - Cavity wall insulations to reach 200,000/year (current level: 41,000/year)
    - Solid wall insulations to reach 250,000/year (current level: 11,000/year)
- **Construction materials to be used more efficiently and switching to low carbon materials** (e.g. timber and low-carbon cement) – although this has only a very small role overall
- **Fully decarbonise the electricity grid by 2035**, by:
    - Scaling-up renewable electricity to represent 80% of generation by 2050 – primarily wind power but also solar, with much of the wind power being offshore – in step with greater electricity demand as buildings and transport switch away from fossil fuel
    - Adding energy storage to the system, including batteries, hydropower, and hydrogen
    - Maintaining or restoring the existing nuclear power capacity by building new capacity in the 2030s to replace existing plants that are being retired in the 2020s
- **Reduction in travel mileage by car**, and phase out of new fossil fuel cars and vans from 2032 in favour of fully electric vehicles – and relatedly, decisions on investment in roads should be contingent on analysis justifying how they will contribute to the UK's pathway to net zero and not increase emissions[xxxviii]
- **Increase woodland cover to 18% of UK land** [xxxix], up from 13% today, and restore peatlands.

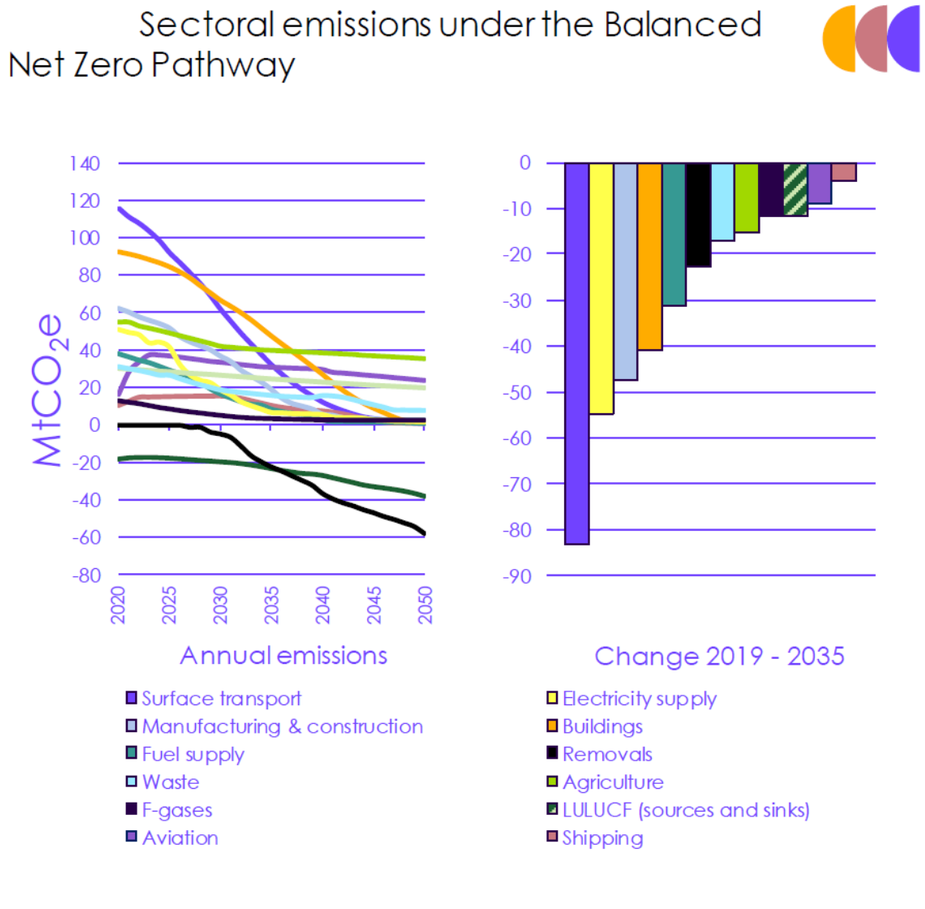


Figure 5: Committee on Climate Change Diagram showing how the carbon emissions of each sector must fall to achieve the 'balanced' pathway to net zero carbon in 2050 and meet carbon budgets. LULUCF = Land use, Land Use Change and Forestrety. From Committee on Climate Change (2020), *The Sixth Carbon Budget: The UK's path to net zero*.

It is vital to note that to realise the 'balanced pathway' to net zero and the carbon budgets, all of the above changes must be achieved in combination, not either/or. This is because there are many interdependencies, and each sector faces such a large challenge in addressing its own emissions that none of the sectors (buildings/energy/transport/land use/agriculture/waste) can be reasonably expected have the capacity to reliably pick up slack from others that underperform.

[3] It is important to note that the carbon budgets, while challenging, are really the minimum degree of action logically necessary for the UK to achieve to play its proportionate role in preventing catastrophic climate change. Other expert analysis has found that, according to the equity principles that the UK has committed to through the Paris Agreement, the UK's proportional of the global carbon budget should logically be about half the size of the budgets that the CCC permits – see separate subsection in this report titled "Tyndall Centre suggested local area carbon dioxide budgets".

To what extent is the necessary mitigation for the UK's legislated carbon budgets being delivered by national regulation or the wider industry?

As discussed previously, the local plan has a duty to mitigate climate change (i.e. actively reduce carbon emissions) and the NPPF indicates that this should be 'in line with the Climate Change Act'.

Where there are already national programs or policies in place to reduce carbon emissions and these are thought to be effective, the local plan therefore clearly needs to support those or be compatible with them. It should also of course exercise its other powers to pursue carbon reductions in whatever ways are more suited to local rather than national decision-making (for example, setting a spatial strategy to direct growth to the locations most likely to reduce car use).

However and furthermore, the extent to which local plan policy logically needs to go *beyond* those national interventions must logically depend on whether or not those national initiatives (or the development industry itself), are already on track to deliver the actions needed to fulfil the carbon budgets set under the aegis of the Climate Change Act. Where these are lacking, this will support the justification set local policy that goes further or faster in its required standards.

We therefore here explore the latest available evidence on whether the UK is already delivering the type, scale, speed and degree of changes that the Committee on Climate Change has analysed to be necessary to fulfil those national carbon budgets. We here focus only on the changes that are relevant to the local plan's sphere of influence, i.e. buildings that require planning permission, and transport (we do not cover changes that the local plan cannot influence, such as changes to existing agricultural or industrial practices).

Please note that this section deals with the picture at national level. The commitments at the level of the local plan area, and the available progress insights towards those, are dealt with in the subsequent section "The role and commitments of Buckinghamshire Council".

Building regulations (current and planned future) do not deliver the performance needed

As explained more fully elsewhere in this report, the national Building Regulations on energy and carbon – Part L – neglects the following:

- Does not cover the entire scope of buildings' energy use, thus does not cover its full operational emissions.
- Does not require its energy and carbon targets to be met in real life, only through estimation methods that have been repeatedly found to be inaccurate (SAP and SBEM; see glossary).
- Embodied carbon (glossary) – neither current nor future Building Regulations deals with this.
- The current Part L (2021) does not rule out gas, and many buildings granted under this regime will actually be completed post-2025.
- The Future Homes Standard (2025) (FHS) is expected to ensure that new homes are gas-free, but not net zero carbon from first operation, going against the Committee on Climate Change's recommended "rapid and forceful pursuit of zero-carbon new-build"[xl].
- The FHS will not deliver a low enough space heat demand[xli] for the UK's carbon budgets. This is true whether calculated with SAP[xlii] or a more accurate energy prediction method[xliii,xliv], in all three of the indicative FHS specifications that the Government has released to date.
    - To achieve the necessary 15-20kWh/m^2 limit, improved fabric is needed. Government's first FHS consultation had indicated that the FHS would include fabric improvements (albeit not enough), but the 2023-2024 consultation[xlv] presented two options that both make little to no improvement on today's fabric. If modelled in SAP, a building fabric similar to the recent FHS consultation would have space heat demand of up to 54kWh depending on home type[xlvi], even before adjusting for SAP's underestimation of this.

Government carbon strategy to date, as a whole, is insufficient to meet the UK's carbon budgets

National Government plans for the achievement of national carbon goals have twice been deemed by the High Court to be so ineffective as to be unlawful in their failure to deliver on the Climate Change Act: in 2022 the Net Zero Strategy[xlvii], and in 2024 the Carbon Budget Delivery Plan[xlviii]).

The Committee on Climate Change annual progress reports reveal the UK's progress towards emissions targets, including progress towards the necessary changes in each sector. Its analysis in 2022 found that the **government's policy plans were insufficient to deliver the full suite of necessary actions for the carbon budgets**[xlix]. The Committee's 2023 and 2024 reports also note a lack of progress on crucial issues. The 2024 headlines on the (former) Government's policies include that:

- **Of the emissions reductions that must be achieved by 2030, around half lack credible plans** for their delivery and/or carry significant risk to the plans that are in place
- **From 2024 onwards, the majority of reductions in coming years need to come from sectors other than electricity generation**, which carried the bulk of reductions achieved in 2008-23.

Further findings from the 2023 and 2024 progress reports are provided overleaf in a summary table.

Topic	UK-wide changes needed to hit legislated carbon goals (note: non-exhaustive)	CCC 2023 progress report[I]	CCC 2024 progress report[Ii]	Therefore what local plan policies could be logically needed to 'mitigate climate change in line with the Climate Change Act'?

Overarching	• Decrease emissions by 2.9% per year between 2014-22 (excluding aviation & shipping)
	• Decrease emissions by 5.6% per year in 2022-2030 (excluding aviation & shipping)
	• 68% emissions reduction by 2030 (from 1990 level)
		• **The 2014-22 rate was achieved, but the bulk of this was via the electricity sector** whose low-hanging fruit is now gone – therefore other sectors' decarbonisation needs to accelerate from now on (non-electricity sector emissions have only fallen by 1.2% per year in 2014-22; must be 4.4% per year from now on).
		• **Government's plans (Carbon Budget Delivery Plan) are insufficient**; about half of the necessary reductions from 2023-2037 lack credible plans for their delivery, especially in the sectors of buildings, industry, surface transport and agriculture.
		• **Of the 50 key indicators, only 9 are on track**; 11 are significantly off track; 14 are slightly off track. The remaining 16 are not yet assessable.
		• The planning system is identified as a particular barrier to rapid progress.
			• **2022-23 emissions dropped by 5.4%, which exceeds the average annual drop in 2015-22 but still short of the required 5.6%. The drop was mostly delivered by external factors including:**
			  ○ A return to normal levels of electricity imports from France as their nuclear power came back online after a period of downtime
			  ○ Overall less gas use in buildings and industry, but this is likely due to high prices rather than efficiency or lasting behaviour change.
			• **Emissions reduction excluding the electricity sector was only 3.2%**
			  ○ This must rise to 4.6% per year in the period 2023-30 if the UK is to meet its 2030 target of 68% reduction on 1990 emissions – a goal set towards the UK's commitment to the Paris Agreement.
			• **Of the emissions reductions that must be achieved by 2030, around half still lack credible plans** for their delivery and/or the plans in place carry significant risk.
			• **Of the 28 key indicators, only 5 are on track;** 7 are significantly off track, and a further 7 are slightly off track. The remaining 9 are not yet assessable or not associated with a specific benchmark/target.
				Design policies to accelerate the rate of carbon reduction overall beyond what is being achieved by national mechanisms – especially in sectors noted to have nationally fallen behind what is necessary, such as:
				• Expansion of renewable electricity generation – whether by promoting the development of standalone renewables, addition of renewables to existing properties, and/or by requiring renewable energy generation capacity to be delivered as part of other types of development
				• Energy and carbon performance of buildings (beyond what national regulation already requires)
				• Spatial allocations to minimise car use
				• Take a positive stance towards infrastructure for public transport, electric vehicles and hydrogen vehicles (although the latter is unlikely to emerge except for heavy logistics)
				• Take a positive stance towards development of premises for specific industry or commercial sectors that are needed for the UK's low-carbon transition, such as research and manufacturing facilities for low-carbon technologies
				• Take a positive stance towards proposals for changes to existing buildings that would improve their energy / carbon performance.

Topic	UK-wide changes needed to hit legislated carbon goals (note: non-exhaustive)	CCC 2023 progress report[I]	CCC 2024 progress report[Ii]	Therefore what local plan policies could be logically needed to 'mitigate climate change in line with the Climate Change Act'?

Rollout of low carbon heating, and fabric improvements, to existing buildings	• Dramatically increase the rollout of heat pumps to existing buildings, so that installations reach 600,000/year by 20228 and 100% of heat system sales are low carbon ones from 2033
	• 3.3 million heat pumps into existing homes by 2030 and expand heat networks throughout 2020s
	• Hydrogen only plays a very limited role in the buildings sector trajectory of the 6th Carbon Budget devised in 2020. Its role dwindled further in 2023, as Government cancelled two village pilots and will decide in 2026 if hydrogen will have a role at all in heating[Iii].
	• No installation of new gas boilers from 2033
		• Heat pump installation rates are very off-track, at one-ninth of what they should be
		• Energy efficiency retrofits to existing buildings are significantly off track, due to national policy failures.
		• Significant risk to market-based incentives for heat pump installations, as government has not balanced the cost of electricity vs gas.
		• Policy gaps remain for energy efficiency measures in buildings.
			• Heat pump installations remain very off-track, only 4% higher than the previous year and far behind other countries on this
			  ○ By 2030, 10% of existing homes should have heat pumps (currently only 1%)
			  ○ Installation rates in homes need to increase by a factor of 10 by 2028 (of which ~40% in new homes and ~60% in existing homes)
			  ○ A recommended priority action is to remove planning barriers to heat pump installations.
			• Energy efficiency retrofits are still significantly off-track:
			  ○ The rate of properties receiving Government-funded energy efficiency improvements fell, and is significantly off-track both for the CCC's trajectory and the Government's own plans.
			• Insufficient progress on policy & plans to support energy efficiency and clean heat in buildings:
			  ○ The (former) Government took several backward steps, exempting 20% of homes from the 2035 phase-out of gas boilers and not implementing the plans to require landlords to meet minimum energy efficiency standards
			  ○ The buildings policy outlook is therefore now worse than the previous year.
			• The buildings sector now lacks credible national delivery plans for almost 100% of the necessary emissions reductions up to 2030.
			• Buildings remain the second highest-emitting UK sector.
				• **Take a permissive stance towards proposals relating to existing buildings that would improve their energy efficiency and carbon emissions, including where these changes are visible from the street, such as:**
				  ○ Improvements to fabric, including external insulation, upgraded windows, and roof replacements
				  ○ Heat pump installation, including on front and side elevations, subject to an acceptable noise impact on neighbours
				  ○ Proposed connections to heat networks (subject to the network being gas-free)
				  ○ Where the proposal relates to a legally protected heritage asset such as a listed building or conservation area, work constructively with the applicant to identify ways that clean heat and improved fabric can be implemented in a way whose impacts would be acceptable
				• **Avoid new builds adding to the problem,** by devising policy for new buildings that would require them to be gas-free and use either a heat pump or other equally efficient low-carbon heat
				• **Take a positive stance towards proposals for business premises that manufacture, sell, install or maintain heat pumps or fabric retrofit products, including training facilities**

Topic	UK-wide changes needed to hit legislated carbon goals (note: non-exhaustive)	CCC 2023 progress report[I]	CCC 2024 progress report[II]	Therefore what local plan policies could be logically needed to 'mitigate climate change in line with the Climate Change Act'?

Renewable energy generation capacity	• Increase in renewable energy generation capacity to reach 60% of total grid electricity generation by 2030 and 80% by 2050, while catering for a doubling in the amount of electricity demand
	• Solar: increase generation by 3 GW per year on average (nationwide)
	• Wind (onshore & offshore combined): 3 GW of new generation per year, and repower older sites
		• Development of wind energy capacity is slightly off track – deployment rates will need to increase to meet the CCC's or the Government's own ambitious targets.
		• Development of solar energy capacity is significantly off track (far too low); has not been growing fast enough.
			• Wind power capacity (both offshore and onshore) remains slightly off-track. By 2030:
			  ○ Offshore wind installation rate needs to treble
			  ○ Onshore wind installation rate needs to double (noting that new government's intent to remove planning barriers is a positive first step)
			• Solar energy capacity still significantly off-track; the installation rate needs to quintuple by 2030.
				• **Take a positive stance towards the development of specific types of standalone renewable energy generation facilities,** including by explicitly identifying areas that are suitable for this
				  ○ This approach would need to take into account that onshore wind turbines are no longer under a national policy moratorium as of December 2024 (see this report's section on the NPPF 2024)
				• **Require new development to include a certain proportion of renewable energy generation capacity –** this can be expressed either as a % of energy use, or as an amount of generation capacity per footprint of building area, or as a percentage of the building's carbon emissions reduction that must be delivered through this renewable energy
				• **Take a permissive stance towards proposals for the addition of solar panels to existing premises** – including where these are visible from the street (subject to legal requirements around heritage protection as noted above in this table in the 'overarching' topic)

Topic	UK-wide changes needed to hit legislated carbon goals (note: non-exhaustive)	CCC 2023 progress report[I]	CCC 2024 progress report[Ii]	Therefore what local plan policies could be logically needed to 'mitigate climate change in line with the Climate Change Act'?

Embodied carbon (via manufacturing & construction)	• Manufacturing & construction sector to reduce emissions 70% by 2035, from 2018 baseline
	• By 2035, improve production resource efficiency to reduce annual emissions by 5 megatonnes, including by designing buildings to reduce material use, especially cement, lime, iron and steel
	• More substitution of low embodied carbon materials for high embodied carbon ones
	• Government should "Introduce mandatory disclosure of whole-life carbon in buildings … as soon as possible", then "a mandatory minimum whole-life carbon standard for … buildings and infrastructure which strengthens over time, with differentiated targets by function and usage … [which] should be included within the Future Homes Standard."
		• Government's Carbon Budget Delivery Plan is fails to drive industrial electrification which is vital for decarbonisation of steel in particular.
		• There is still no national mandatory disclosure of whole-life carbon of buildings.
		• There is no sign of Government intent to mandate a whole-life carbon targets for buildings.
		• Thus regulation and national policy continue to neglect the steps needed to reduce embodied carbon in line with the goals of the Climate Change Act.
			• There was a significant drop of 8.1% in emissions from this sector* this year, but this is suspected to be influenced by high gas prices leading to reduced output, rather than reflecting any long-term lasting efficiency improvements
			  ○ Industrial energy intensity (energy consumption per unit output) has been steady, whereas it should ideally be reducing in the long term
			  ○ Reductions in total energy consumption have been due to reduced output
			  ○ Industrial electrification is off-track (there needs to be more electrification to replace use of gas) and although there has been some progress in development of Government policy to remedy this compared to the previous year's report (via deals to switch specific steel sites to electric arc furnaces), this is still insufficient across the sector (the UK Emissions Trading System will not achieve this on its own and the current carbon trading price is too low to incentivise it).
			• There remain significant gaps in plans for the necessary increase in industrial resource efficiency
			• The recommendation to introduce mandatory whole-life carbon reporting in buildings (and then targets for whole-life carbon) remains but no progress is reported on this.
			
			*Assuming that the 'Industry' sector in the 2024 report is equivalent to what had previously been titled the 'Manufacturing & Construction' sector in the 2023 report.
				• **Set ambitious policies specifying target limits for embodied carbon in new development** – or at least for the reporting of embodied carbon (as this will educate developers who generally are not aware of their buildings' embodied carbon, and data from this reporting can form a baseline on which future target limits can be based). Such targets are typically expressed in kgCO2 / m2 floorspace, and can be based on existing industry guidance such as that of LETI or the UKNZCBS (see section "'Net zero carbon building' – alternative definitions in the construction sector").
				• **Set policies that seek to favour the reuse of existing buildings wherever suitable, feasible and viable**, rather than demolition and rebuilding (albeit recognising that there will be cases where demolition is not always avoidable, e.g. where the existing building is not suitable for the necessary proposed use)
				• **Set ambitious policy for carbon reductions in proposals for new non-residential premises including manufacturing** – this policy could be broken down into specific requirements for energy efficiency and renewable energy, or could be a carbon reduction target regardless of how it is achieved in the building
				• **Take a positive stance towards proposals for business premises that primarily support low-carbon construction industry** (for example that manufacture, supply or install or maintain low-carbon construction products or services, including training facilities for low-carbon construction techniques)

Topic	UK-wide changes needed to hit legislated carbon goals (note: non-exhaustive)	CCC 2023 progress report[I]	CCC 2024 progress report[Ii]	Therefore what local plan policies could be logically needed to 'mitigate climate change in line with the Climate Change Act'?

Transport	• New cars/vans majority EV by 2030 and all EV by 2032
	• Reduce average car mileage by 6% by 2030, reaching 17% by 2050 (from pre-2020 level)
	• Road investment should depend on evidence that this would not increase overall emissions, and should be accompanied by proportionate investment in EV charging, active & public transport[Iii]
	• Electrify 55% of rail network by 2050 (requires 200km/year)
	• Remove all diesel passenger trains from network by 2040
		• The rate of EV car sales was positive (slightly higher than in the CCC pathway)
		  ○ But: government's EV uptake goals from 2025 onwards are too low and the Government has delayed its 2030 target for 100% clean vehicle sales to 2035.
		• The rate of EV van sales is significantly too low and van traffic is increasing fast.
		• Government's Carbon Budget Delivery Plan does not sufficiently estimate the emissions savings that could be made through traffic reduction.
		• Transport is the highest-emitting sector in the UK.
			• Rollout of public EV charge-points is on track (this is the only indicator of low-carbon technology uptake that is on-track)
			• Car traffic is still below pre-pandemic levels, putting 'total car km travelled' on track, but van km travelled is slightly off-track (still too high)
			• Uptake of EV cars is now off-track because sales stalled in the most recent year's data
			• Uptake of EV vans remains significantly off-track, and has been increasing much too slowly
			• Transport remains the UK's highest-emitting sector
			• There remain significant gaps in plans for reduction in transport demand (driving)
			• A recommended priority action is to remove planning barriers to installation of EV charge-points at existing premises
				• **Set policies that require generous EV charging provision in development that has parking:**
				  ○ Building Regulations Part S (in force since 2022) will largely take care of this for typical residential parking that is outdoors and directly associated with residences (whether new build or major refurbishment).
				  ○ However, Part S only requires very minimal EV charging provision in non-residential and 'covered' car parking, and does not cover public car parking – therefore these are the gaps that local policy could most usefully aim to remedy by setting higher targets for the proportion of proposed spaces that must have EV charging provision, especially in parking that is likely to be used mostly by vans (e.g. logistics premises).
				  ○ Part S also only requires a charging speed of 7kW, which could take circa 10 hours to fully charge a car[Iiv] - therefore local policy could seek higher speed chargers in development that proposes parking at short-stay locations such as shopping centres.
				• **Structure the approach to transport planning to reflect the CCC's point about not investing in roads without evidence that this would not increase emissions and balancing this with investment in active and public transport** – the local plan specifically could reflect this in their developer contributions charging schedule, and bear this in mind wherever development is required to mitigate its impacts on the road network.
				• **Take a positive stance towards proposals that are necessary to fully electrify the rail network,** if these should arise.

Topic	UK-wide changes needed to hit legislated carbon goals (note: non-exhaustive)	CCC 2023 progress report[I]	CCC 2024 progress report[II]	Therefore what local plan policies could be logically needed to 'mitigate climate change in line with the Climate Change Act'?
Land use	Forest cover to reach 18% of land use by 2050 (up from 13% in 2020)	• New woodland creation is significantly off track; today's rate must double by 2025. • Peatland restoration rates have been a factor of 5 less than recommended rate.	• New woodland creation remains significantly off-track. No improvement since the 2023 report, meaning there remains a need to more than double by 2025 and maintain that doubled rate in future. ○ This is a serious problem because tree's growth rate creates a long lag before they begin to remove significant amounts of greenhouse gas from the air – thus today's low afforestation rate is already curtailing the amount of carbon savings achievable in the 2040s and beyond • Peatland restoration rates remain significantly off-track.	• **Take a generally negative stance to proposals that would result in the destruction of woodland,** or where the benefits of the development outweigh that loss, require their like-for-like replacement elsewhere in Buckinghamshire (including plans and funding for long-term maintenance of that new woodland or that restored peatland) • **Likewise take a stance that dissuades destruction or drainage of peatland.**

To clarify: Please note that where the table above uses the term 'take a positive stance' towards certain types of proposal, this is not to say that all such proposals must always be permitted in all circumstances. Rather, it is an indication that the benefits of such proposals should be explicitly acknowledged as vital parts of the UK's transition to net zero, which the NPPF instructs the planning system, including the local plan, to proactively support. As such, these benefits should be given a significant amount of material weight in the planning decision in proportion to their carbon savings impact and crucial role in that net zero transition, especially if being weighed up against more subjective concerns. Yet all such proposals of course remain subject to legal constraints such as biodiversity protections and heritage protections, and all application decisions are the result of a balance of policy priorities. Taking a 'positive stance' to such proposals would mean that the proposal's compatibility with the net zero transition is a central consideration as opposed to a peripheral one, and only refusing such applications if they really do have an unavoidable detrimental impact on other vital policy priorities that are equally as objectively important as the national net zero transition.

To conclude: The 2023 and 2024 reports on national progress in reducing carbon emissions show that, although there has been some good progress in absolute emissions cuts overall, the majority of recent years' success have come from the phase-out of coal power and reductions in gas use due to high prices rather than to sustained improvements in efficiency. Moreover, key changes in relevant sectors to local planning (i.e. the built environment) are already behind where they need to be, and will need to accelerate in coming years in order to realise the UK's future legislated carbon budgets. In particular progress has been too slow on buildings energy efficiency, uptake of heat pumps, and embodied carbon in manufacturing / construction. In these points and overall, the reports have found that national government's current policies and plans are insufficient to drive forward large parts of this transition.

Therefore, this leaves a strong justification for local planning policy standards to be set to drive forward the necessary changes beyond or ahead of national standards, in order to compensate for the failure of national government action to do so. Without such action by the local plan, it would fail to mitigate climate change 'in line with the objectives and provisions of the Climate Change Act' as per the requirement set by the NPPF.

Further notes on progress towards national carbon targets, beyond commentary found in the Committee on Climate Change Progress Report 2023 and 2024

Regarding transport: We note that the Government's introduction of the new Part S of Building Regulations, which requires electric vehicle charging provision at all development that has associated parking, will go a long way towards supporting increased uptake of electric vehicles. This requires at least one EV charging point of 7kW speed or more to be provided for each home that has associated parking, and for one EV charging point at each non-residential development that has at least 10 associated parking space. Both of the above are subject to some exceptions, such as covered car parking (although Part S does not explain its rationale for this exception).

However, Part S *non-residential* requirements are not optimal in that they *do not scale up in proportion to the number of non-residential parking spaces*. Part S requires one EV charging point to be provided where there are 10 or more parking spaces associated with non-residential development, but its wording does not appear to require more than 1 EV charging point even if there are far more than 10 (e.g. it appears to require just 1 space no matter how large the non-residential parking provision is).

This is concerning in that the Committee on Climate Change progress report cited above shows that electric *van* sales are behind where they need to be, and that *van* traffic is increasing fast. Vans are more likely to be business vehicles, thus likely to be parked in *non-residential* spaces, which as noted above is not ensured to have *proportional* provision of EV charging by Part S.

Part S also does not require any EV charging provision where parking spaces are not directly "associated with" a particular home or building. For example, where a developer proposes that residents or building users would use on-street parking or parking that is separated from the building by a highway or public footway, that parking appears not to be considered to be directly 'associated' with the development. Please note we do not find Part S completely clear on this.

Dense urban developments, which are more likely to be served only by on-street or covered car parking, are therefore less likely to be provided by Part S with sufficient EV charging provision to accelerate EV uptake needed for the UK's carbon goals.

Regarding embodied or whole-life carbon of buildings: An industry coalition in the development sector drafted and proposed a "Part Z" to building regulations. This was then put forward by a House of Lords member as an amendment to the Levelling Up & Regeneration Act but was never debated and thus never implemented.

In the absence of any action by national government to introduce mandatory standards for whole-life carbon, the industry has acted to develop these. There is a single formal established standard for the accounting of whole-life carbon (BS/EN15978) and this has been translated into a methodology or 'Whole Life Carbon Assessment' by RICS. In turn, leading bodies and coalitions within the industry have developed benchmarks and targets using that RICS methodology, differentiated by building type. The prominent examples are the RIBA and LETI aligned carbon targets[lv] or the targets found in the UK Net Zero Carbon Buildings Standard (explained later). Given that target-setting policy is necessary on embodied carbon in order to fulfil the UK's carbon budgets, and given the absence of any national government standard with which local policy needs to be consistent, there is a clear role for the local plan to play and no reason why the LETI/RIBA targets could not be adopted if feasible and viable.

The role and commitments of Buckinghamshire Council

2020 Motion recognising global emergency and targeting 'net zero' by 2050

As previously noted, in 2019 the UK committed (via an update to the Climate Change Act) to become net zero by 2050. Net zero means all of the greenhouse gases emitted into the atmosphere must be balanced by an equal amount of carbon removals. This is to slow down and eventually stop the earth heating up, causing global disruption. This 2050 net zero target, and the interim carbon budgets before then, are steps towards fulfilling the UK's international commitment to the Paris Agreement (2015) which was to limit global warming to no more than 2°C and to pursue an even lower limit of 1.5°C.

In recognition of the urgency to tackle climate change, very soon after its formation as a new unitary authority, **Buckinghamshire Council passed a motion in July 2020[lvi] in which it:**

- Acknowledges that climate change is an emergency and therefore that climate change *mitigation* should be a priority for the Council
- **Commits to work towards the objective of a net zero carbon Buckinghamshire by 2050** (i.e. across the whole geographical area administered by the unitary authority), working alongside national government
- **Intends to "evaluate reaching 'net zero' for [the Council's] own emissions [by] 2050** and possibly before this, potentially by 2030, subject to resources"[4].

That Motion includes that the Council's work towards that goal would include (but not be limited to):

- Creation of planning guidance requiring energy efficiency in new development
- Proactive provision for sustainable transport (presumably by the Council)
- "Extensive carbon offset via new tree planting in partnership with the community and utilising the Council's own assets"
- (and also various other actions less relevant to the local plan).

Buckinghamshire Climate Change & Air Quality Strategy (2022) and linked Action Plan(s)

In light of these commitments made in that 2020 motion, the Council then created a Climate Change and Air Quality Strategy[lvii] (CC&AQ Strategy) with the purpose to help "achieve national air quality objectives and zero carbon ambitions".

Working together via workshops within all of its own directorates and also via public engagement surveys, the Council understood that that the vast majority of its citizens were concerned about climate change (with their level of concern rising in the last 2 years).

Via national government data publications of subnational emissions, the Council also found that transport and the domestic sector are responsible for the largest part of the area's emissions (at 51% and 31% respectively at the time of Buckinghamshire producing the Strategy, albeit these are now 40% and 26% as of the latest figures – see section in the current report on carbon accounting methodologies for local areas; subsection on BEIS/DESNZ annual data).

Importantly, the CC&AQ Strategy notes that as a prosperous area of the country experiencing significant growth in population and housing, **emissions "may … increase over time in the absence of action to reduce emissions from the existing population"** – albeit recognising that increases in renewable electricity in the grid and also increases in energy efficiency may counterbalance the growth trend.

The CC&AQ Strategy recognises that much of the necessary change in these sectors are not easily or strongly influenceable by the Council – including replacing existing gas boilers in homes, mass uptake of electric vehicles, renewable power for these, and through-journeys on Buckinghamshire's motorways.

Nevertheless, informed by the data and engagement, the Strategy commits to 60 separate actions to exert its influence wherever possible to achieve climate mitigation, adaptation and air quality mitigation. The Strategy therefore categorises its actions from 'most' to 'least' degree of influence:

- **Direct Control**
- **Financial or Regulatory Role** – this is where the local plan would sit
- **Enabling Change** (outside regulatory role; e.g. providing EV charging or active travel routes)
- **Inform & Influence**.

The "County-wide" chapter of that Strategy is the most relevant to the local plan. Within this chapter:

- The subsection on 'Buildings and developments' recognises that:
  - Major development and major transport hubs (even outside Buckinghamshire's borders) can influence traffic volumes in Buckinghamshire and associated emissions.
  - Public engagement survey respondents agreed in the vast majority that renewable energy and innovative technologies are important for climate and air quality.
- The subsection on 'Housing' recognises in particular that:
  - Homes are 2nd largest emitting sector in Buckinghamshire.
  - Energy use (and therefore emissions) is also interlinked with fuel poverty.
  - Public engagement survey respondents stated that **planning obstacles are one of the reasons for not implementing carbon or energy improvement works to their homes**.

This last point shows that it is important that the local plan should not only drive the right design in new development, but also include policy wording that reduces real and perceived barriers to the vital works that are necessary in new homes in order to support the UK's legislated carbon budgets (as per previous report section covering the Committee on Climate Change emissions progress reports).

Of the 60 actions contained within Buckinghamshire's CC&AQ Strategy, the table overleaf identifies that **at least 15 actions are potentially relevant to local plan policy formulation on carbon** (and outlines that relevance, noting how the local plan could be an important means to help deliver each of those actions).

[4] We do not here further explore the potential or implications of 'net zero' in the council's operations, as that is not relevant to local plan policy formulation (and in any case a 'net zero carbon Buckinghamshire' would need to include a net zero carbon Council, as the Council's operations would be part of the emissions of the Buckinghamshire geographical area).

-	Actions from Buckinghamshire Climate Change & Air Quality Strategy with potential relevance to local plan policy formulation towards carbon reduction	How might this be relevant to the local plan's carbon reduction policies?
2, **13,** **20,** **27,** **29,** **30**	"Explore carbon offsetting fund and low carbon energy generation investment options" "Implement a large scale tree planting programme across the estate" "Conduct feasibility studies for the installation of solar car ports at appropriate parking sites" "Help communities identify, develop, and secure funding for projects addressing climate change and/or air quality" "Develop a service that supports schools to address climate change and air quality issues", building on the Council's prior success in school rooftop solar installations. "Endeavour to improve the energy performance of investment properties"	If a local plan policy requires new development to be net zero carbon (or other quantified target), then in the event that a development is unable to comply with this on site, then carbon offsetting payments can be raised from that development via Section 106 'developer contributions' (see current report section "How can the Local Plan take action towards net zero carbon?"). Valid uses of carbon offset funds raised in that manner could include: • Low carbon energy installation, including as solar PV panel canopies on Council car parks or on school rooftops • Community projects, where these deliver a quantified, guaranteed and permanent carbon reduction (which again could be via renewable energy generation installations) • Energy retrofit of Council properties (albeit noting that this should only be where the retrofit would not have happened without this carbon offset funding) • Tree planting, so long as the carbon savings of this are robustly calculated and its carbon credits registered via a nationally recognised method (at present, only the Woodland Carbon Code meets this criteria)
15	"Embed climate change and air quality considerations in policy and decision making"	The local plan is clearly a key policy document that can exert influence to reduce carbon (and planning decision-making is the moment of implementation).
42, **43,**	"Improve infrastructure for active travel … and electric vehicles." "Assess the carbon emissions from proposed road schemes"	Not relevant to *net zero carbon buildings policy formulation*, but instead relevant to site allocation/spatial choices, and developer contributions to infrastructure and the use of those contributions. The point on 'proposed road schemes' is especially cogent given the Committee on Climate Change recommendation that all investment into further road infrastructure should be contingent on evidence demonstrating that it will actively help deliver the UK's transition to net zero (i.e. being aware that increased road capacity typically tends to increase the use of cars by making driving more convenient and increasing the volume of traffic that the road carries).
49	"Produce a Technical Advice Note (TAN) on addressing climate change in new developments"	A local plan policy, as it would go through the full process of public consultation and examination in public, would hold more weight than a technical advice note and thus be more enforceable. However, once such a policy is adopted, a technical advice note could provide relevant and consistent detail on how to comply.
50	"Use opportunities coming out of changes to national planning policy to enhance environmentally sustainable aspects of developments."	The NPPF expects local plan policy on the sustainability of buildings to be not incompatible with relevant national policy. See current report section "How can the Local Plan take action towards net zero carbon?".
51, **52,** **53,**	"Explore means to protect heritage assets from, and use them to address, climate change and poor air quality." "Support registered social housing providers' implementation of sustainable energy and climate change adaptation initiatives in their stock" "Promote opportunities for residents to improve their homes to help them mitigate and/or adapt to climate change and poor air quality"	Local plan policies could help deliver these actions by being supportive towards that would result in an improvement to the carbon and energy performance of existing buildings. For example, policies that proactively welcome effective works including where the building owner may otherwise be concerned that they would be rejected due to visible changes to the building, such as improved windows, addition of air-source heat pumps or solar panels that may be visible from the street. Where these affect a heritage asset, there must of course still be careful consideration of that impact, but the policy could explicitly acknowledge that the decision will equally weigh the climate against any heritage harm. The policy (or linked guidance) could steer the applicant in how to devise an acceptable proposal.
54	"Encourage the use of recycled, biodegradable, and/or recyclable materials in products."	A local plan policy on embodied carbon could help to deliver this action in new developments, as recycled and bio-based materials tend to have inherently lower embodied carbon than other construction products.

The Buckinghamshire Climate Change and Air Quality Strategy's actions have been subject to several updates. The latest updated Action Plan (July 2024) is the fourth edition, which also notes progress of previous years. The Council also releases progress reports; the latest is November 2023 (2022-23).

The table below assimilates points from the July 2024 Action Plan and November 2023 Progress Report, for the actions with potential relevance to the Local Plan (identified in previous page table). Items with strongest relevance to the local plan (policy formulation, justification, or use of any potential future carbon offset fund raised from development) are emphasised in **green text**.

-	Buckinghamshire CC&AQ Strategy action	Influence	Time	Status (as of report 2023 & Action Plan 2024), where potentially relevant to local plan carbon policy as previously noted
2	"Explore carbon offsetting fund and low carbon energy generation investment options"	Financial / Regulatory	Medium	Initial research into options was conducted in January-March 2023.
13	"Implement a large scale tree planting programme across the estate."	Direct Control	Medium	Various sites planted in 2021-2024; procurement exercises underway for more sites. **Two sites in 2022-23 are Woodland Carbon Code registered** (to calculate and record their carbon removals).
15	"Embed climate change and air quality considerations in policy and decision making"	Direct Control	Medium	A relevant section was added to corporate reporting in 2022. A climate risk report was issued to internal 'business strategy' team and 'risk management group' for input. **The 2024 Action Plan does not record any link to plan policy or decisions.**
20	"Conduct feasibility studies for the installation of solar car ports at appropriate parking sites"	Direct Control	Medium	Supplier engagement in 2021. **Identified scope for 2,675kWp on public car parks and 428kWp at a council operational site.** A bid was submitted in 2022 to the Local Electric Vehicle Infrastructure fund.
27	"Help communities identify, develop, and secure funding for projects addressing climate change and/or air quality."	Enabling Change	Short	Various successful fundings including Local Authority Treescape Fund, HS2 Tree Giveaway, and Forestry Commission. Workshops/briefings delivered and online guidance updated.
29	"Develop a service that supports schools to address climate change and air quality issues", building on the Council's prior success in school rooftop solar PV.	Financial / Regulatory	Medium	Solar for Schools lease & **[solar] Power Purchase agreement with a specific school** (2022-23). Connected/promoted Woodland Trust free trees opportunity.
30	"Endeavour to improve the energy performance of investment properties"	Financial / Regulatory	Long	None stated in 2024 Action Plan.
42	"Improve infrastructure for active travel … and electric vehicles."	Direct Control	Short	EV charging fund bids: 1 successful (2021). 2 further submitted in 2022. 2 active travel routes improved (2022 and 2023) and 2 new routes or sections created (2021, 2022, 2023).
43	"Assess the carbon emissions from proposed road schemes."	Direct Control	Short	1 assessment draft (2024) with "baseline vs as designed" study and carbon management plan.
49	"Produce a Technical Advice Note (TAN) on addressing climate change in new developments"	Direct Control	Short	"Sustainable Development TAN exploration" in 2021. **No further progress noted as of 2024.**
50	"Use opportunities coming out of changes to national planning policy to enhance environmentally sustainable aspects of developments."	Direct Control	Short	Climate Response Team has responded to various planning consultations, commented on neighbourhood plan consultations, and recommended conditions for renewable energy on for planning applications.
51	"Explore means to protect heritage assets from, and use them to address, climate change and poor air quality."	Enabling Change	Long	**"Advice provided to Environmental Specialists with regard to accounting for embodied carbon within planning consultation requests"**, 2023.
52	"Support registered social housing providers' implementation of sustainable energy and climate change adaptation initiatives in their stock."	Enabling Change	Long	Three incidences of social housing providers in the area successfully securing grants from the Social Housing Decarbonisation fund (2023). Not noted what sort of works this would fund.
53	"Promote opportunities for residents to improve their homes to help them mitigate and/or adapt to climate change and poor air quality."	Enabling Change	Short	Bucks Solar Together delivered 2.1MW solar PV capacity in 2022/23. Green Homes Grant retrofit (91 homes 2021/22), Sustainable Warmth Scheme (203 homes 2022/23). Home Upgrade Grant (30 homes 2023-25). 'Energy Doctor' via UK Shared Prosperity Fund, 2023-25.
54	"Encourage the use of recycled, biodegradable, and/or recyclable materials in products."	Inform & Influence	Short	Promotion (via Bucks Zero Waste Map, 2020) of shops, recycling points and businesses in Buckinghamshire that can help people reduce their waste.

In summary, regarding Buckinghamshire's 2050 net zero goal and action commitments made in its Climate Change and Air Quality Strategy (CC&AQ Strategy):

- **Tree planting programmes have had much success in finding existing grant funding to date,** and as a result good progress has been made
- **Some tree planting on Council land has been registered via the Woodland Carbon Code,** meaning that its carbon savings will have been robustly quantified and will help reduce the carbon account of the Council and in turn of Buckinghamshire as a whole
- **On the ambition to expand solar PV provision across the County's car parks, schools and non-Council buildings:**
    - Good progress has been made in promoting opportunities for low-cost solar domestic installations to home owners/occupiers,
    - At least one success has been made in getting solar power onto a school (and valuable experience gained in setting up a Power Purchase Agreement)
    - The ambition to utilise Council-run car parks for solar canopy installations has seen an initial capacity scoping exercise carried out in 2021.
- **There has been effort to incorporate carbon considerations (and renewable energy targets of e.g. 10%) into planning decisions, although the Action Plans and Progress Reports do not specify the difference this made in developments' performance compared to the 'business as usual'** Building Regulations Part L (which does not meet UK carbon goals; previously noted)
    - For example, current Building Regulations since 2021 have required solar PV provision that is likely to exceed 10% of regulated energy demand in low-rise buildings, and the Future Homes Standard may require even more in the form of renewable heat.
- **Much greater progress could be achieved towards the Strategy's commitments via a solid local plan policy in new builds** to require improved energy efficiency, greater renewable energy provision, a quantified carbon reduction target, and/or carbon or energy offsetting payments to the Council where the required performance is not met on site.
    - Funds raised via offsetting requirement could unlock the Strategy's actions that would quantifiably reduce carbon – especially those that have been unable to access other funding (thus meeting the 'additionality' criteria necessary for a robust offset), such as:
        - Renewable energy installations
        - Energy retrofit of other existing buildings that do not meet the criteria of the various national funding opportunities.
- **A positive local plan policy towards specific energy retrofit in existing buildings** could remove obstacles to the Strategy's commitments to address climate change using heritage assets, and help residents improve their homes' climate impact.
- **Promotion of recycled materials is not stated to have progressed further** – this could be helped by local plan policy on embodied carbon and/or circular economy statements.

Buckinghamshire's CC&AQ Strategy highlights studies by UCL and the Carbon Disclosure Project showing that a global failure to mitigate climate change will lead to economic impacts of around a 10% reduction in global GDP growth by 2050.

A local plan that achieves dramatic carbon reductions will help to avoid contributing to the risk of Buckinghamshire's residents being impacted by those financial harms that would come with climate change. Adding to that UCL/CDP global study cited by the Buckinghamshire Strategy, and zooming in on the UK context specifically - we note that the Committee on Climate Change[lviii,lix] has found (and UK central government has recognised[lx]) that the changing climate brings risks to the UK population's health, wellbeing, and economy in coming decades, all of which could affect Buckinghamshire residents, workers and businesses:

- Overheating – deaths, health-related productivity losses, additional energy cost for cooling
- Flood – danger to life, health, and cost of damage to property and infrastructure
- Drought – perhaps risking the need for expensive solutions to maintain public water supplies
- Future contagious epidemics via disease vectors – ticks are becoming more abundant, and malarial mosquitoes may begin survive in the UK due to warmer winters
- Crop losses or soil damage via droughts, floods, heat, and wildfires – impacting jobs in our fragile farming sector, and potentially the availability and affordability of healthy food.

These are in addition to the impact on ecology/wildlife of the UK whereby freshwater ecosystems are already being harmed by over-abstraction of water[lxi], and whereby native UK wildlife may struggle to compete with invasive species that move in as our climate becomes milder.

Emerging Local Plan Draft Vision & Objectives, 2023

Based on early public engagement in 2021-22, the Council developed a draft 'Vision and Objectives'[lxii] in 2023 which has 8 objectives. Objective 2 is "Mitigating / adapting to climate change". This comprises:

a. "work towards achieving a carbon-neutral plan – this means reducing and offsetting carbon emissions across Buckinghamshire"
b. "direct growth to the most sustainable locations in terms of connections and services"
c. "design new development to be resilient to climate extremes and manage the risk of flooding"
d. "increase the supply of renewable / low-carbon energy and provide supporting infrastructure such as electric vehicle charging points and alternative fuels"
e. "require the highest standards of insulation and energy efficiency in new and refurbished buildings"
f. "enable locally liveable neighbourhoods in new development and regenerated areas"
g. "provide attractive and viable alternatives to the private car."

This shows a clear commitment to use the local plan to tackle climate change, and logical steps towards that. One caveat is that the term 'carbon-neutral plan' may not be ideal as it may not be possible to define exactly which emissions 'belong' to the local plan itself (see report section on carbon accounting). A preferable term might be 'local plan that ensures development is compatible with a net zero carbon Buckinghamshire and with Buckinghamshire's role in the UK's carbon budgets'. We also note that that draft Vision and Objectives are to be reviewed in light of the new NPPF released in 2024.

To support that aim and the relevant actions within Buckinghamshire CC&AQ Strategy as previously noted, the local plan's powers to address carbon are explored next.

Conclusion: Draft Position Statement

In light of the evidence presented in this report regarding:

- The legal duty to mitigate climate change and the national policy exhortation that this should be done in line with the Climate Change Act
- The UK's legislated carbon budgets and net zero 2050 goal set by the Climate Change Act,
- The analysis of what national and local carbon budgets should be if the UK and Buckinghamshire are to pull their weight towards the UK's international agreement to limit the global temperature increase to 2°C and pursue a lower target of 1.5°C
- Buckinghamshire Council's commitment to work towards enabling its entire area to be net zero carbon by 2050 and commitment to specific actions to facilitate that goal,
- Buckinghamshire's characteristics as a place where transport and domestic buildings are the two highest carbon-emitting sectors and as a prosperous area experiencing significant growth,
- The way in which carbon accounting methodologies for building-level, local area-level and national level relate to each other and must contribute to each other
- The degree of change needed in every sector in order to fulfil those carbon budgets (whether the UK legislated budget, or the tighter budget that would be in line with the Paris Agreement), especially those changes in the energy performance of new and existing buildings,
- The failure of national policy to deliver many of those key changes to date, in areas that local planning policy could also influence
- The relative merits of the national definition of a 'net zero carbon building' through Building Regulations compared to the industry definitions that result in a truly net zero carbon building,
- The commitments made by Buckinghamshire Council regarding making the whole area net zero carbon by 2050 and the actions in support of that in the Buckinghamshire Climate Change and Air Quality Strategy and associated Action Plans
- The planning powers made available to the local plan through primary legislation
- The various conflicting national policy statements regarding how far those local planning powers can or should be used
- The tests of soundness that the local plan will have to pass during examination in public before the plan is adopted
  and
- The array of precedent local plans elsewhere (adopted and emerging) that have pursued various types of carbon reduction policies and approaches, the success these have had, and the evidence they in turn have produced to justify their approaches,

a suggested position statement on the pursuit of carbon reductions (and the ultimate net zero carbon goal) via the Buckinghamshire Local Plan was provided at the end of the executive summary (link).

That position statement could be used in a variety of ways: Buckinghamshire Council could choose to adopt the position statement in whole or in part, to incorporate it into the local plan itself, or simply to use the statement as a means to guide the ongoing formulation of relevant local plan policy and spatial choices. It could also take any of these routes with or without amendments to the draft text that is provided here.

Effectively, that position statement is the conclusion to this report. It represents the recommended position that Buckinghamshire take regarding climate change mitigation, in line with it is recommended that policy be developed.

We do not here present any specific recommended policy, rather the basis on which the policy should be developed. Instead, options for such policies are presented in the separate 'Risk Matrix' report which also evaluates the relative merits of those policy options in terms of their climate mitigation effectiveness, compatibility with national policy, and several other criteria such as the impact on occupants of the 'net zero carbon' buildings that would be created. The actual policy approach that Buckinghamshire Council eventually selects will depend on the Council's degree of ambition to mitigate climate change, and its appetite for risk in different topics.

Defining net zero carbon at different scales from global level to building-level

As climate and carbon emissions are global challenges, consistency of effort is key (from the building scale through to the local, regional, national and international scales). If carbon emissions are not consistently accounted for, there will be a risk of not reducing emissions but simply displacing them – or failing to account for the full emissions of new development.

When devising local plan policies for Buckinghamshire, it will be vital to make sure those policies use a definition of 'net zero carbon development' that fully contributes to the achievement of a net zero carbon Buckinghamshire and net zero carbon UK.

We here look at the global, national, area-wide and building-level definitions of net zero carbon that are generally accepted. Precedents of how local plans have defined and pursued net zero carbon is then explored.

This context is important because national policy expects local plan policy to act 'in line with the objectives and provisions of the Climate Change Act 2008' which include the 2050 net zero goal and also five-yearly limited 'carbon budgets' beforehand (as explored later). Yet, most of the older adopted precedent local plans use a definition of 'net zero carbon development' that is significantly different to how a fully-fledged carbon accounting methodology would define it.

The reason for this difference is that most – although not all – of the older local plan adopted precedents have set their 'carbon reduction' requirements based on energy and carbon metrics set by national building regulations. These building regulations metrics do not account for the building's full energy use, let alone the embodied carbon of the building's materials and construction, or the transport carbon that will be induced in the lifestyles of the building's users. The use of building regulations metrics in local plan policy has been due to the way in which planning legislation defines the local planning authority's powers, and the ways in which other pieces of national government policy may constrain how those powers are exercised.

As set out later in this report, some pioneering local planning policies have begun to move beyond these potential constraints arising from planning legislation and associated national policy, instead using more effective definitions and metrics. However, due to a Written Ministerial Statement (WMS) released in 2023 which purports to limit how local energy efficiency policies are expressed, this recent surge of ambitious local plan policy is likely to diminish until the WMS2023 is either revoked or found to be unlawful and hold minimal weight once inspected at Examination in Public sessions.

This section looks at the global, national, and district-level definitions of net zero carbon. This makes it possible to understand the relative merits of different definitions of net zero carbon buildings in existing and emerging precedent local plans.

This report also helps contextualise the levels of performance or change that would be necessary to achieve those definitions of net zero carbon – in terms of changes to new buildings, existing buildings, transport, the energy system, and land use.

Net Zero Carbon at global level

At global level, 'net zero carbon' means that emissions of greenhouse gases (GHGs) are balanced out by removals of GHGs from the atmosphere.

'Greenhouse gas' encompasses a bundle of different gases that have a climate-changing effect. The most common greenhouse gas is carbon dioxide (CO_2) which represents 80% of the UK's climate impact[i]. Six other GHGs are also relevant: methane (12%), nitrous oxide (5%), and four types of fluorinated gas (refrigerants, 3%). Some of these have a weaker global warming effect, and some have a stronger effect but stay in the atmosphere for longer and therefore cause more change over time.

As CO_2 stays in the atmosphere for a long time, there is a fixed amount – a 'carbon budget' – that we can emit between now and 2100 if the world is to avoid the worst impacts of climate change (limiting global warming to less than 2˚C above pre-industrial climate). The other greenhouse gases are not subject to the 'budget' approach, because they stay in the atmosphere for a different amount of time, but should still be reduced as far as possible.

Together, the **bundle of greenhouse gases is referred to as 'carbon dioxide equivalent' or 'CO_2e'.** This refers to the global warming effect that the gas would have in a 100-year timeframe, compared to that of carbon dioxide. 'Carbon emissions' can refer to carbon dioxide, or the whole collection of greenhouse gases.

'Net carbon' or 'net emissions' refers to the amount of CO_2 or greenhouse gas that remains after deducting the amount that was removed from the atmosphere, usually over the course of a year.

'Net zero carbon' is sometimes used interchangeably with the term 'carbon neutrality'. These are overlapping concepts which essentially mean the same thing at global level, but at sub-global levels they are used slightly differently[ii], to reflect whether the emissions and removals are achieved *directly by* or purely *on behalf of* a particular country, area or organisation. This becomes a question of 'carbon accounting', discussed next.

Where is carbon emitted from and how can carbon be removed from the atmosphere?

The main *source of rising GHG levels* in Earth's atmosphere is the burning of fossil fuels (as this is an emission of carbon that had been locked up underground for many thousands of years until recently). Greenhouse gas is also emitted by many other human activities including fertiliser use (nitrogen fertilisers are often made from fossil fuel), ruminant livestock's digestive systems, breakdown of organic waste, and the chemical reaction during the production of cement.

Greenhouse gas *removals* are achieved by plants and soils such as forests, grassland, and wetland. These are currently the only reliable and scalable means to remove greenhouse gases, as no technology for carbon capture has yet been developed that is appropriate, efficient or scalable for most purposes. Still, research is underway to develop such technologies, and future carbon removal technology is a significant part of many countries' long-term strategy to limit the total amount of carbon emitted this century.

Carbon accounting methodologies: whose carbon is whose?

Human activities and economies are highly interconnected across local, organisational and international lines. Activity by a person in one location (such as using electricity) can cause carbon emissions by another entity elsewhere (such as burning coal to generate energy in power stations).

Therefore we need 'carbon accounting' methodologies to work out what share of carbon 'belongs' to each entity. An entity could be a person, organisation, building, local area, or country.

Returning to the question of 'net zero carbon' compared to 'carbon neutral', the Intergovernmental Panel on Climate Change[lxiii] essentially explains that:

- **'Net zero carbon'** typically means a balance of emissions and removals under direct control or territorial responsibility of the entity reporting them (such as a country, district, or sector)
- **'Carbon neutral'** can also apply to a firm or commodity, and typically also includes emissions and removals beyond the entity's direct control or territorial responsibility.

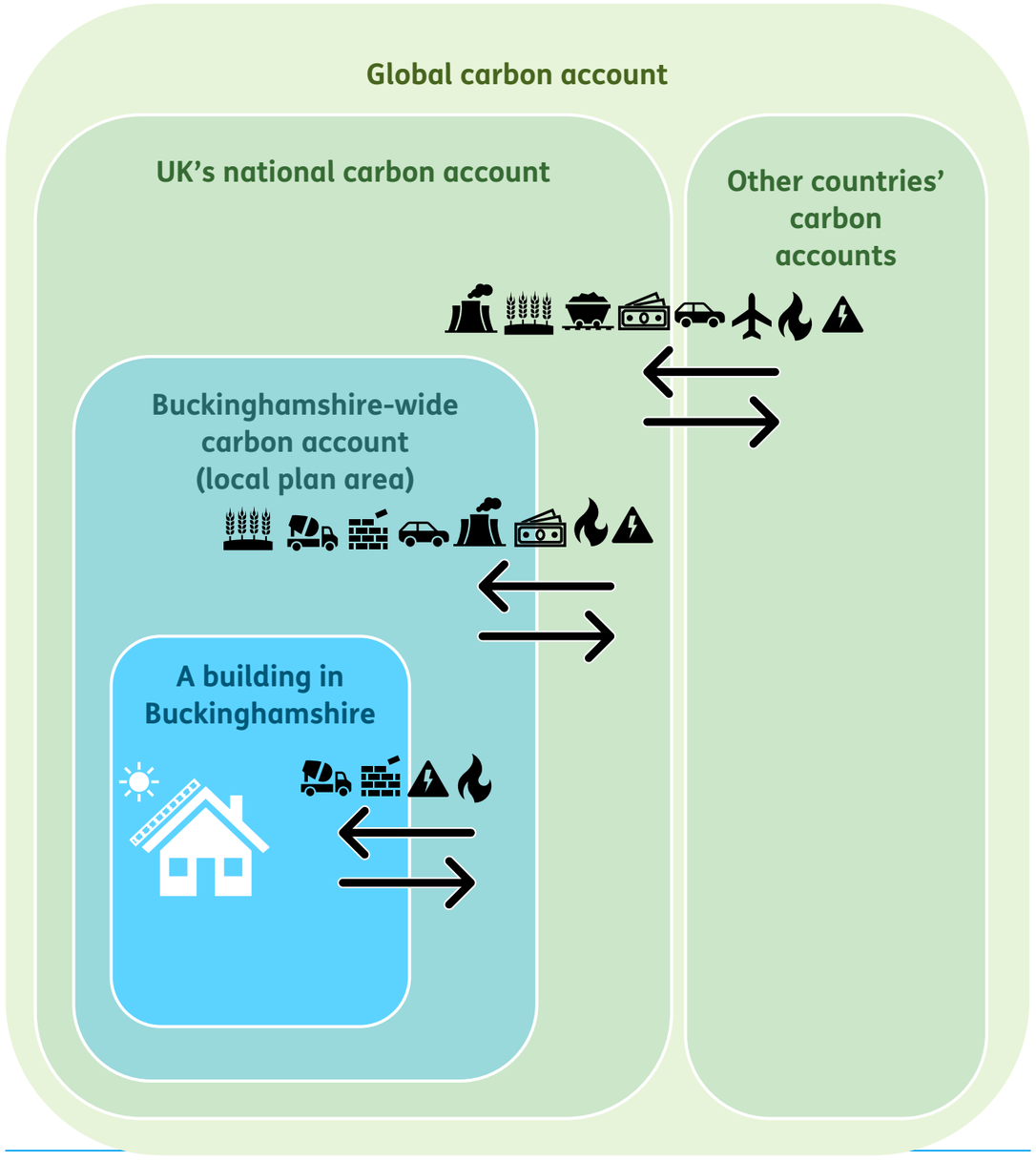
Following this logic, **'net zero carbon' would be the appropriate term if the district or country achieves enough carbon removals within its own area to balance out its own carbon emissions,** while 'carbon neutral' is a less appropriate term for a country/district but would be the term to use if the balance of emissions/removals is achieved by buying carbon offset credits from outside that location.

For the purposes of the local plan, it is relevant to consider the carbon account of three key entities: the entire UK, Buckinghamshire as a geographic area, and each new building. If development is to truly *mitigate* (i.e. reduce overall) carbon emissions, we must consider how the building's carbon emissions fit into Buckinghamshire's carbon account, and how Buckinghamshire's emissions fit within the wider UK's carbon account which is legally bound to achieve net zero by 2050 and steep reductions in the preceding years. If we use inconsistent definitions or accounting methods, then our 'net zero carbon' buildings might not help Buckinghamshire to achieve its net zero 2050 goal, and Buckinghamshire in turn might not help the UK meet its 2050 goal or its interim carbon budgets.

Several carbon accounting approaches are available to determine how much carbon a geographical area is responsible for:

- Global Greenhouse Gas Protocol for Cities (GPC) – which has three 'scopes'
- PAS2070
- Local area CO_2e inventories, released annually by the UK government DESNZ (formerly BEIS)
- Tyndall Centre local carbon budgets / SCATTER local carbon emissions accounts.

Each of these methodologies is designed to define the area's 'carbon account' based on the degree of direct or financial control the area has over activities that emit or absorb carbon. Although each methodology differs slightly from the others, a local area would usually achieve 'net zero carbon' status when the GHG removals achieved within the local area are equal to greenhouse gas emissions from directly within the local area plus the greenhouse gases due to production of grid energy the local area consumes. If an area exports grid energy to other locations, any emissions associated with the production of that energy would not count towards the area's carbon account. The methodologies generally agree that the local area's carbon account should not include offsets purchased from outside the area. These should be reported separately, if at all. However, such offsets may still help towards the overall UK net zero carbon goal so long as they are within the UK.



The Global Greenhouse Gas Reporting Protocol for Cities (GPC)

The Greenhouse Gas Reporting Protocol is the **most widely used and accepted methodology** to account for any entity's carbon emissions. The GPC is a version of that methodology that has been adapted for the use of cities or any other local area. Its aim is to enable local area carbon accounts to be tracked consistently enough to be aggregated to the regional or national level.

The GPC **covers several gases** (along with CO_2) and **splits the account into three 'scopes'** which reflect the **degree of responsibility and control** the local area has:

- **Scope 1**: emissions directly from within the area – such as through burning fuel, or through methane emissions from livestock kept within that area. Ditto, carbon removals achieved directly within the area, such as by trees growing in the area.
- **Scope 2**: emissions associated with that area's use of grid electricity, whether that energy was actually generated inside the area or outside the area.
- **Scope 3**: emissions that happen outside the area but caused by activity or spending by entities inside the area – such as production and transport of goods imported from elsewhere.

The GPC states that if an area purchases carbon offsets from outside the area in order to mitigate some of its emissions, these should be reported separately and not deducted from the total.

If Buckinghamshire chooses to use any external 'offsets' in its quest for emissions reduction (as a last resort), these should be from within the UK so that they fall within the UK's Scope 1 account and thus contribute to the UK's overall net zero carbon goal (which should not include overseas offsets).

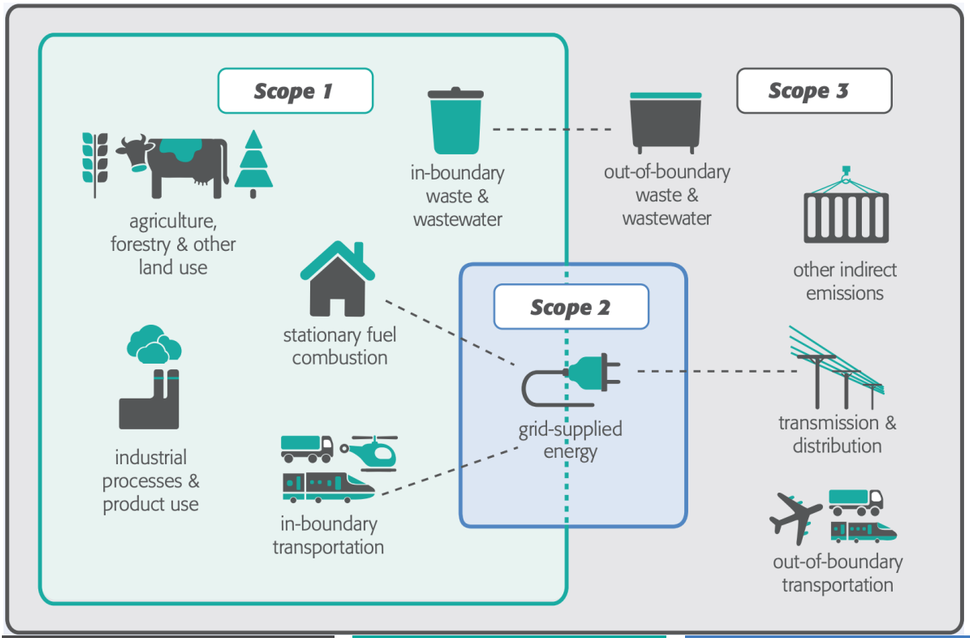


Figure 6: Various sources of emissions according to Scope 1, 2 and 3, from the GPC methodology.

PAS 2070

A PAS is a Publicly Available Specification, which is essentially the precursor to a British Standard or European EN standard. A PAS defines good practice standards for a product, service or process.

PAS 2070 aims to define good practice for the assessment of the greenhouse gas emissions of an area. It **builds on the GHG Protocol for Cities (GPC)** to include a **wider range of emissions sources** and a **slightly wider bundle of gases.** It also offers two ways of accounting, one of which is equivalent to the GPC's three scopes ("direct plus supply chain"), and the other of which allows exclusion of emissions from goods produced in the area that are then exported ("consumption-based emissions").

Just like the GPC, PAS2070 notes that if out-of-boundary offsets have been bought (whether by the municipality, businesses, organisations or residents) these should not form part of the total of a city's GHG account by deducting them from the total. Instead, such offsets should be accounted separately.

UK DESNZ/BEIS official subnational emissions inventories

The Department of Energy Security and Net Zero (DESNZ, formerly BEIS) releases annual figures that break the UK's carbon emissions down to a local level[lxiv] to help local authorities make decisions. Until the 2021 data release this counted CO_2 only, but since 2022 now **includes CO_2, methane and nitrogen dioxide (although not F-gases).** It uses data from the National Atmospheric Emissions Inventory and national statistics on local area's energy consumption. It excludes aviation, international shipping and military transport because there is no clear basis for how these would be allocated to local areas.

These DESNZ figures include only **local direct emissions** (including from land use, chemical use and waste processing, as well as fuel use) **and grid energy use.** They do not include consumption-based emissions (embodied emissions of goods produced elsewhere but transported to and consumed in Buckinghamshire). They are not broken down into 'scopes' as in the aforementioned GPC's concept, but would mostly equate to Scope 1 + Scope 2 as they do not include emissions from the local area's consumption of goods produced elsewhere (except electricity).

The DESNZ figures are **broken down into several sectors:** industry, homes, commercial buildings, public buildings, transport, and land use/forestry ('LULUCF'). Each sector's data is also further broken down into the different activities within that sector (most include electricity use, gas use and other fuel use; whereas transport is broken down into railways, different types of roads, and 'other'). Transport emissions are calculated based on traffic flow data on local roads, plus fuel use on inland waterways and trains. Electricity use in railways is accounted for separately (in the 'industry/commercial' sector instead of 'transport').

The DESNZ figures show how much carbon is removed by the area's grassland and woodland. This is positive, but also shows the scale of the challenge: The woodland/grassland is nowhere near enough to counterbalance the area's emissions even if the green areas were expanded many times over.

The DESNZ figures also reveal how important it is to plan for reduced car use and enable low-emissions deliveries – as transport is responsible for 40% of the area's emissions (larger than any other sector; see graphs overleaf).

These DESNZ figures used by Buckinghamshire Council to track progress[lxv] towards its county-wide goal of net zero by 2050 (as per Buckinghamshire Climate Change and Air Quality Strategy).

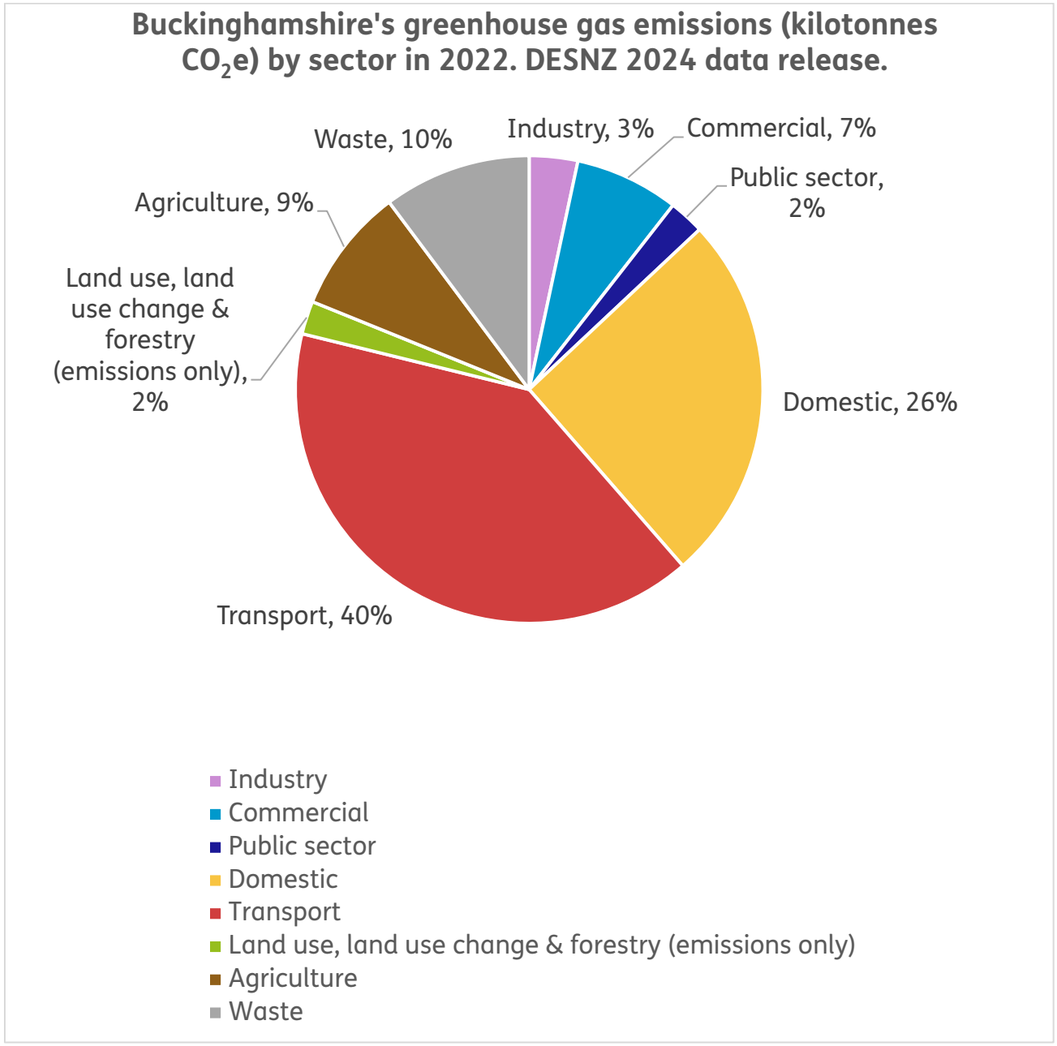


Figure 7: Buckinghamshire's greenhouse gas emissions (kilotonnes CO_2e) by sector in 2022. DESNZ 2024 data release

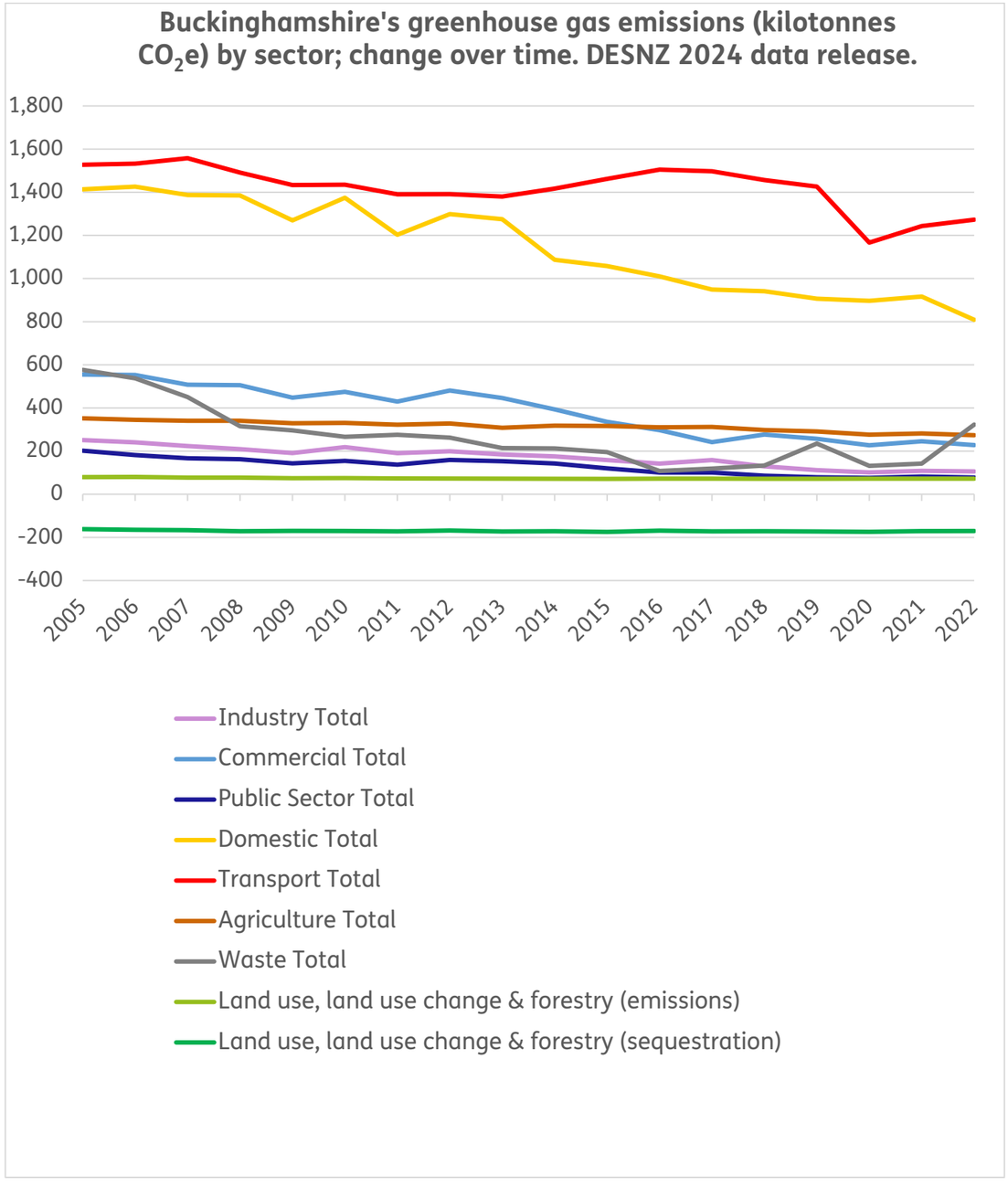


Figure 8: Buckinghamshire's greenhouse gas emissions (kilotonnes CO_2e) by sector; change over time. DESNZ 2024 data release.

Tyndall Centre suggested local area carbon dioxide budgets

The Tyndall Centre is a climate change research organisation made up of several UK universities working to get climate science evidence into policy. It created a tool that produces municipal-level carbon budgets towards a 2˚C global climate pathway that are necessary and fair, taking into account each location's sectoral base by looking at its historical portion of the country's emissions.

Please note: The Tyndall Centre carbon budgets are an academic interpretation. They are not the same as the national legislated carbon budgets set via the Climate Change Act (see later subsection) although both start from the same source of global carbon budget data (the IPPC; see glossary). Those national legislated budgets are not officially divided into local area budgets, although clearly the national budgets cannot be achieved unless each local area plays its proportionate role. The following paragraphs describe the Tyndall Centre's work and methodology – several points in which give rise to differences between the Tyndall budgets and the legislated national budgets (especially the points about equity, scope of gases, scope of sectors, and assumptions about carbon removal technologies).

The Tyndall trajectories show the UK's **total CO_2 budget to 2100** if the UK is to play its proportional role towards fulfilling the **Paris Agreement** (to **limit global warming to 2˚C**, with **carbon cuts equitably distributed to each country** in proportion to its technological and financial capability, its needs, and its responsibility for historic emissions; see later report section on this topic). Starting from a global carbon budget that would keep global warming "well below" 2˚C, determined by the IPCC, the Tyndall Centre derives a CO_2 budget for the UK from this global budget. It allocates the UK's share of this based on Paris Agreement equity principles as above regarding capability, need and responsibility[5]. It then allocates a proportional local carbon budget from the UK one, split into five-yearly budgets.

The Tyndall methodology **only covers CO_2 that is emitted due to energy use** (whether in transport, buildings, agriculture or other industries). It does not cover the other six greenhouse gases, or releases of CO_2 from activities other than energy use. The reasons are as follows:

- Other gases are left out because "a cumulative emission budget approach is not appropriate for all non-CO_2 greenhouse gases, as [they have] … differing atmospheric lifetimes and warming effects", with more uncertainties around them.
    - There is a parallel methodology named SCATTER that builds on Tyndall carbon budgets to estimate these other gases; see separate subsection later in the current report.
- Other activities are excluded because energy use is the main source of CO_2 emissions and therefore the main activity that needs to be addressed.
    - Emissions from cement production (except fuel use) are excluded because cement production is assumed to be unavoidable to some extent, therefore a deduction for cement is made from the global budget before the UK's budget is allocated.
    - Aviation and shipping are excluded from the local budget, because it is considered that those cannot be fairly allocated to local areas – so a deduction is made from the UK budget to make room for aviation and shipping, before the local budget is allocated.

The Tyndall Centre assumes that global forest levels do not change between 2020-2100, assuming afforestation in certain areas to counteract deforestation in others. It recommends that GHG removals achieved by further afforestation are monitored separately from this budget and used instead to compensate for unavoidable non-CO_2 emissions, such as agricultural methane.

Unlike the official national legislated budgets (that are based on Committee on Climate Change analysis as previously noted), **the Tyndall Centre does not assume that carbon capture technologies appear in future**, as this would risk over-estimating the budget if that technology does not emerge. If these technologies were to be developed in future, they may expand the size of the available budget.

Offsetting is not part of the budget, because the budget is designed to reveal the actual CO_2 reductions needed from each local area.

The Tyndall Centre Paris-compliant carbon budgets for Buckinghamshire are shown in Figure 6.

- The cumulative total carbon budget for Buckinghamshire from 2018-2100, with this Tyndall Centre methodology, is 23.7MTCO_2.
    - This would run out in 2026 if emissions continued at the 2017 level.

  In order to stay within the Tyndall Centre carbon budgets, these emissions would need to fall an average of 13.7% year-on-year every year from 2020 until 2100.

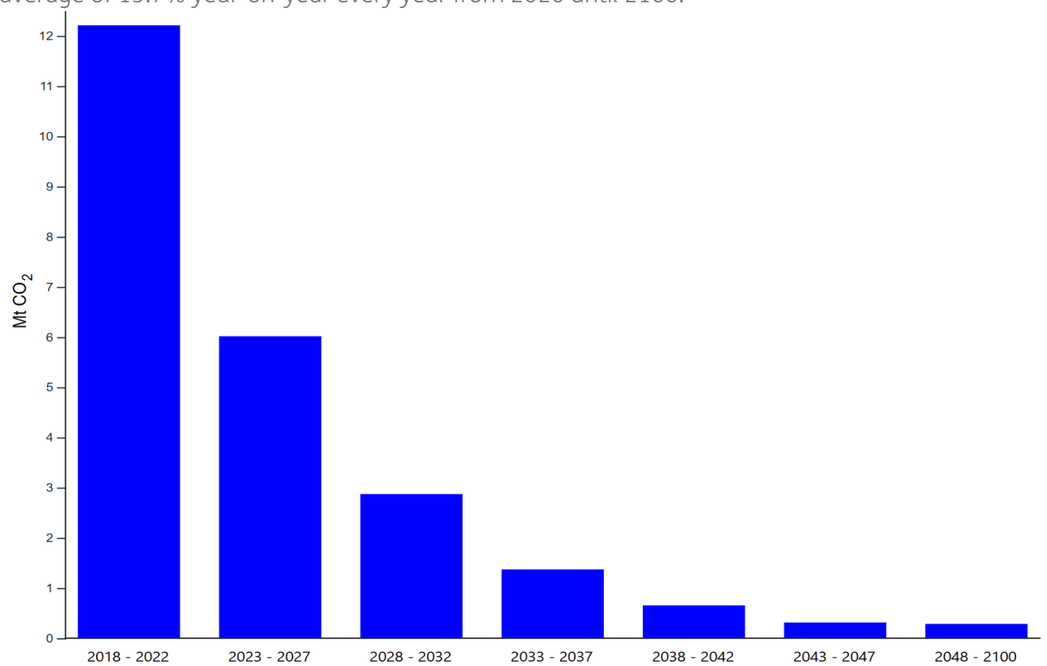


Figure 9: Buckinghamshire's carbon budgets to 2100 (energy-only, CO_2 only) compliant with the UK's commitment to the Paris Agreement. Calculated by the Tyndall Centre. (Buckinghamshire Unitary Authority Area report generated by selecting Aylesbury Vale, Chiltern, South Bucks and Wycombe from Tyndall Centre 'combined report' tool: https://carbonbudget.manchester.ac.uk/reports/combined/)

[5] Tyndall allocates developing countries a larger proportion of the global budget because they have more human need to develop further, more economic reliance on hard-to-decarbonise sectors such as manufacturing and agriculture, and less responsibility for historic emissions already in the atmosphere. By contrast, the analysis behind the legislated national budgets does not make clear whether or how Paris equity principles play any role.

Although (as noted above) the Tyndall Centre budgets differ somewhat from the national legislated carbon budgets, it is of interest to explore how much Buckinghamshire's rate of carbon reduction would need to accelerate if Buckinghamshire were to pursue the Tyndall Centre Carbon budgets.

This is relevant because it can help justify carbon-reducing policy in the local plan. Specifically, if the local plan proposes to include policies that act further or faster than national regulations, in order to pass the local plan's Examination in Public there will need to be an argument to justify these policies in that they are necessary to fulfil certain legal duties and national policy expectations.

Within that argument at examination, The Tyndall Centre budgets could logically act as a yardstick for the extent of 'climate change mitigation' that the local plan is obliged to pursue by law[6] and national policy expectations[7]. Alternatively, even if Buckinghamshire were to instead interpret that the relevant yardstick should be the nationally legislated carbon budgets, the achievement of those national carbon budgets will also still need local policies that go beyond national building regulations and existing national policy stimuli, as evidenced by the analysis that underlies those carbon budgets[8]. In that case, the Tyndall carbon budgets are a useful comparator to show that pursuit of those national carbon targets – while ambitious and challenging – is not even the most stringent 'climate mitigation' extent that Buckinghamshire *could* have chosen to calibrate their policy.

For this purpose, we visited the previously cited DESNZ dataset to estimate the extent to which Buckinghamshire is on or off track for the Tyndall Carbon budgets. Assuming we have correctly selected the DESNZ categories to match the Tyndall Centre scope (see below), Buckinghamshire's emissions (CO_2-only and energy-only, as per Tyndall Centre scope) have fallen but not fast enough:

- **The year-on-year reduction since 2017 has been an average of ~3%.**
- **2020 saw the highest year-on-year drop (11%), being the only year that neared the 13.7%** drop that would be needed every year to meet the Tyndall Centre goal.
- As of the DESNZ 2022 figures (released in 2024) **Buckinghamshire has already "spent" 56% (13.2mt) of its total 23.7mt CO_2 budget** that is meant to last until 2100 in the Tyndall analysis.

Figure 7 shows that on historical emissions, the DESNZ and Tyndall data do correlate closely (see the blue and black lines) indicating the data is broadly compatible.

DESNZ data categories were selected to match Tyndall scope as closely as possible, i.e. CO_2 only, energy-only.

- Categories in DESNZ data selected on the basis that these would be part of Tyndall's definition of 'energy only' were: Industry electricity, Industry gas, Industry other, Commercial total, Public sector total, Domestic total, Transport total, and Agriculture electricity/gas/other.
- DESNZ categories excluded on the basis that they would not be part of Tyndall's scope were: Industry large installations, LULUCF (land use/ land use change /forestry), Agriculture livestock / soils, Waste landfill, Waste other.
- For definitions/methodology of how DESNZ categorises emissions into sectors, see DESNZ latest technical report (2024).

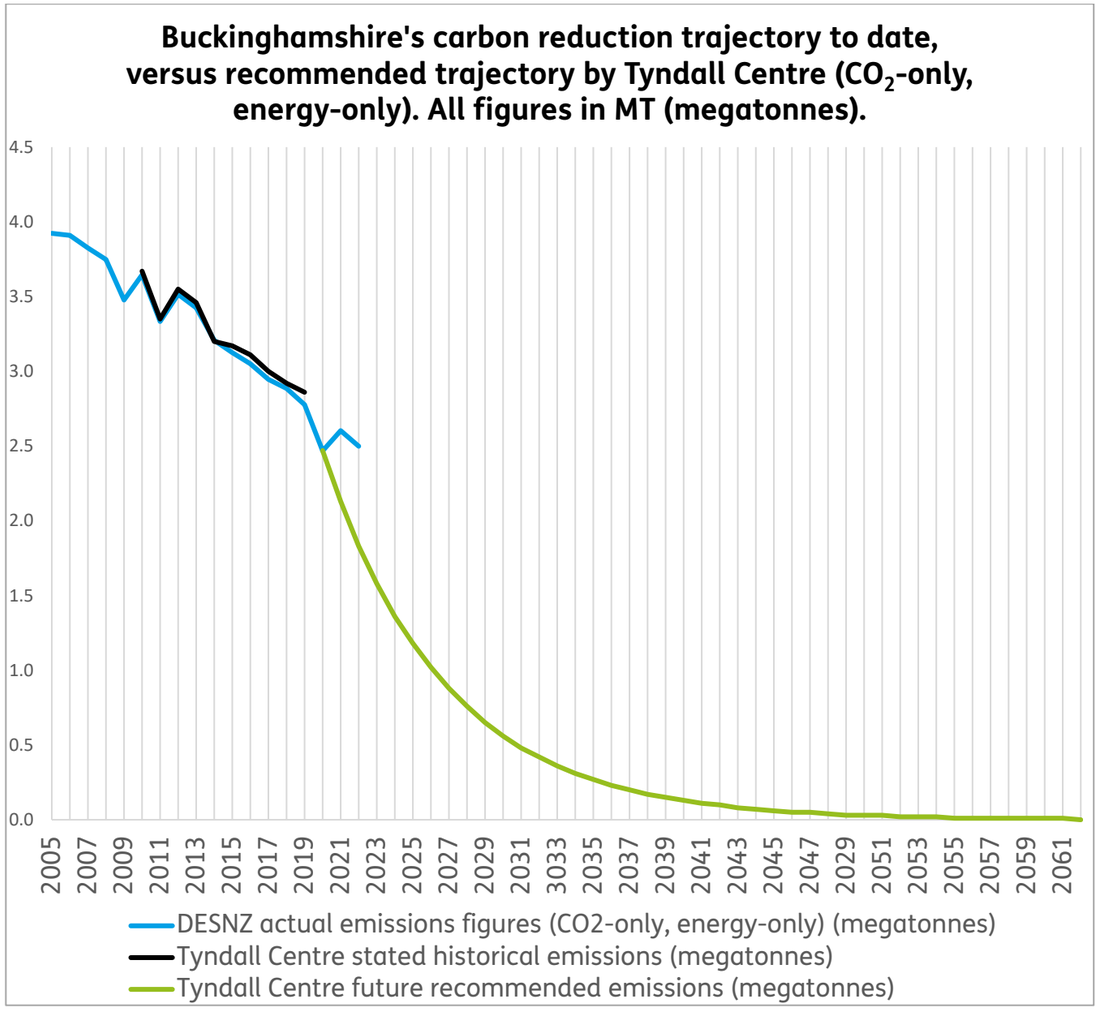


Figure 10: Buckinghamshire's carbon reduction trajectory to date versus recommended carbon reduction trajectory for a Paris Agreement-compliant carbon budget as devised by the Tyndall Centre.

Relevant geographic area selected in the Tyndall tool as: Aylesbury, Chiltern, South Bucks and Wycombe. (https://carbonbudget.manchester.ac.uk/reports/.)

[6] See later subsection "The legal duty to mitigate climate change through the local plan".
[7] See later subsection "What degree of mitigation is justifiable?".

[8] See later subsections "The UK's national and international commitments to address climate crisis" and "To what extent is the necessary mitigation for the UK's legislated carbon budgets being delivered by national regulation or the wider industry?"

SCATTER tool for local area carbon reduction trajectories

A consultancy named Anthesis, along with the Tyndall Centre and input from others, developed a tool named SCATTER: Setting City Area Target Trajectories for Emissions Reduction. Insights from this tool **could help Buckinghamshire to develop and justify localised policies towards carbon reduction**, whether new development, refurbishment, renewable energy or transport interventions.

This SCATTER tool uses the previously explained Global Protocol for Cities carbon accounting method (GPC) to build on the Tyndall Centre local area carbon budgets. SCATTER does this as follows:

- **SCATTER includes the Tyndall Centre carbon budgets (CO_2-only, from energy use only), but additionally covers other greenhouse gases** including methane and nitrous oxide, and activities other than energy use. It follows the previously explained GPC methodology to add in those other gases and activities (and some of SCATTER's data sources[lxvi] are the same as those used in the production of BEIS/DESNZ local area carbon figures).
- **The SCATTER tool breaks down the emissions into 'Scopes 1, 2 and 3' as per the GPC** (previously explained) and shows which activities cause those emissions, and in which sectors.
- **The SCATTER tool can explore what changes are needed in each sector, to deliver the carbon budgets** that it has devised for the local area.

The SCATTER tool enables the user to:

- Account for the local area's existing emissions, to a level of detail and robustness suitable for international carbon reporting standards
- Estimate a proportionate local area carbon budget for all emissions to 2050
- See how that carbon budget could be spread across the period from today to 2050
- **Model what reductions could be achieved depending on which desirable changes take place**, showing how close this would get towards the devised carbon budget for the area
    - This modelling function offers three levels of ambition in the speed and scale of change: 'Business as usual' pathway, 'medium ambition' pathway, and 'high ambition' pathway.

This is relevant as it helps justify a local plan designed to realise the 'medium' or 'high' pathway.
For example, the 'high ambition' pathway includes many changes that the local plan can influence:

- Fixed energy efficiency standards for new buildings (such as a 15kWh/m^2/year limit on space heat demand – which is also an industry criterion for the design of net zero carbon buildings that are fit for the UK's legislated carbon reduction goals; see later section on this topic)
- Faster rollout of low-carbon heat in existing and new buildings
- Faster rollout of renewable energy generation on buildings and standalone
- Faster rollout of energy efficiency retrofits to existing buildings
- Transport modal shift (less driving; more walking / cycling and public transport)
- Faster growth of electric vehicles as a share of in the overall fleet.

Importantly, in outputs from SCATTER for other local authority areas, even the 'high ambition' pathway does not reach the recommended carbon budget. This highlights the scale and speed of action that would be needed for the local area to support the UK's Paris Agreement goal (see later section on this).

However, as previously explained: it is important to note that the UK's *legislated* carbon budgets are not precisely aligned to the Tyndall/SCATTER recommended carbon budget. In fact, a 2020 analysis[lxvii] by Tyndall Centre academics found that the UK's carbon budgets (at the time) were more than double what the Tyndall Centre believes they should be. The difference is due to several points, including:

- The Tyndall/SCATTER interpretation of a 'fair share' of the global carbon budget is based on the Paris Agreement equity principle of how responsibilities are distributed between different countries. By contrast, the UK legislated carbon budgets do not clarify how they derived the UK share of that global carbon budget.
- The UK legislated carbon budgets' rely on the hope that carbon removal technologies (carbon capture and storage) will emerge in future to balance out higher emissions – albeit this higher emissions allowance would be mainly for sectors irrelevant to the local plan (such as aviation and agriculture) or with only minimal local plan influence (such as industrial processes). By contrast, Tyndall/SCATTER does not assume these technologies will appear.

The SCATTER tool is free to use by local authorities. From its first year's dataset (2017), SCATTER has to date been updated with data for 2018, 2019 and 2020. The front page current states that the 2020 dataset was added in August 2024. It is uncertain where there is long-term commitment to continue updating the data on an annual or otherwise regular basis, as this is dependent on funding.

See overleaf for a screenshot of examples of SCATTER tool outputs.

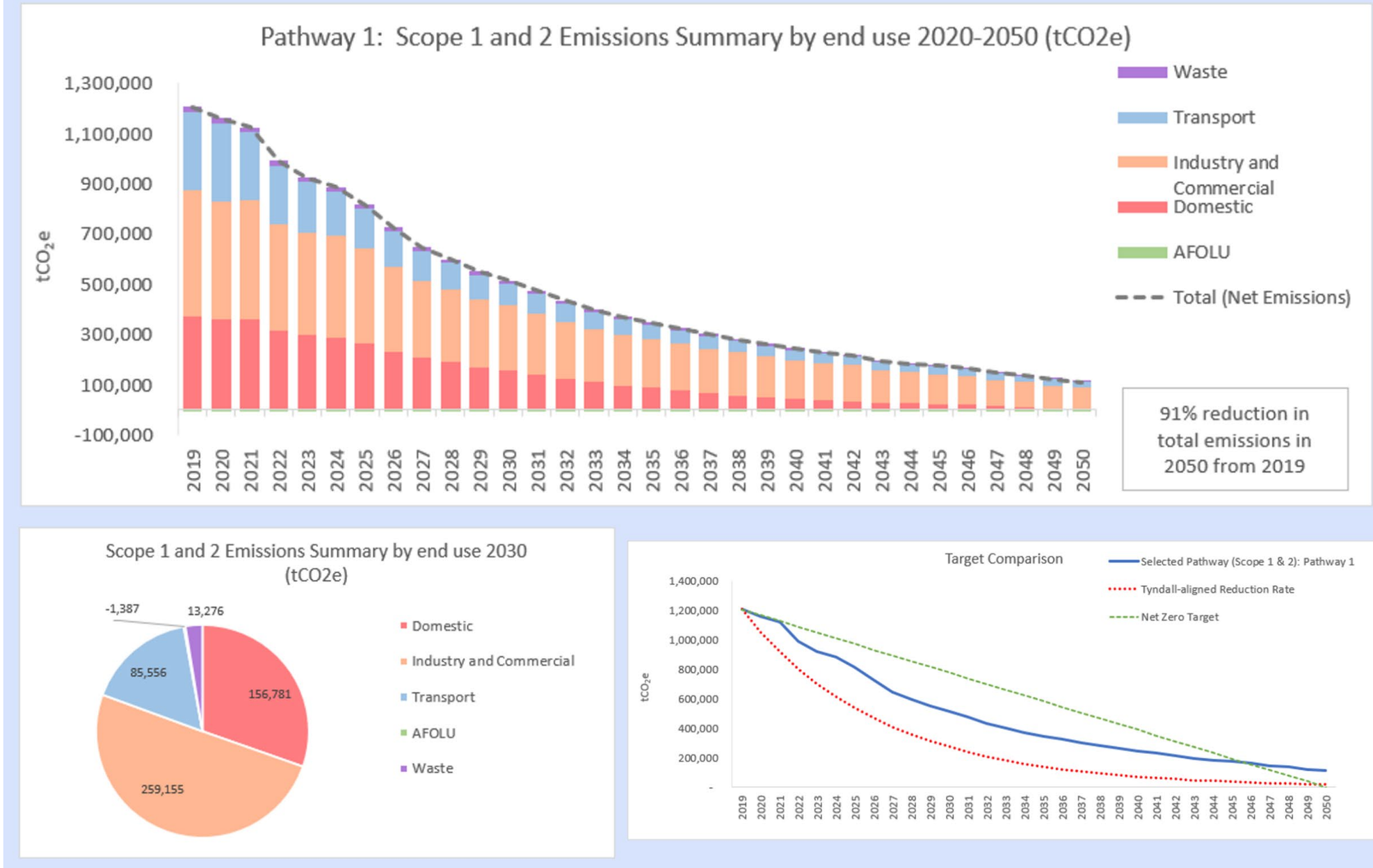


Figure 11: Screenshot of example output from SCATTER. From front page of: https://scattercities.com - therefore please note that this is illustrative of the outputs SCATTER produces, not data for the local plan area.

‘Net zero carbon building’ definition in national building regulations and planning

Building Regulations Part L is the legal tool that controls buildings’ energy and carbon emissions. Most definitions of ‘net zero carbon buildings’ in local and national policy are based on Part L’s metrics and calculation methodologies, explained here (and later chapters on powers and precedents).

Building Regulations Part L looks only at *operational* energy and carbon (and does not even address the entirety of this, as explained below). There is currently no regulatory method to consider *embodied* carbon, nor to hold new development responsible for carbon emitted by new occupants’ transport.

Part L only controls the ‘fixed’ energy uses of a building: space heating/ cooling, hot water, fixed lighting, ventilation, fans, pumps. It **ignores plugin appliances**, lifts, escalators, and so on (‘unregulated energy’). **This means a ‘zero carbon’ building using Part L is not truly zero carbon.**

To legally comply with Part L, a proposed development must use an **energy and carbon calculation** named the **Standard Assessment Procedure** (**SAP**, for homes) or the **Simplified Buildings Energy Model** (**SBEM**, for non-residential). These are submitted to building control. From 2025 (when the Future Homes Standard arrives), SAP will be replaced with a new ‘Home Energy Model’ (HEM).

SAP and SBEM set limits on the amount of energy a building uses per square metre per year, and the amount of carbon emissions that associated with the building’s energy use. These are the **Target Emission Rate (TER)** and **Target Fabric Energy Efficiency (TFEE)**. The TFEE relates only to energy used for heating and cooling. The TER is the carbon emissions associated with all ‘regulated’ energy uses.

These limits are set by modelling a ‘notional building’ of the same size and shape as the proposed building, with a range of basic energy saving measures applied (insulation, glazing, air tightness, lighting efficiency, heating system efficiency and so on). Part L defines what these measures are. The proposed building must be designed so that it uses no more energy nor emits more carbon than the ‘notional building’ would. This means the targets vary between buildings, as heat losses are affected not only by the fabric but also the size and shape (more external surface and joins = more heat loss).

Part L is updated periodically, but not often: the previous version was in place from 2013 to 2022. “**Part L 2021**” was implemented from June 2022. A further version is expected in **2025 (the Future Homes Standard, FHS).** These come with changes to the ‘notional building’[lxviii]. Part L 2021 has small improvements to fabric (insulation/glazing) and some solar panels, but still has a gas boiler. Together these make the target emission rate (TER) 31% lower than that of Part L 2013. Part L 2025 (FHS) has a heat pump and *may* have improved fabric or solar panels (the most recent consultation had two options). Together these make the TER ~75% lower in 2025 than in 2013 (or ~64% lower than Part L 2022). Local policies often seek percentage reductions on the TER of a specific version of Part L.

SAP and SBEM methods are also periodically updated to reflect changes in the carbon emissions of grid electricity, and the efficiency of various appliances or fittings such as boilers and hot water taps. Nevertheless, it is widely acknowledged that **these methods are poor at predicting actual energy use** (discussed overleaf) and their periodic **updates tend to lag far behind the real-world changes** to electricity grid carbon or changes to the efficiency of different heating technologies.

The Government’s consultations on the Future Homes Standard have noted that their intent is that the Part L **2025 target emission rate will be low enough that new homes would not use a gas boiler.** The 75% reduction on Part L 2013 would be essentially impossible to achieve in a home that has a gas boiler, which is likely to prompt the use of heat pumps in most homes, although some may be able to reach that emissions target using direct electric heating combined with extensive solar panels.

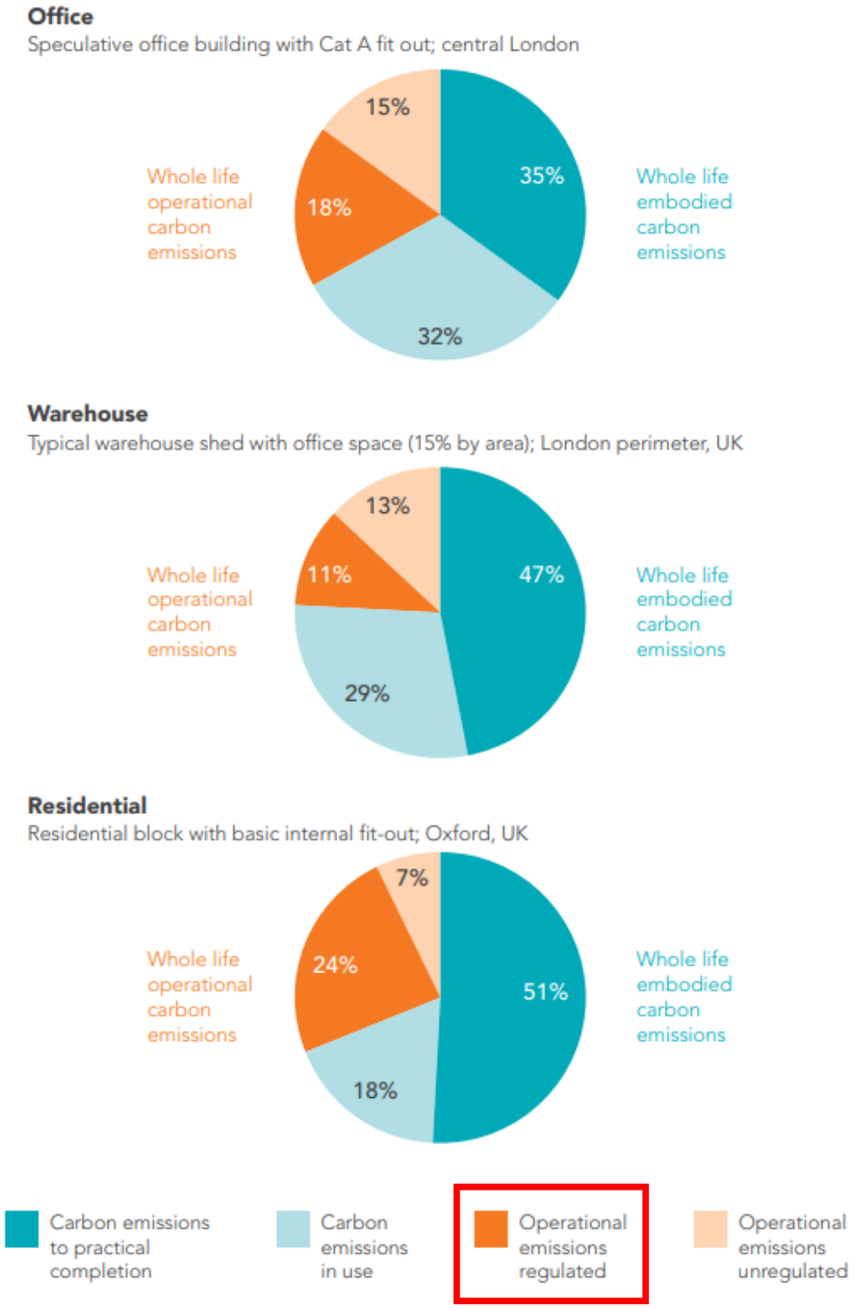


Figure 12: Diagram showing a breakdown of whole-life carbon emissions for three building types. Building Regulations Part L only looks at the orange segments - and even then quite inaccurately. Source: UKGBC.

‘Net zero carbon building’ – alternative definitions in the construction sector

Green construction experts have recently been developing new approaches to remedy the shortcomings of the national building regulations, SAP and SBEM in defining and delivering net zero carbon buildings. The main **weaknesses in Building Regulations identified by the sector are**:

- **Failure to account for ‘unregulated energy’** – plugin appliances, lifts, escalators, and any other uses not covered by building regulations – which can be 50% of total operational energy use[lxix]
- **Poor accuracy at predicting buildings’ actual energy use using SAP and SBEM methods** (the ‘energy performance gap’), often incorrect by a factor of 200-300%
- **Frequently outdated carbon emissions factors** for energy, especially electricity
- **Failure to sufficiently incentivise energy-efficient building design**, due to relatively weak standards for airtightness and not setting absolute targets in kWh/m^2 that all buildings of a certain type must achieve.
- **Failure to address embodied carbon** (the carbon that was emitted to produce building materials, transport them to site, and assemble them into a finished building).

For all of the reasons above, a ‘net zero carbon building’ calculated by Part L SAP or SBEM will in fact be very far from being carbon-free in operation[lxx], before even considering its embodied carbon impacts.

The industry has therefore begun to collaboratively develop new definitions that address not only the end result of net zero carbon, but also inform the design and energy procurement measures that should sensibly be used to achieve it, such as energy efficiency targets and embodied carbon targets.

[UK Green Building Council (UKGBC) Framework Definition of Net Zero Carbon, 2019]

The UKGBC definition[lxxi] of net zero carbon buildings includes twin tracks: operational and embodied. These twin tracks for net zero carbon buildings can be treated separately. However, buildings seeking ‘net zero carbon construction’ should also aim to fulfil the operational track too.

- **Net zero carbon in construction** [embodied carbon] is: “When the amount of carbon emission associated with a building’s product and construction stages up to practical completion is zero or negative, through the use of offsets or the net export of on-site renewable energy.”
- **Net zero carbon in operation** is: “When the amount of carbon emissions associated with the building’s operational energy on an annual basis is zero or negative. A net zero carbon building is highly energy efficient and powered from on-site and/or off-site renewable energy sources, with any remaining carbon balance offset.”

UKGBC does not require the building to hit any specific targets for space heating, operational energy use, or embodied carbon , although it encourages reductions to be prioritised before offsetting.

UKGBC’s separate energy procurement guidance[lxxii] confirms that off-site renewable energy supply does not have to be via a long-term power purchase agreement[9], but can be a green tariff so long as that it meets certain criteria on ‘additionality’ (so the purchase of the energy brings forward additional renewable energy generation capacity, not just buying up existing renewables present in the grid).The guidance notes that when it was written (2021) only three such tariffs existed in the UK. It also notes:

- Fossil fuel must not be the primary energy source for heating, hot water and cooking
- All new build energy systems should be compatible with being renewably powered.

[9] A fixed contract between a renewable energy generator and a customer at a pre-negotiated price. This long-term certainty can unlock finance allowing the generator to install dedicated new capacity for generation.

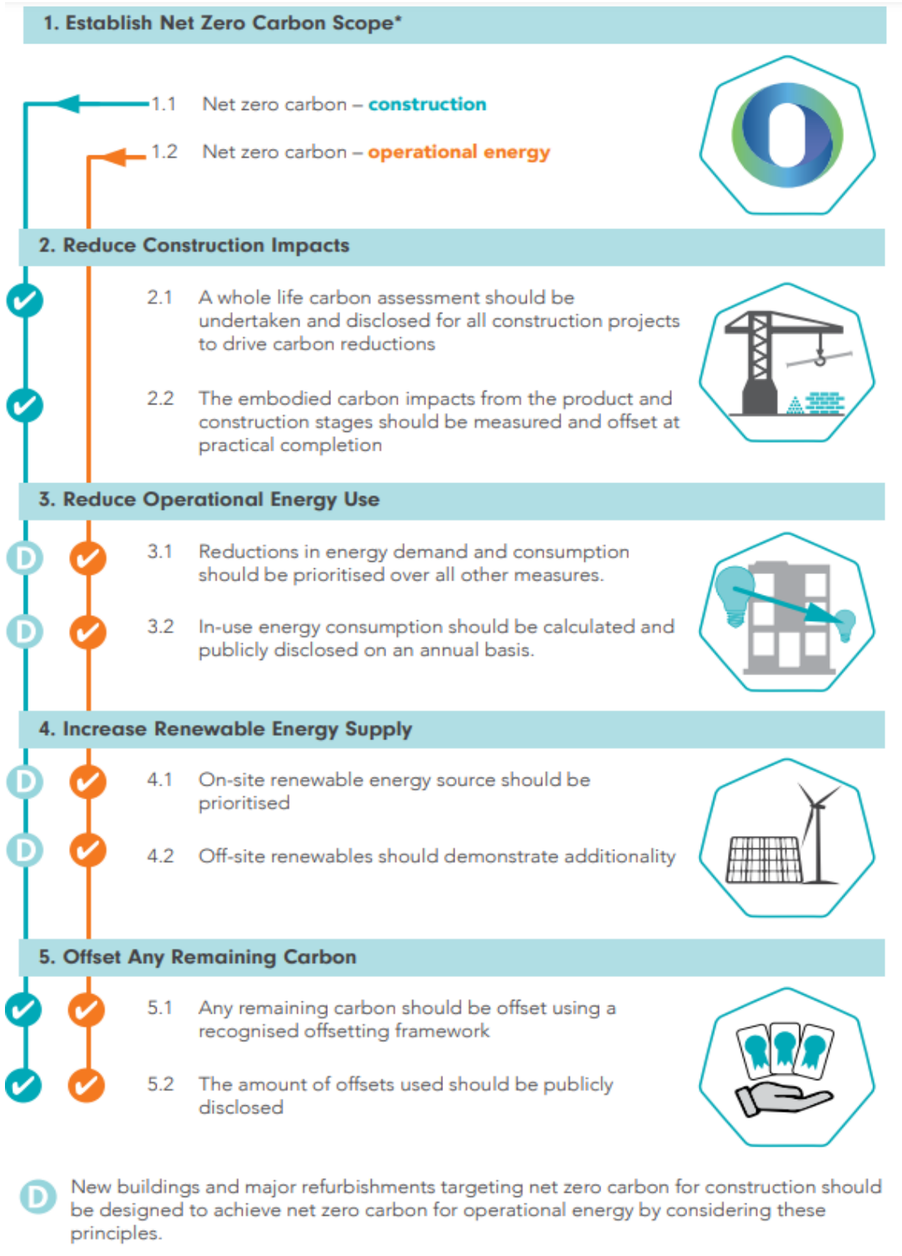


Figure 13: UKGBC Net Zero Carbon Buildings Framework Definition - twin track diagram.

Low Energy Transformation Initiative (LETI) Net Zero Operational Carbon

LETI is a coalition of industry-leading green building experts, architects and surveyors.

Its definition[lxxiii] is that the building achieves a zero carbon 'balance' in its energy use across each year. That means that for each unit of energy that the building consumes from the grid, it exports at least one unit of zero-carbon energy produced by the building itself (generally assumed to be through solar panels). Alternatively, the building's energy demands can be entirely met by additional renewable energy supply from off-site.

LETI's definition also requires that the building fulfil the following targets:

- **Space heat demand**: 15kWh/m_2/year for all building types.
- **Total energy use intensity**, including unregulated as well as regulated: 35kWh/m_2/year in homes, 65kWh/m_2/year in schools, or 70kWh/m2/year in commercial offices
- These targets are designed to ensure the use of heat pumps, as these have a ~300% efficiency which translates a 15kWh space heat demand to a 5kWh energy use. All space heat and energy demand targets must be fulfilled at the design stage using an **accurate predictive energy modelling methodology** (not the building regulations methods SAP or SBEM[lxxiv]), such as Passivhaus Planning Package (PHPP)[10]
- **Heating and hot water not to be generated using fossil fuels**
- Onsite renewable energy should be maximised.

These targets – specifically the space heat demand target and fossil-free heating – are in line with the similar targets that apply to the industry certification 'Passivhaus' (although Passivhaus basic certification does not require any level of renewable energy provision or full 'net zero carbon' status). This means the **LETI targets are well-aligned to the recommended SCATTER 'high ambition scenario'** interventions for the new build sector as previously described].

Other sustainable construction frameworks such as the RIBA Climate Challenge[lxxv] have adopted similar targets for energy use intensity at similar levels, although not for space heating.

LETI also recommends annual reporting of energy use and renewable energy generation on site for 5 years to verify the net zero carbon status, and that embodied carbon should be separately assessed and reported. It offers separate targets[lxxvi] for embodied carbon, but does not expect the embodied carbon to be offset – rather, reduced at source as far as possible.

We note that although UKGBC has not updated its 'framework definition' (discussed in the previous section), it has since endorsed the LETI definition of net zero carbon[lxxvii] .

More recently, both LETI and UKGBC have been part of the steering group or coalition that developed, and are now endorsing/promoting, the very new UK Net Zero Carbon Buildings Standard (discussed next).

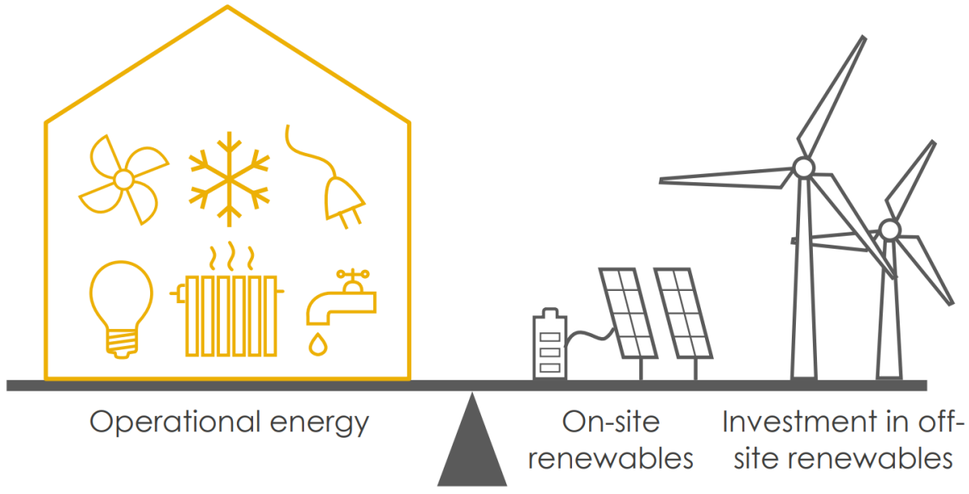


Figure 14: Diagram of LETI net zero operational balance. From LETI Climate Emergency Design Guide.

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[10] Please note the Passivhaus Planning Package (PHPP) is a method to model and predict building's energy use. Although it was developed for use in the Passivhaus certification process, there is no obligation to undergo Passivhaus certification – the PHPP tool can be used in any project without pursuing certification.

UK Net Zero Carbon Buildings Standard (UKNZCBS) (Emerging, 2023-24)

Building on the work by LETI and UKGBC, a unified industry standard is in the works by a coalition that includes LETI, UKGBC, BRE, RIBA, RICS, CIBSE, and other standard-setting entities in the buildings sector. **This new Standard aligns with science-based carbon goals** (the UK buildings sector's share of the carbon budget to stay under **1.5°C** of global warming as per the UK's Paris Agreement pledge).

A pilot version was released in September 2024. Representatives from UKNZCBS founding entities UKGBC, RIBA, LETI, BRE and CIBSE (and others) presented it at a launch webinar, where it was stated these entities commit to aligning their ongoing work with the UKNZCBS. Thus it appears **the UKNZCBS is now the 'correct' approach in those entities' view**.

The UKNZCBS is applicable to both new builds and existing buildings/retrofit. It allows two potential levels of claim about a building:

- **"Net-Zero Aligned":** The building meets all the applicable targets that the UKNZCBS sets (and is thus *aligned* with the UK trajectory to net zero within the global carbon budget for 1.5°C – *but does not mean that the building is 'net zero carbon' in its own right*.
- **"Net-Zero Aligned Plus Offsets":** The building meets all the applicable targets, and also the claimant has offset all emissions in the reporting period (5 years for up-front embodied carbon, and 1 year of emissions associated with operational energy and refrigerant leakage).
    - **This is the point when a *building would actually be 'net zero carbon' in its own right.***
    - Valid offsetting mechanisms include renewable energy procurement (to offset electricity use not met by onsite renewables), or carbon credits (ICROA or ICVCM)

The UKNZCBS sets several mandatory targets **that must *all* be met for a building to meet UKNZCBS:**

- **Operational energy use limits**:
    - Energy Use Intensity (in kWh/m^2 floorspace/year; nearly all building types/sectors)
    - Space Heat Demand (in kWh/m^2 floorspace/year; certain building types/sectors only)
- **Global warming impact of refrigerants**, expressed as CO_2 equivalent (kgCO^2e / kg refrigerant)
- **Embodied carbon limits (up-front only, not whole-life) (including the last 5 years of works in the case of existing buildings, or to building completion in the case of new builds):**
    - Buildings, excluding on-site renewable electricity equipment: limits in kgCO2e/m^2 floorspace.
    - PV solar electricity generation equipment: 750kgCO_2e per kWp system size.
    - (Other renewable electricity generation is not subject to an embodied carbon limit).
- **Renewable electricity generation target:** in kWh/m^2 building footprint/year; varies by region (this variability is due to differing amounts of sunlight at more northerly or southerly areas).
- **No operational fossil fuel use on-site by the building** other than for critical backup power.

The operational energy and embodied carbon limits vary by project type (new build or existing/retrofit), building/sector type (e.g. homes, various types of non-residential, etc), and the year in which the project seeks to meet the UKNZCBS (the limits gradually tighten in each year to 2050).

The pilot UKNZCBS comes with:

- A pro-forma spreadsheet that applicants can fill in to submit their data
- A 'roles and responsibilities' annex of whose action is likely to be needed to meet UKNZCBS.

Where a building use type is not represented in the Standard (see table provided in Appendix 1), the UKNZCBS is not yet applicable to that sector. The Standard also does not apply to infrastructure.

The Standard also requires that various other data is *reported* for the building but without requiring any particular limit or target to be met in these (at least in the pilot version or in the full 'version 1' anticipated in early 2025). These 'reporting-only' data are: metered water use and associated carbon, whole-life embodied carbon, electricity demand, delivered heating/cooling energy measured via sub-metering, and the CO_2-equivalent amount of refrigerant leakage if the building contains refrigerant equal to 3,000kgCO_2e or more. The coalition developing the UKNZCBS intends that data collected on these other aspects (and any data submitted in relation to buildings in sectors not yet covered by the targets) will form the evidential basis for additional targets in future versions of the Standard.

Key points to note about the UKNZCBS (in which it differs from earlier frameworks such as the RIBA Climate Challenge or the net zero definitions set in Part L, LETI, and UKGBC) include:

- **The operational energy targets are for in-use actual metered energy use**, based on at least one year's metered data of full occupancy of the building.
    - Thus it is **impossible to claim compliance with the Standard at the point of submitting a planning application nor even at discharge of planning conditions before occupation** (except perhaps in very late retrospective applications).
- **UKNZCBS compliance will only be valid for 1 year at a time**, as it relies on energy meter data.
- **A UKNZCBS building must meet both the operational *and* embodied carbon targets** – there is no 'net zero in construction' versus 'net zero in operation' unlike prior work by UKGBC or LETI.
- **The claim must be verified via an independent third-party verifier** (a status that the UKNZCBS coalition will award to entities with the appropriate skills and experience).
- **'Equivalence' opportunity:** UKNZCBS invites other standard-setting entities to align their standard to a point where UKNZCBS would recognise them as equivalent. At the launch webinar, BRE indicated interest in seeking this 'equivalence' for relevant parts of the BREEAM rating system as part of the updates they are currently making to finalise version 7 of BREEAM.

How can the Local Plan for Buckinghamshire take action towards achieving net zero carbon?

This report's primary focus is to support local plan policy formulation regarding the carbon emissions of *buildings* (including energy generation), which are responsible for a large share of local area carbon emissions[11]. Specifically, new builds are the subject of most planning applications and thus the area that local plan policy wording (as opposed to spatial strategy) can most strongly influence. Therefore, this section focuses on the planning powers available to reduce the carbon of buildings, including via their energy supply. Specifically, we explore the **extent to which the local plan is empowered to require various different criteria of 'net zero carbon buildings'** (whether by the national definition, or preferably the more comprehensive industry alternative definitions, as previously explained).

The previous section highlighted the key pieces of legislation and national policy that set out the *duties* local plans hold to address climate change. This section explores many of the documents, but this time sets out how these documents define the *powers* available to local plans to meet those duties.

The powers afforded to the local plan to set policy requirements towards net zero carbon new buildings flow principally from the **Planning and Energy Act 2008**. Further direction how these powers should be used is found in the **National Planning Policy Framework** (NPPF) and **National Planning Practice Guidance** (PPG). Additionally, **formal ministerial statements** and other official government policies can also affect interpretation of how those powers should be wielded.

Planning and Energy Act 2008

The Planning and Energy Act 2008 grants local plan the power to set "reasonable requirements" for:

- "energy efficiency standards that exceed the energy requirements of building regulations"
- and "a proportion of energy used in development in their area" to be from renewable or low-carbon sources "in the locality of the development".

Policies using these powers "must not be inconsistent with relevant national policies"; that is, those relating to energy from renewable sources, low carbon energy, or furthering energy efficiency.

The Act defines "energy efficiency requirements" as standards that are 'set out or referred to in regulations made by the [Secretary of State]' or 'set out or endorsed in national policies or guidance issued by the [Secretary of State']. This is also repeated in National Planning Policy Framework paragraph 159. The only 'energy efficiency standards' currently clearly set out or endorsed in this way are the energy and carbon calculation methodology used for Part L of the building regulations. Until recently, this was only SAP and SBEM, but the new Part L 2021 for residential also mentions CIBSE TM54 as a suitable method to fulfil the new requirement for energy forecasting. **This may be interpreted to mean that energy efficiency requirements must use SAP/SBEM or TM54 calculations.** If SAP/SBEM, their scope will be limited to regulated energy only (heating, hot water, fixed lighting, ventilation). If TM54, total energy efficiency could be specified (including unregulated). However, several examples have recently successfully been adopted that use PHPP as well as TM54.

The act does not define 'energy used in their area'. Therefore, it is probable that requirements for renewable energy could cover a proportion of the new building's *entire* energy use, not just the share that is 'regulated' by Part L and calculated using SAP/SBEM.

Definitions and requirements for 'net zero carbon buildings' in most previous local plans are based on Part L and the associated calculation methods (although some make a separate requirement for renewable energy). This means they are subject to the previously noted weaknesses that befall Part L in terms of inaccurate calculations of energy and carbon, and a lack of incentive to create an inherently thermally efficient building shape.

Town and Country Planning Act 1990

The key parts of this Act relevant to carbon reductions are:

- **Section 106[lxxviii], planning obligations** – this enables the local plan to require payments for the purpose of making an otherwise unacceptable development into an acceptable one. Section 106 obligations are expected to be reasonable, proportional to the development, necessary to make the development acceptable. **This has been used in several precedent local plans to require carbon offsetting payments from new development.**
- **Section 61[lxxix] enables the creation of a Local Development Order**. This is a legal tool used by local government to achieve specific local plan objectives by permitting certain types of proposal that would otherwise need to go through the planning permission process. These are **sometimes used to bring forward renewable energy, or low-carbon heat** to existing buildings.

Infrastructure Act 2015

Section 37 of this Act[lxxx] included provision for the Building Regulations to be amended to require provision for off-site carbon abatement measures. This was in relation to the anticipation of the national net zero carbon building standard which was scrapped before coming into force. Nevertheless, this is where the concept of 'allowable solutions' to carbon emissions originated, in terms of allowing buildings to be legally accepted as 'net zero carbon' by delivering measures off-site to reduce carbon emissions or increase carbon sequestration, which could include paying others to perform those measures or purchasing carbon offset certificates through a national scheme.

Although the national net zero carbon buildings plan was scrapped and the government has not yet proceeded to enact the national 'allowable solutions' scheme envisioned by the Act, this is still the concept taken echoed in many subsequent local plans in the form of requirements for carbon offsetting either by payments or by direct delivery of projects that will reduce carbon emissions.

[11] Beyond this, new development will often also have carbon impacts from the transport induced in the lifestyles of its residents, workers or visitors. This transport carbon is also part of Buckinghamshire's overall carbon emissions – and would therefore need to be reduced to zero in order to hit the goal of net zero carbon by 2050. Nevertheless the transport carbon is not part of the definition of 'net zero carbon buildings' for which we now explore the planning powers to regulate. Transport and standalone renewable energy are briefly considered in the section entitled "beyond the building".

National Planning Policy Framework (December 2024)

Whereas this report already explained the *expectations* laid on the local plan by the NPPF regarding climate change mitigation, we here explore how the NPPF indicates *appropriate ways* to do so.

This national policy document, updated in December 2024, is the framework by which the preparation of local plans is expected to be guided, and by which their soundness is judged by the planning inspectorate. It expresses four key tests of soundness (all of which can be relevant to carbon):

- Plan should be positively prepared (responding to needs; delivering sustainable development)
- Plan should be justified (having considered alternatives and be based on evidence)
- Plan should be effective and deliverable over the plan period
- Plan should be consistent with national policy (again delivering sustainable development and being in accordance with other relevant statements of national planning policy).

It also reaffirms various ways in which the local plan (and whole planning system) can mitigate climate change (although its contents need not be considered an exhaustive list of the appropriate climate mitigation actions in a local plan). Beyond paragraphs 161-165 (explained previously), the following paragraphs help clarify which interventions are considered appropriate by the NPPF:

- **Paragraph 109:** "Transport issues should be considered from the earliest stages of plan-making and development proposals, using a vision-led approach to identify transport solutions that deliver well-designed, sustainable and popular places. This should involve … identifying and pursuing opportunities to promote walking, cycling and public transport use; and … assessing and taking into account the environmental impacts of traffic and transport infrastructure – including appropriate opportunities for avoiding and mitigating any adverse effects"
    - **The new NPPF's glossary** now explains that a 'vision-led approach' is "an approach to transport planning based on setting outcomes for a development based on achieving well-designed, sustainable and popular places, and providing the transport solutions to deliver those outcomes as opposed to predicting future demand to provide capacity (often referred to as 'predict and provide')."
    - This is vital in that it allows the local plan scope to pivot away from a transport assessment that simply predicts the amount of car usage from a given development and simply provides for that, thereby inadvertently making that car usage more likely through 'induced demand' (the observed effect whereby the better the road infrastructure and parking provision, the more people will use their cars in response). Instead, the new NPPF's concept of 'vision-led transport planning' gives license to require transport provision that actively brings about the desired modal shift. This is urgently needed for the realisation of the UK's legally binding carbon budgets (as previously explained via Committee on Climate Change analysis.)
- **Paragraph 168:** "When determining planning applications for renewable and low carbon development, local planning authorities should not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognise that even small-scale projects provide a valuable contribution to cutting greenhouse gas emissions".
    - **And, as previously noted:** The NPPF 2024 no longer requires onshore wind turbine development to be rejected, unlike previous NPPF iterations from 2015-23. Wind is now on the same footing as other renewable energy generation technologies – that is, the local plan should "provide a positive strategy for energy from these sources … consider identifying suitable areas for [them]" (paragraph 165) and once such suitable areas have been identified, subsequent applications for commercial scale projects elsewhere should be expected to meet the criteria used in identifying those suitable areas.
    - **This is a positive step for both climate action and socioeconomic wellbeing:** Firstly, in light of the previously explained Committee on Climate Change analysis showing how vital the expansion of renewable energy generation is (including wind) for the achievement of the UK's legislated carbon budgets. Secondly, alongside the climate imperative there is also a socioeconomic argument for this especially in context of the recent energy price volatility, as onshore wind is one of the cheapest forms of energy generation[lxxxi].
- **Paragraph 167:** "In determining planning applications, local planning authorities should give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings … including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights", albeit the separate NPPF policies on heritage assets still apply if such proposals would affect them.
- **Paragraph 203:** "Plans should set out a positive strategy for the conservation and enjoyment of the historic environment, including heritage assets most at risk through neglect, decay or other threats … taking into account the desirability of sustaining [them] … and putting them to viable uses consistent with their conservation".
    - This, along with Paragraph 167 above, may support a sensitive but permissive approach towards energy retrofit, where this keeps a heritage building fit for long term use.

The NPPF also includes points which could be taken to constrain the extent to which a local plan can require carbon and energy improvements in development, including:

- **Paragraph 164b**: "Any local requirements for the sustainability of buildings should **reflect the Government's policy for national technical standards**."
- **Paragraph 166** allows that new development should comply with local requirements for decentralised energy supply *unless it is demonstrated to be not feasible or viable*.

At present, the relevant 'national technical standards' may mean the metrics or standards building regulations Part L, and perhaps also the electric vehicle charging requirements that were introduced through the new Part S of building regulations.

A final key point to note in this new NPPF, as relevant to climate and carbon, is that it retains several references to Supplementary Planning Documents (and how proposals should be refused if not in line with these), despite the sector's general anticipation that SPDs were going to be removed from the revised planning regime brought in by the Levelling Up and Regeneration Act 2023.

Planning Practice Guidance (PPG)

The PPG section on Climate Change[lxxxii] reiterates several powers relevant to carbon, and also constraints on how those should be exercised. It highlights several opportunities including:

- Reducing the need for travel and providing sustainable transport
- Providing opportunities for renewable and low carbon energy and decentralised energy
- Promoting low-carbon design approaches to reduce energy consumption in new buildings.

It confirms that appropriate mitigation measures in plan-making can be identified by:

- Using available information on the local area's carbon emissions [such as BEIS subnational carbon inventories referenced elsewhere in this report]
- Evaluating future emissions from different emissions sources, taking into account probable trends set in national legislation, and a range of development scenarios
- Testing the carbon impact of different spatial options, as emissions will be affected by the distribution and design of new development and each site's potential to be serviced by sustainable transport
- Noting that different sectors have different opportunities for carbon reductions, noting that "In more energy intensive sectors, energy efficiency and generation of renewable energy can make a significant contribution to emissions reduction".

For existing buildings, the PPG notes that many carbon-reducing measures may not require planning permission, but for those that do, "local planning authorities should ensure any advice to developers is co-ordinated to ensure consistency between energy, design and heritage matters."

It reiterates the Planning & Energy Act powers that the local plan can require developments' energy/carbon performance to be higher than those of national building regulations to an extent:

- For homes: up to the equivalent of Level 4 of the Code for Sustainable Homes
    - [We note that this limit should no longer apply, as it has been exceeded by national building regulations Part L 2021, whereas that part of the PPG citing the Code was last updated in March 2019.]
- For non-residential buildings, the plan is not restricted or limited in setting energy performance standards above the building regulations.
- Requirements for new buildings' sustainability are expected to be set in a way consistent with the government's zero carbon buildings policy … adopt nationally described standards … and be … based on robust and credible evidence and pay careful attention to viability".

The PPG section on renewable and low carbon energy[lxxxiii] confirms that:

- Local planning authorities hold decisions on renewable energy development of ≤50MW [Separately, please note that from 2016, onshore wind over 50MW is also now a local planning decision[lxxxiv]]
- Neighbourhood Development Orders and Community Right to Build Orders can be used to grant planning permission for renewable energy development.
- There are no concrete rules about how to identify suitable areas for renewable energy, but should consider the requirements of the technology and cumulative environmental impacts, and could use tools such as landscape character assessment to inform this.
- Identifying suitable areas gives greater certainty to where renewable energy will be permitted – and wind turbine development should only be approved in such identified suitable areas.

The PPG section on viability[lxxxv] confirms that:

- Plans should set out the contributions expected from a new development, including for infrastructure, informed by evidence of need and viability-tested alongside other policies.
- The role of viability assessment is mainly at plan-making stage, and should not compromise sustainable development but should ensure that policies are realistic and deliverable.
- Once the plan is made, the price paid for land is not considered a valid reason for failing to comply with the relevant policies of that adopted plan.

The PPG section on planning obligations[lxxxvi] (such as Section 106 payments) notes that:

- The previous restriction on pooling more than 5 planning obligations towards a single piece of infrastructure has been removed – so LPAs can now pool as many S106 or CIL as they wish, subject to meeting the other tests (necessity, scale and direct relation to development).
- The Community Infrastructure Levy "is the most appropriate mechanism for capturing developer contributions from small developments".
- Planning obligations should not be sought for development that consists only of residential extensions/annexes.

Other government outputs that relate to how local plans can wield powers

Written Ministerial Statement on Planning (WMS2015)

In 2015, Government announced that it would update building regulations to have on-site carbon emissions equivalent to the withdrawn Code for Sustainable Homes Level 4 (a 19% reduction on the emissions rate of Part L 2013). It stated that when this change was made, it would remove local plans' Energy and Planning Act powers to require higher energy standards. It also stated that meanwhile, local planning authorities should not set policy requiring any level of the Code nor other standard in layout, performance or construction, nor set conditions requiring more than that 19% carbon reduction. This caused many local plans to abandon any policies that exceeded that limit.

However, a decade later these changes to the Energy and Planning Act are still not implemented. Furthermore, Part L 2021 of Building Regulations makes the 2015 Ministerial Statement obsolete, because the Part L 2021 already delivers a carbon saving greater than the supposed 19% limit. Even between 2015 to 2021, several local plans were successfully adopted that go well beyond that limit (London 35%; Reading 35%; Milton Keynes 39%). Many also require other standards relating to 'construction, internal layout or performance' such as the Home Quality Mark or BREEAM. Developers in these locations have for many years proven able to consistently comply with these higher standards.

A 2022 planning inspectorate appeal decision[lxxxvii] confirmed that the WMS2015 was no longer the most relevant expression of national policy, as the Future Homes Standard and Climate Change Act net zero carbon goal are now quite clearly more relevant. Similar views appeared in the Inspectors' reports on the successfully adopted plans of Bath & North East Somerset Council (B&NES) (2022), Cornwall Council (2023) and Central Lincolnshire Council (2023), which all set ground-breaking policies requiring new buildings to demonstrate 'true net zero carbon in operation' via an on-site net zero energy balance and specific absolute targets for energy efficiency. A 2022 letter from Government to B&NES Council also reaffirmed local plans' power to exceed Building Regulations standards.

Open legal advice[lxxxviii] in April 2023 for Essex County Council similarly concludes that "it is clear that the Government does not consider that [the WMS2015] constrain[s] [local planning authorities] and that the [Planning & Energy Act 2008] empowers [them] to set energy efficiency standards [that] go beyond national Building Regulations … This is the correct approach in law".

An inspector's decision to reject a similar policy in Salt Cross Area Action Plan due to the WMS2015 was recently overturned (February 2024) in the High Court[ii] on the basis that the decision placed too much weight on the WMS2015 which had been overtaken by Part L 2021.

Finally, the **WMS2015 was explicitly replaced by a subsequent WMS in 2023** (discussed next).

Written Ministerial Statement on Energy Efficiency 2023 (WMS2023)

On 13th December 2023, a new Written Ministerial Statement (WMS) was made by Lee Rowley (Minister of State for Housing) together with Baroness Penn (Parliamentary Under Secretary of State for Levelling Up, Housing and Communities). Its topic is "Planning - Local Energy Efficiency Standards".

The new WMS2023 attempts to place severe new limitations on the exercise of existing powers held by local planning authorities to require improvements in new builds' energy performance.

What does the WMS2023 say?

The WMS2023 does not remove the ability to set improved local standards, but purports to constrain them in this way:

- **Energy efficiency policy must be expressed as % reductions on a building's TER (Target Emissions Rate set by Building Regulations), using a specified version of SAP.**
- Policies that go beyond national building regulations should be "applied flexibly to decisions … where the applicant can demonstrate that meeting the higher standards is not technically feasible, in relation to the availability of appropriate local energy infrastructure … and access to adequate supply chains."

The above would affect how the plan can exercise its power to require energy efficiency standards beyond those of building regulations (a power granted by the Energy & Planning Act 2008).This WMS therefore undermines several recent adopted local plan precedents that used other more effective metrics to deliver buildings suitable for the UK's carbon goals, such as energy use intensity and space heat demand (Cornwall, Bath & North-East Somerset, and Central Lincolnshire).

The WMS also states that any such energy efficiency policies should be rejected unless they 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". This is not really new – any new policy should typically come with such justification. Still, this reiteration in the WMS is likely to bring additional scrutiny to any evidence put forward.

What impact does the WMS2023 therefore have on local plan climate mitigation efforts?

For new buildings, the WMS2023's stipulations make it much harder to fulfil local planning authorities' legal duty to mitigate climate change (Planning & Compulsory Act 2004) and the expectation laid on them to support "radical reductions in greenhouse gas emissions … [taking] a proactive approach … in line with the objectives and provisions of the Climate Change Act 2008" (NPPF, as previously cited).

The main reason the WMS make this duty harder to fulfil are:

1. **Pushing the use of a *carbon* metric, when contrarily the goal is *energy efficiency.*** The biggest problem is that the WMS asks for energy efficiency policies to be expressed using the Part L TER metric – but TER is in fact not an energy efficiency metric. As the acronym suggests, TER is instead a *carbon emissions* metric. It is unclear why this choice was made in the WMS, given that the Part L methodology (SAP) does also contain two energy efficiency metrics: the TFEE (Target Fabric Energy Efficiency) and TPER (Target Primary Energy Rate). Additionally, as previously noted, the SAP methodology is notoriously poor at estimating the actual energy performance of a building, and therefore any of the SAP metrics would not reliably ensure that buildings have the absolute energy efficiency performance that is known to be a necessary part

of the UK's legally binding carbon goals. That unsuitability is why several recently adopted precedents (Cornwall etc, as noted previously) had used alternative metrics that are actually effective for delivering energy efficiency and measuring whether a building is 'net zero'.

2. **Forcing the use of a 'specified version of SAP' for the required metric:** SAP is the method used to calculate all target metrics set by Part L of Building Regulations, including the TER metric named by the WMS. SAP is updated more often than Part L. SAP updates can include anything from changes to the assumptions about the baseline building characteristics or the performance of standard types of equipment, through to changes in the carbon intensity of grid electricity. The current version is SAP10.2. Some precedent local plans had previously overcome this issue by stating that calculations must simply use 'the latest available version' of SAP. That way, the policy does not go out of date each time a new version of SAP is released.
    a. The WMS does not make clear whether it would be acceptable to say 'the latest version of SAP', or if it would have to be 'SAP10.2' or similar. If the latter, then the WMS would require the policy to be at risk of going out of date very quickly.
    ~~b.~~ SAP is due to be replaced with a new model, HEM (Home Energy Model) in 2025 when the Future Homes Standard (FHS) is introduced. This too would put local policy out of date if the policy states a 'specified version of SAP' as per the WMS. The HEM recently underwent consultation alongside the FHS; HEM's final form, function and outputs are not yet known. Thus it is not yet possible to write a policy that uses HEM metric for targets, as it would not currently be possible to robustly assess their feasibility or cost, even if the WMS had not failed to acknowledge HEM's imminent introduction.

3. **Creating a hostile climate towards buildings energy and carbon improvement policies:** Beyond its specific prescriptions, the WMS sets a tone that is generally discouraging (albeit not prohibitive) towards any local policy that exceeds "current or planned building regulations", stating that the government does not "expect" this. This negative stance is likely to be used in objections from developers at examination. However, the WMS does not actually prohibit such policies so long as they are well-justified. The Council should prepare to strongly and accurately counter any such claims that the WMS contra-indicates any such local energy policy.

What is the status of the WMS compared to the legal duties and powers, and must it be followed?

The National Planning Policy Framework confirms that Written Ministerial Statements are one of the "statements of government policy [which] may be material when preparing plans or deciding applications". However, being a 'material issue' does not make a WMS incontrovertible.

Legislation holds far more material weight than a WMS. Therefore, it may be possible to diverge from the WMS' stipulations by demonstrating that adhering to the WMS would prevent the local plan from fulfilling its legal duty to 'contribute to the mitigation of climate change' imposed by the Planning & Compulsory Purchase Act. This point could be underlined by similar evidence relating to the ability to meet the NPPF expectation for 'radical' carbon reductions *in line with the Climate Change Act*. The NPPF should hold at least equal material weight to the WMS, as the NPPF undergoes extensive public consultation – whereas the WMS had no consultation or democratic process. There may also be other national policy (e.g. on energy efficiency targets) whose aims the WMS2023 would inhibit.

Government does not appear to have made any assessment of how the WMS would affect the ability to fulfil those climate mandates, nor advised which should take priority where they conflict.

The most robust evidence for this argument would be energy and cost modelling to demonstrate the difference that would occur as a result of following the WMS stipulations, as opposed to using more accurate energy metrics (used in industry standards and recent pioneer local plans). For example:

- The difference in carbon emissions, thus moving the buildings sector's carbon reduction trajectory even further from what it needs to be within the 'balanced pathway to net zero' as analysed by the Committee on Climate Change to comply with the UK's legislated carbon budgets (set under the aegis of the Climate Change Act, as previously explained)
- The difference in energy efficiency compared to what the Climate Change Committee has shown to be necessary as part of the UK's wider energy system transition needed for all sectors (not just buildings) in order to meet the legislated carbon budgets as above. This is also relevant to any other local plan objectives on the affordability of home running costs.

Even with such evidence, there remains a risk that it may be challenging to fully express this argument to the Inspector in the time available at examination, as it is a highly technical topic to explain to anyone not already expert in net zero carbon building design. The WMS states that such policies may draw close scrutiny from central government, meaning the Council may have to defend against not only the usual objectors but also central government. This does not mean Buckinghamshire *should not* pursue such policies, but that it would need to even more robustly prepare to defend them if so.

Regarding the extent to which a WMS constrains local plans' powers, we note a recent High Court decision[ii] (February 2024) overturned a planning inspector's decision based on a *different* WMS (the WMS2015, previously outlined). This was in relation to energy efficiency policies within the Salt Cross Area Action Plan. The decision confirmed that **a WMS "cannot mis-state the law, or restrict the legal powers of the LPA under the 2008 [Planning & Energy] Act."** This should therefore also be true about the WMS2023. However, that decision also notes that the Planning and Energy Act includes a clause saying that local policies using the powers of that Act 'must not be inconsistent with relevant national policies for England'. It is thus difficult to predict how this would be interpreted by a planning inspector, given that there would appear to be somewhat of a 'circular reference' in that the Planning and-Energy Act could be seen to contain within it a clause allowing 'national policy' to invalidate the exercise of the powers that it grants, although the Act itself – as a piece of formal legislation – holds primacy over the ill-defined set of items that could be considered to constitute 'national policy'.

Legal challenges against the WMS2023

A legal challenge to the WMS2023 has been brought by the same community organisation that successfully won the Salt Cross AAP case as cited above. The challenge put forward that the WMS2023 is unlawful on the following grounds:

1. Failure to fulfil the duty (Environment Act 2021) to have regard to the Environmental Principles Policy Statement (EPPS), as no EPPS assessment was released until after the WMS was made and a separate pre-action letter challenged that lack
2. That the WMS2023 unlawfully purports to restrict local authorities' exercise of powers granted to them by statue (specifically the Planning & Energy Act, but also the Planning & Compulsory Purchase Act which establishes the climate mitigation duty and the statutory presumption in favour of the application of adopted development plan policies)
3. That the WMS2023 unlawfully misleads the reader about decisionmakers' legal powers.

This case was heard at the High Court on 18 June 2024[lxxxix] but was not successful[xc]:

- Ground 1 was rejected because the judge followed other case law that had established that the assessment can come after the national policy itself so long as the assessment is still "done in substance, with rigour and an open mind".
- Grounds 2 and 3 were rejected because the Planning & Energy Act contains a clause within it that local policies must not be inconsistent with relevant national policy, therefore as the WMS is such a relevant national policy, it is in accordance with the Act. However, the judgement does not evaluate the point about whether the WMS' stipulations inhibit the ability to fulfil the separate legal duty to mitigate climate change.

The claimants have informed us that they intend to go to appeal and have won the right to do so. It is uncertain whether this future appeal might occur in time to affect Buckinghamshire Council local plan's intended examination timeframe.

Similarly, the Secretary of State had to defend itself via pre-action legal correspondence against a similar case raised in a pre-action letter by a coalition of local authorities about this WMS2023. In that pre-action correspondence, the Secretary of State had to concede that the WMS is only a material consideration (not a concrete constraint) and cannot limit the use of powers granted to local planning authorities in legislation.

Meanwhile, Good Law Project has also begun a public campaign[iii] to pressure Government to revoke the WMS, and Essex County Council has updated its open legal advice[iv] to explain why the 2023 WMS should not legally be interpreted as a binding constraint from which local policy cannot diverge with sufficient justification.

If successful, these legal challenges could reopen the door for the Council to revert to the more effective policy later on.

What can the Local Plan still do if the WMS2023 were strictly interpreted?

The WMS only relates to *energy efficiency* policies, not to policies on *renewable energy*, *embodied carbon*, or *overall carbon reductions*.

Therefore, policies on renewable energy could still:

- Require a certain proportion of energy use to be met with on-site renewable energy provision.
    - Define 'energy use' to mean *total* energy use, not just the regulated energy use as calculated by building regulations
    - Support this with feasibility and cost evidence – noting that several other local plans' similar requirements have been shown to be feasible, albeit those required that energy efficiency targets were met before calculating the amount of renewable energy needed.

And policies on embodied carbon could still (with suitable feasibility and viability evidence):

- Require reporting of embodied carbon, and/or
- Require new development to stay within certain target limits on embodied carbon

These would need to be supported by with suitable feasibility and cost evidence – either from the local context, or pointing to suitably relevant data from other recent local plans' evidence bases.

These embodied carbon requirements might need to apply only over a certain size threshold, in order to ensure the cost of the embodied carbon assessment itself is not prohibitive and that smaller sites are not held back by any shortage of professionals able to undertake the calculation. By contrast, larger sites tend to consist of a small number of repeated home types with identical materials, thus are able to benefit from the economy of scale by having a larger number of homes that can share a small number of embodied carbon assessment exercises.

Meanwhile, policies on *energy efficiency* – which is what the WMS affects – could either:

- Comply with the WMS by expressing the policy as a requirement to 'achieve a certain % carbon reduction on the Part L 2021 Target Emission Rate *through energy efficiency measures'* (see examples later in this report, e.g. London Plan 2021; this would require a definition of what is an 'energy efficiency measure'),
  Or
- With sufficient evidence to justify diverging from the WMS (as previously outlined) - continue to use metrics that are not endorsed by the WMS, including:
    - A fixed or relative improvement on the Target Fabric Energy Efficiency metric calculated by Part L SAP10.2 (less risky, as this is still a metric from national technical standards),

      Or

    - Fixed targets for space heat demand and energy use intensity, set to align with the performance known to be necessary for the UK's carbon budgets as previously noted (see later section of this report for examples of how existing and emerging local plans have formulated similar policies – these are now more risky in light of the WMS).

Policy statements on brownfield development, 2023 - 2024

A Written Ministerial Statement[xci] was made by Michael Gove on 19th February 2024 that could make it difficult to implement some policies on sites that are recognised as brownfield (previously developed land). This approach was also previously announced on 13th February 2024 via a press release.

The written statement indicated the then-Government's intent to introduce a 'presumption in favour of brownfield development' in 'the twenty most populous cities and urban centres in England'.

Based on the accompanying consultation paper, the national policy changes would mean:

- In planning decisions, additional weight would be given to the benefits of housing delivery on brownfield sites (in all local planning authority areas)
- A 'presumption in favour' for development proposals on brownfield sites where the local authority is failing to meet at least 95% of its housing requirement.
- Any policies relating to the *internal layout* of development, including daylight and sunlight policies, should be applied flexibly on brownfield so that they do not "inhibit making the most efficient use of a site (as long as the resulting scheme would provide acceptable living standards)". This would apply to all local planning authority areas.

The latter point should not strongly affect the ability to implement *carbon*-related policy, as this is not strictly a policy about 'internal layout', nor external layout and appearance or other policy standards. However, the consultation also asks a question about whether the consultee agrees that 'internal layout' should be the only kind of policy that has to be made flexible in this way. It is therefore not impossible that the Government's future policy direction could be further extended to include any other policies that could potentially add to the cost or perceived complexity of brownfield sites.

However, the 'presumption in favour' principle, depending on how it is interpreted, could make it more difficult to refuse brownfield housing schemes that fail to comply with carbon or energy policies. The press release accompanying that statement also noted that the Government was extending Permitted Development Rights. This may make it difficult to impose carbon and energy-related policy expectations on changes to existing buildings, especially in the case conversion to housing.

It is important to note that the February 2023 Statement and associated press release were made before the then-Conservative government was replaced by the Labour one in July 2024. Still, a September 2024 policy paper[xcii] by the new government indicates that it will continue with similar relaxations on brownfield development and change of use to housing, to support its confirmed return to mandatory housing targets much higher than those in recent years' planning regimes.

That 2024 policy paper describes not the granting of automatic permission on brownfield sites, but rather a "'brownfield passport': setting clear parameters which, if met, serve as accepted markers of suitability, with approval becoming the default and a swifter outcome" and "being explicit that development on brownfield land within urban settlements is acceptable unless specified exclusions apply", giving the example of "adverse impact in relation to flood risk and access that cannot be mitigated". It also notes that this would not come through the NPPF but would instead be part of "the suite of … web-based national policies for development management that we have committed to taking forward subsequently". The exact extent to which such a 'brownfield passport' would overrule any other locally specific policies, such as targets for energy and carbon performance in those developments, is not clarified within the policy paper.

Future Homes Standard Consultation Response (2021)

This is the government's response to public consultation on the new Future Homes Standard, which will update building regulations in 2025 with tighter standards in energy and carbon. The document also lays out an 'interim uplift' titled Part L 2021, which is now in force as of June 2022.

The government asked whether it should now enact the changes to Planning and Energy Act that would remove local planning authorities' power to require higher standards of energy efficiency and renewable energy, as per the 2015 Written Ministerial Statement. 86% of responses said no. The response confirms that "in the immediate term" it will not enact those changes and that local plans thus retain their existing powers. It notes the previous "expectation" set by the 2015 Ministerial Statement, but does not say that this still applies, and recognises that many local plans exceed this.

The response document also lays out an indicative specification for the 'notional building' for the 2021 & 2025 Part L. This is the imaginary building with several energy efficiency and renewable energy measures, whose carbon emissions rate the proposed building must not exceed. See table below. It was later confirmed that the document forms a piece of official government policy.

Part L Interim uplift 2021 (changes vs 2013)	Part L Future Homes Standard 2025
Minor improvements to roof, windows, doors Solar PV panel m^2 equal to 40% of ground floor Wastewater heat recovery system Still has gas boiler as basic assumption	Major improvements to walls, roof, floors, windows, doors Low carbon heat pump Solar panels and wastewater heat recovery are not part of notional building spec
Result: 31% reduced target emissions rate compared to 2013	**Result: 75% reduced target emissions rate compared to 2013 (low enough to rule out gas boilers)**

Table 1: Comparison of 'notional building' specification of current Building Regulations (Part L 2021) and the Government's first indication of the Future Homes Standard as published in 2021, both as an improvement on the previous Building Regulations (Part L 2013).

Future Homes Standard second consultation (2023-24)[xciii]

In December 2023 – March 2024, Government ran a new round of consultation on the forthcoming FHS. As this is a consultation only, looking at multiple options, its contents presumably do not yet constitute a formal statement of national policy, but the consultation response (when available) would. No response has been released as of January 2025. It is uncertain whether the Government will release its response in time for consideration within the present scope of work for Buckinghamshire.

However, we here summarise the content of this FHS consultation to inform Buckinghamshire of the potential future national policy direction. This contributes further evidence of need for local policy on buildings' carbon and energy performance, because the approaches laid out in this FHS consultation do not meet the standards needed for the national carbon budgets as described previously.

The consultation puts forward two options that Government may adopt as the FHS, both of which are significantly weaker than the previously drafted standard that had been described in 2021. Essentially, these are the least stringent two options from the range of six 'Contender Specifications' laid out by the Future Homes Hub[xciv] (a collaboration of major developers, industry bodies and government).

The two options now on the table are shown in Table 2. Please note the 'DFEE' and 'space heat' figures are not taken from the consultation itself, but rather from prior analysis by the Future Homes Hub[iii].

We note that the consultation also proposes to replace the SAP calculation methodology with a new model titled HEM, the Home Energy Model, which is intended to be more transparent and adaptable.

Table 2: FHS options consultation 2023-24, versus current standard and previously indicated FHS

Part L 2021 (today's standard)	FHS (as in previous consultation)	FHS 2023 consultation Option 1	FHS 2023 consultation Option 2
Fabric: [see *Table 1*]	Fabric: [see *Table 1*]	Fabric: All U-values identical to Part L 2021. Small improvement to airtightness.	Fabric: No changes thus no improvement on Part L 2021.
Heat: Gas boiler.	Air-source heat pump.	Air-source heat pump and wastewater heat recovery	Air-source heat pump.
PV equal to 40% of ground floor area.	PV: None.	PV: Equal to 40% of ground floor area.	PV: Removed; none.
Results: [Carbon - see *Table 1*] • Heat bill/year: £640 • DFEE: 19.3-55.9 kWh /m^2 /year	Results: [Carbon – see *Table 1*] • Heat bill/year: Unknown • DFEE: 13.5-51 kWh/m^2/year	Results in semi-detached: • Carbon emissions: 0.05t/year • Heat bill/year: £520 • DFEE & space heat demand unknown, as this Option does not match any of the Future Homes Hub Contender Specifications.	Results in semi-detached: • Carbon not given. • Heat bill/year: £1,220 • DFEE: Identical to Part L 2021.

The Levelling up and Regeneration Act 2023 (LURA)

This Act will affect the planning system in a variety of ways, the most relevant of which for carbon are:

- **As noted previously, this Act reiterates the climate mitigation requirement** that 'local plans must be designed to secure that the use and development of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change'.
- **Section 106 & Community Infrastructure Levy (CIL) may be largely replaced** by 'Infrastructure Levy' set by gross development value (GDV). The Act does not scrap Section 106 or CIL, but empowers the Secretary of State to do so and to make regulations for the new Levy. It was originally thought that these regulations might scale-back S106's role to limited purposes[xcv], which could alter the ability to use Section 106 to raise carbon/energy offset funds (as it has been in several precedents). However, until the Secretary of State creates the new levy regulations, it is unknown whether S106 will still be usable for the purpose of raising carbon offsetting funds, or for any other purposes related to reducing developments' carbon impact.
    - However, these S106/IL reforms were proposed by the previous government. The new government indicates[xcvi] it will not implement the new IL and instead "focus on improving the existing system of developer contributions". It remains to be seen whether these 'improvements' will affect the scope for S106 as a carbon/energy offsetting tool.
- **New 'national development management policies' (NDMP)** with which local plan policies must not be inconsistent. The Act does not confirm what they will cover but empowers the Secretary of State to create NDMPs by direction, in which process he or she must "Have regard to the need to mitigate … climate change". It is as yet unknown whether the NDMP regime will affect local plans' ability to set their own carbon and energy performance standard (see Appendix 2).
- **A new 'Environmental Outcomes Report'** to replace the existing system of Sustainability Appraisals, Strategic Environment Assessments and EU Environmental Impact Assessment. The outcome topics are yet to be clarified but may conceivably include carbon. Certain text within the Act could be interpreted to allow climate mitigation to be part of those outcomes that are set. However: Neither climate nor carbon is specifically mentioned in Part 6. Recent national consultations on the Environmental Outcomes regime have been either vague or silent on carbon, and there has not yet been a national response to those consultations (see Appendix 2). Therefore it appears unlikely that the Act's 'Environmental Outcomes' approach will affect the local plan's scope to require carbon reduction standards in developments.
- **Supplementary Planning Documents (SPDs) to be replaced with "Supplementary Plans":** Until the LURA, the production of supplementary documents with significant but less material weight than the local plan itself was established in the Town and Country Planning (Local Planning) (England) Regulations 2012. The LU&R Act provides for the creation of a new type of document, 'Supplementary Plans'. The previous Government's 2023 consultation[xcvii] explained that these would replace SPDs entirely and have the same weight as the rest of the local plan. However, "[existing] SPDs will remain in force until planning authorities adopt a new style local plan or minerals and waste plan". There has been no national response to that 2023 consultation. For more detail, see Appendix 2. However, the online text of the Town & Country Planning Regulations 2012 still refers to SPDs, and the new NPPF 2024 still retains existing references to SPDs. It is therefore as yet uncertain whether SPDs will remain a useful tool to assist implementation of any local plan policies aimed at carbon reduction.

National policy statements on wind energy development and other renewable energy in 2024

Alongside the new removal of the previously imposed insurmountable obstacles to wind energy development in the December 2024 NPPF (previously discussed), two other national government formal policy statements in 2024 further clarify the new positive national policy stance towards wind energy development, with which local policy and decision-making will need to be consistent in order to be found sound.

The new national government's July 2024 Policy Statement on Onshore Wind[xcviii] explicitly states the Government's intent that onshore wind should be on the same footing as other energy development.

Towards that aim, a December 2024 national consultation response[xcix] explains that the reason for this is that "putting [onshore wind] on the same footing as [other energy development] will provide greater certainty to the industry and help deliver the government's Clean Power Mission". It then confirms that:

- Onshore wind power developments of 100MW or greater will be brought back into the Nationally Significant Infrastructure Project (NSIP) consenting regime, meaning that they would be subject to national planning consent rather than being a local planning decision.
- The threshold above which solar power development projects would be classed as NSIP will be raised to 150MW or more, as opposed to the current threshold of 50MW.

Part of the reasoning for these NSIP size threshold changes is that both wind and solar technologies have advanced significantly since the original threshold of 50MW was first put in place (2008), meaning that a higher MW amount is now achieved with a physically smaller amount of equipment and associated smaller amount of land use.

How have other existing and emerging local plans used those powers?

Having considered the reasons why the local plan is obliged to act to achieve carbon reductions, the extent to which those can justifiably go, and the powers available to the local plan to achieve them, we now move on to illustrating this with examples of how other local plans have utilised those powers to fulfil that obligation.

Although each area is different and although planning inspectors' reactions to carbon reduction policies have been far from consistent between each other (as is illustrated throughout this chapter), it is still relevant to consider these past examples because they evidence that certain approaches *can* be found sound. Additionally, despite the inconsistency in examination decisions and the fact that the planning system is not bound by precedent in the same way that the legal system is, planning inspectors often show interest in examples of similar successful policies during examinations.

We here provide a range of examples or precedents that act to improve buildings' carbon and energy performance to differing extents and expressed in different ways.

Within these precedents, where relevant and especially where the policies push the boundaries of what might be considered consistent with national policy or other constraint, we note how the Planning Inspector weighed up these issues at the respective plan's Examination in Public, including their stated reasoning for either accepting or rejecting the proposed policies on carbon reduction.

We present these precedent example plans grouped by the approach they each take, which vary by:

- What methods and metrics they use to set targets for climate mitigation performance of buildings – that is, Building Regulations metrics, or other metrics
- What frameworks or concepts they require development applications to apply when communicating the performance improvements they propose to make (such as the energy hierarchy)
- The use of offset payments – that is, carbon offsetting or energy offsetting
- Their use of qualitative or process-based requirements – such as mitigation of the energy performance gap
- Whether they have policy that seeks to bring forward improvements to energy and carbon performance in *existing* buildings.

Later in this chapter we also revisit the importance of providing justification evidence in order to be able to robustly defend these policies at Examination in Public. We look at this in terms of necessity, feasibility, viability, and design quality. Within this we give examples of how these points have been made by other local plans at their examinations, where available.

Finally, the chapter covers ways that a local plan could conceivably act beyond the specific development management policies for building design – rather looking at the spatial choices in transport and protection of landscape features that sequester carbon. As spatial choices are necessarily unique to an area, there are fewer relevant precedents to mention in this section; however, it does mention some examples that are illustrative of a general approach that could be emulated in Buckinghamshire.

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Reductions on the building regulations baseline carbon emissions

Using powers granted by the Planning and Energy Act, most older precedent local plans lay out their 'low carbon' or 'net zero carbon' policy requirements in terms of a percentage reduction on the Target Emission Rate set by Part L of Building Regulations (usually the previous version i.e. Part L 2013, as Part L 2021 is more recent than most of the precedent local plans in existence).

This percentage reduction in on-site carbon emissions usually ranges from 19% to 40%. Some also require the remaining Part L carbon emissions to be offset at a fixed cost per tonne, payable by the developer through a Section 106 payment, to be spent on local projects for carbon reductions.

Older precedent plans sought only a 19% reduction because this reflected the national Code for Sustainable Homes which was previously seen as best practice – and because of the 2015 Written Ministerial Statement as previously explained, which was taken to mean that 19% was the limit.

Later, requirements for higher percentage improvements in Part L carbon emissions were pioneered by the London Plan, justified by evidence assembled by the GLA and its consultants to show that new developments in preceding years had already been typically achieving 30 to 40% reductions[c]. Several other adopted local plans have similarly adopted similar requirements (see examples box).

As of mid-2022, the building regulations Part L has been updated (Part L 2021), resulting in a ~31% reduction in the carbon Target Emissions Rate compared to Part L 2013. From 2025, it will be updated again to a ~75% reduction (Future Homes Standard). However, as previously explained, this 'Target Emissions Rate' from Part L does not cover the full scope of the building's carbon emissions as it excludes unregulated energy and embodied carbon, and it uses inaccurate calculation methods (SAP or SBEM) even for the scope of energy use that it *does* purport to cover.

Requirement to demonstrate implementation of the energy hierarchy

Some local plans divide their carbon and energy requirements into several steps prioritising the most effective and long-lasting carbon reduction measures first. This follows **the energy hierarchy**, which is generally accepted best practice across the low carbon building design sector.

The logic is that if energy demand is minimised first, this reduces not only the burden that the new building places on our limited energy resources in operation, but also the amount of new equipment needed to generate and distribute energy to meet that demand. This reduces the materials, carbon and cost involved in producing and installing that equipment (and lowers energy bills).

The energy hierarchy as applied in planning policy is typically as follows:

1. Reduce energy demand (also known as 'be lean')
2. Supply energy efficiently (also known as 'be clean')
3. Supply renewable energy (also known as 'be green').

A policy requiring minimum improvements in each stage of the energy hierarchy makes the developer demonstrate that they have pursued the more effective on-site improvements as far as they felt possible, rather than just picking the cheapest options or resorting to offsets to reach zero carbon. Local plans usually express this as a requirement for the developer to show that they have made a minimum % improvement in the building's carbon emissions rate by measures taken at each stage. Policy compliance is demonstrated in an energy statement submitted with the planning application.

Example local plans requiring percentage reduction on regulated carbon emissions compared to Part L 2013

London Plan 2016, Policy 5.2: 35% reduction on site via the use of the energy hierarchy (expressed at the time as 40% reduction on previous Part L 2010) in both homes and non-residential. To rise to zero carbon for homes from 2016 and other buildings from 2019.

Reading Local Plan 2019, Policy H5: 35% reduction on site and offset the rest of regulated carbon to zero (major developments). All other new build housing to achieve 19% reduction on site.

New London Plan 2021: 35% on-site emissions reduction, followed by carbon offset payment for the remainder of Part L regulated emissions.

Bath & North East Somerset Local Plan Partial Update 2023: 100% reduction to be met following a fabric-first energy hierarchy (major non-residential). Any residual on-site emissions to be offset.

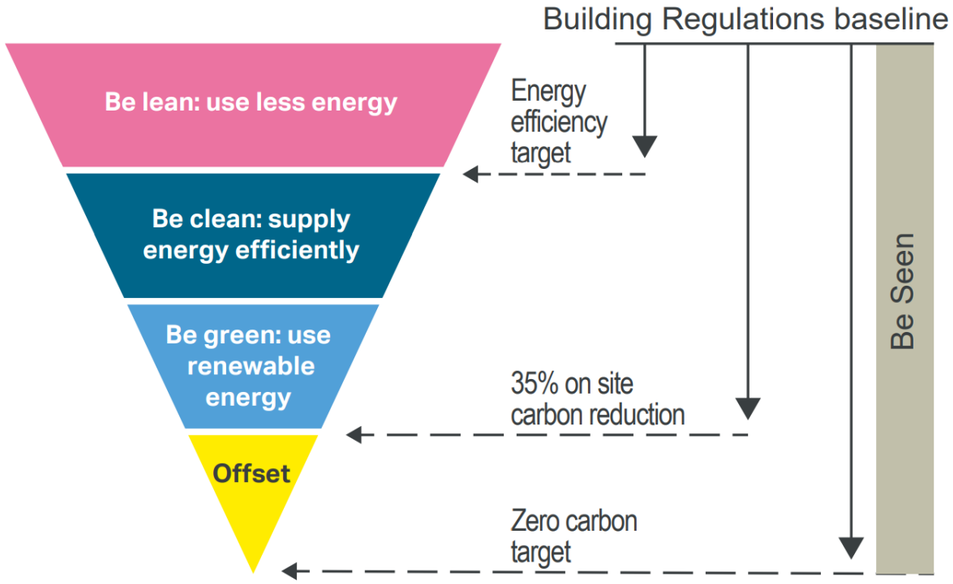

Figure 15: New London Plan (2021) Diagram of the energy hierarchy to reach 35% on-site reduction compared to baseline carbon emissions rate set by Building Regulations Part L 2013.

The following sections explore example local plan policies in each of these steps and how they were justified. Three more sections then look at offsetting, existing buildings, embodied carbon and new innovative approaches based on Energy Use Intensity.

Energy hierarchy step 1: Reducing energy demand (using Building Regulations metrics)

To achieve the legislated target of net zero carbon by 2050, we must reduce our total energy consumption as well as scaling up the supply of renewable energy. In the country's transition to net zero carbon, **increased demand will be placed on the electricity grid** as vehicles and existing buildings' heating switch from fossil fuels to electricity. Upgrading the electricity grid and expanding renewable generation is already a huge but necessary challenge, involving a great deal of shared **cost and embodied carbon to produce that infrastructure**. It is thus vital to minimise the extra burden that new buildings place on our energy infrastructure, to ensure that it does not become technically or financially unfeasible to deploy the required amount of renewable energy to meet our demands.

Improving the energy efficiency of new homes (minimising their energy demand) is a very cost-effective **way to minimise the new infrastructure that will be required to support them** in a future zero-carbon energy system. New homes should therefore target reductions in energy demand to reduce the amount of total energy that must be supplied, both from the electricity grid and from other renewable energy sources. Put simply, optimising the efficiency of the building fabric is the starting point for the whole net zero journey.

It is critical to set higher **fabric energy efficiency standards to ensure buildings do not need to be retrofitted expensively at a later date,** as the cost of retrofitting to tight energy standards is typically three to five times the cost of achieving the same performance in a new build[ci]. This argument will be further underscored if the Government proceeds with the recent Committee on Climate Change proposal that no home should be able to be sold unless it reaches EPC Band C by 2028. However, EPCs have recently been deemed 'not fit for purpose' by Lord Deben, the Chair of the Committee on Climate, since the grading system is primarily based on the *cost* of energy and not the actual *amount* of energy used. This statement is supported by research that shows the actual operational energy use of existing buildings differs significantly from values predicted through EPCs.

(However: Please note that this point on the cost of energy performance in new builds vs retrofit is not an argument to allow demolition of existing buildings so that they can be replaced with new buildings – as this would result in greater embodied carbon from new building materials. Reuse of existing buildings is also desirable in that it reduces the need to build on greenfield, and tends to occur in urban areas, where there is typically less need for car use. Therefore, planning policy should encourage and enable reuse, especially wherever a proposal includes retrofit that would significantly improve an existing building's energy efficiency. But where new buildings *are* proposed the policy should be designed to avoid a need for *future* retrofit by building to excellent standards in the first place).

Fabric efficiency (insulation and airtightness) is particularly pertinent for housing schemes that use **heat pumps and MVHR, as these will require highly insulated and draught-proofed buildings** to operate efficiently. The previously referenced costs report also found that if very high thermal efficiency is reached, the whole construction can become more cost-effective because the developer can then **save money on smaller-sized heating systems** (pipes, radiators, heat pumps, etc.).

A further final justification for including a minimum improvement on energy efficiency is that it helps with the **social needs of affordable living, fuel poverty and healthy homes**. An energy-efficient home saves energy bill costs for the home occupiers and also often helps make the home interior more comfortable and conducive to good health (warmer, less draughty, and with less condensation on cold spots on walls or windows thus reducing the chance of respiratory harm from mould growth).

How can local plans set requirements for improvement at the *demand reduction* stage?

The Planning and Energy Act 2008 grants Local Planning Authorities the power to require "energy efficiency standards that exceed the energy requirements of building regulations". It defines "energy efficiency requirements" as standards that are endorsed by national regulations, national policies, or guidance issued by the secretary of state. It defines 'energy requirements' as regulated energy only (the energy affected by Part L of building regulations – this does not include plug-in appliances).

Example adopted plans generally require a **set % reduction value to be achieved through energy efficiency measures** ranging from circa 5-15% against the emissions rate set by Building Regulations Part L 2013. In the examples we have examined (overleaf), this contributes part of the total required % improvement on the Part L baseline, and were set to ensure that energy efficiency (not just energy supply) played a role within that total target. These % were set according to best practices already being achieved in local proposals when those plans were being drafted, which might now be outdated.

An **alternative** could be a percentage improvement on the **'Target fabric energy efficiency' (TFEE)** set by Part L and SAP. The TFEE is the legal limit on how much heat a home needs per m^2, based on the *fabric* not the efficiency of the heating *system*. Part L sets the TFEE to reflect a home of the same size and shape to the proposed home, with a set minimum standard of insulation, glazing and airtightness. The TFEE thus varies by the size and shape of the proposed building. By law, new homes must not exceed the TFEE. An improvement on the TFEE would show effort at this step of the energy hierarchy. The requirement could be a % improvement on the Part L 2021 TFEE, or an absolute kWh/m^2/year figure. The target may need to be updated when Part L 2025 (Future Homes Standard) enters force.

Potential energy efficiency targets based on precedents	Justification
Homes: • 10% improvement on the Target Fabric Energy Efficiency Rate set by Part L 2021 using SAP10.2 and • Energy efficiency measures to deliver 63% reduction in TER carbon vs Part L 2021	The current national baseline is the notional building fabric set by Part L 2021. In 2025 it will be replaced by the Future Homes Standard (FHS). • This 10% TFEE improvement figure reflects the approximate difference in fabric (building element U-Values and airtightness) between Part L 2021 and the Government's first draft of the FHS (2019-2021 consultations). • This 63% TER improvement figure equates to ~75% reduction on Part L 2013, i.e. equivalent to the Future Homes Standard (FHS). Demonstrably feasible in that the Government's first draft of the FHS achieved this with only fabric and a heat pump. Follows the WMS2023 prescribed metric (TER % reduction).
Non-residential: Energy efficiency measures to deliver 19% reduction in TER carbon vs Part L 2013 or equivalent vs Part L 2021.	Lacking any equivalent data of the energy efficiency % improvement that will be delivered in *non-residential buildings* by the Future Buildings Standard 2025 compared to Part L 2021. Therefore, a 19% improvement on Part L 2013 is cited here because it has been demonstrated feasible and viable in Milton Keynes; see case study.
Homes: 15-20kWh/m^2/year Fabric Energy Efficiency using Part L SAP10.2. Additional energy reporting with PHPP or TM54.	Homes: kWh space heat demand limit shown to be necessary for the UK to meet its legislated carbon budgets and net zero 2050 goal. Recent precedent evidence bases (Greater Cambridge & Central Lincolnshire) have shown this space heat demand target to be feasible even when using accurate calculation methods (PHPP or TM54), as opposed to SAP which underestimates space heat demand.

Example: New London Plan (adopted 2021)

As part of its requirement for an overall 35% reduction in carbon emissions against the building regulations baseline, London requires that part of this carbon reduction is achieved through energy efficiency measures, as follows:

- *New homes: 10%*
- *Other new buildings: 15%.*

A topic paper on energy efficiency (within the New London Plan evidence base) explains the evidence that justified how this was set:

London's requirement for a total 35% reduction in Part L carbon emissions in major developments had been in place since 2013, but not much of this was being delivered through energy demand reduction. Instead, developers were showing the reduction through energy supply, expedited by grid carbon reductions. The GLA commissioned a study of the carbon savings achieved through energy efficiency across major developments' energy statements submitted to the GLA in 2013-2017 to understand what was already possible with best practice:

- The **average** carbon saving achieved from energy efficiency alone was only 3.5% (in homes), 11.6% (non-residential) or 6.3% (mixed-use)
- But much **higher performance was achieved in many cases** (37% of new home projects achieved at least a 5% reduction, and 13% achieved a 10% reduction)
- New homes could technically achieve a 5 – 10% reduction, and other buildings could technically achieve a 15% reduction in many cases.

The GLA the commissioned a further detailed study of the implications of achieving an energy efficiency target of this sort for a set of typical development types. It found that homes could typically achieve a 10% improvement just through the then-current best practice. It also found that offices could achieve a 15% improvement and schools could get close to this. These percentage improvements were tested and found to be viable for most development types. They were therefore adopted, with flexibility for certain non-domestic development types such as hotels which would struggle to meet the target due to high hot water demand.

The London Plan 2021 also requires action on *unregulated* energy use:

- Policy SI 2 (E): "calculate and minimise carbon emissions … that are not covered by Building Regulations, i.e. unregulated emissions".
- Supplementary guidance instructs that unregulated energy calculations should use "BREDEM 2012 methodology".

Example: Milton Keynes Local Plan 2019

Milton Keynes Local Plan 2019 Policy SC1 includes a requirement for a reduction of **19% on the building regulations carbon emission rate**, followed by a ***further*** **reduction of 20% through the use of renewable energy** and low/zero carbon technologies.

The latter 20% would fall under step 3 of the energy hierarchy ('be green'), implying that the **first 19% must be achieved through the first two steps of the hierarchy (reducing energy demand, and supplying energy efficiently)**[12]. Milton Keynes Sustainable Construction Supplementary Planning Document (2021) states why the overall requirement is considered to be feasible:

> "As the Whole Plan Viability Study (2017) for Plan:MK demonstrates, the requirement to exceed the TER by 19% would not be unduly onerous for developers. Analysis of BRUKL data for recently consented schemes in Milton Keynes also indicates an average improvement of 41% over the TER is already being achieved at the design stage."

[12] This is within reason. Bioregional recently worked on a mixed-use planning application in Milton Keynes whose homes achieved a carbon emissions reduction of approximately 26% using energy efficiency measures only. For the non-residential parts of the scheme this figure was 25%. The scheme then adds renewable/low carbon measures to achieve a further 20% site-wide carbon emissions reduction. The site-wide total carbon emissions reduction is 51.39%. Homes were flatted blocks. Non-residential spaces were office, retail and gym.

Energy hierarchy step 2: Efficient energy supply

This stage of the energy hierarchy is also referred to as 'be clean'.

This step generally refers to the use of heat networks[13] to distribute heat efficiently and cleanly and with minimal losses, as opposed to individual gas boilers.

Heat networks usually serve several buildings or sites from a common energy source and can be expanded over time to serve more sites. Networks have variously included:

- Heat networks fed by local waste heat sources such as from waste incineration, refrigeration, or data centres which generate (or reject) a lot of heat as a by-product of their normal activity
- Heat networks fed by large-scale heat pumps (taking energy from air, ground or water sources) at a standalone energy centre that does not 'belong' to any individual new building
- Networks that 'share' heat across mixed-use schemes where some facilities need to reject a lot of heat (e.g. refrigeration or air-conditioning) while other uses demand heat (e.g. hot water)
- Heat networks fed by CHP plant (combined heat and power), essentially a small-scale power station which burns fuel to generate electricity and heat at the same time.
    - This was previously seen as 'efficient' because the CHP plant would be close enough to homes and businesses that the heat could be reused.
    - However, it is no longer a sustainable option because CHP almost always runs on fossil gas which needs to be fully phased-out to meet net zero carbon goal and carbon budgets, unless carbon capture technologies emerge in future. The electrical grid now provides electricity at a lower carbon intensity than a CHP plant, and heat pumps are a more efficient and cleaner heat source which is ready to reach zero carbon as the electrical grid decarbonises, and avoids the negative air quality impacts that come with fuel combustion in CHP.

Because local waste energy sources are extremely geographically site-specific and because heat networks in general are dependent on a relatively high density of heat demand, it is not appropriate to seek a universal carbon percentage reduction to be achieved at this stage of the energy hierarchy.

Because heat networks are often powered by waste incineration or fossil gas – neither of which currently has a path to zero carbon – there is a risk that a building connected to a heat network may not necessarily save carbon compared to a building with an individual heat pump other electrical heating combined with renewable electricity supply. One grey area is waste incineration, where the incineration may occur whether or not the heat is reused. A case-by-case treatment may be the most logical approach (considering the counterfactuals and embodied carbon of the new network).

Thus, it may be beneficial to design a policy so that heat network connection is only sought where the heat source is low- or zero-carbon and/or a lower carbon solution to individual electrical heating solutions per building. If the local plan also has a policy requiring on-site renewable electricity generation (see next section), then it is likely that individual heat pumps run on this renewable electricity would be a lower-carbon solution than a heat network – unless in major mixed use development, in which case a communal heat sharing network driven by heat pumps could be the optimal solution as these can (if correctly designed) enable recycling of heat rejected from cooling systems at commercial uses at the scheme.

Local plan examples (see overleaf) are therefore instead expressed as:

- A requirement to connect to an existing or planned heat network, if present
- A requirement to have an energy strategy that is compatible to connect to a future heat network, if the proposed development is within suitable area identified in a heat mapping exercise
- An acknowledgement that lower-carbon energy options may be available, in which case the heat network connection will not be required, and
- An acknowledgement that the requirement may be waived if there are unsolvable feasibility or viability obstacles which make heat networks unsuitable for the specific scheme.
- In some policy examples, heating system options are arranged into a 'heat hierarchy' with heat networks being the top priority, and developers only permitted to use solutions further down the hierarchy if they can prove that the higher-priority solutions are unfeasible or unviable. However, this approach can give rise to unwanted outcomes if the hierarchy is too prescriptive to respond to technological change[14].

[13] Heat networks (also known as district heating) are networks that supply heat across an area through underground piping systems flowing from a central heat source.

[14] If specific technologies are arranged into a hierarchy at the time of writing the plan, but other lower-carbon technologies emerge during the plan period, this can result in a 'lower priority' technology becoming in fact lower-carbon than a 'higher priority' technology. For example, gas-fired heat networks were once considered a 'better' option than electric heat pumps when the electrical grid mix had more coal and less renewable generation, but this is no longer the case thanks to the decarbonisation of the grid.

Example: New London Plan 2021 (adopted)

Policy SI3: Energy Infrastructure

This policy requires that major development proposals within identified 'Heat Network Priority Areas' should have a communal low-temperature heating system, whose heat source should be selected according to the following hierarchy:

a. Connect to local existing or planned heat networks
b. Use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)
c. Use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)
d. Use ultra-low NOX gas boilers (which must meet requirements of a separate air quality policy).

Where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.

Example: Milton Keynes Local Plan 2019 (adopted)

Policy SC2: Community energy networks and large-scale renewable energy schemes

This policy requires that:

- Major development proposals should consider the integration of community energy networks in the development. This consideration should form part of development proposals and take into account the site's characteristics and the existing cooling, heat and power demands on adjacent sites
- All new developments in proximity of an existing or proposed combined heat and power (CHP), combined cooling, heat and power (CCHP) station or local energy network will be expected to connect to the network unless it can be demonstrated that:
    1. A better alternative for reducing carbon emissions from the development can be achieved; or
    2. Heating and/or cooling loads of the scheme do not justify a CHP connection; or
    3. The cost of achieving this would make the proposed development unviable.

Example: Bristol Local Plan 2011 (adopted)

Policy BCS14: (Sustainable Energy) contains a 'heat hierarchy' whereby specific technologies are arranged in order of preference, from highest to lowest:

- Connection to existing CHP/CCHP distribution networks [combined heat and power/combined cooling, heat and power]
- Site-wide renewable CHP/CCHP
- Site-wide gas-fired CHP/CCHP
- Site-wide renewable community heating/cooling
- Site-wide gas-fired community heating/cooling
- Individual building renewable heating.

That policy establishes that, in the specified "Heat Priority Areas", "major development will be expected to incorporate, where feasible, infrastructure for district heating, and … to connect to existing systems where available." These Heat Priority Areas are based on areas identified by the Citywide Sustainable Energy Study (2009) as suitable due to the density of heat demand.

Supporting text to the policy asserts that by following this hierarchy, "the lowest carbon heating / cooling solution feasible for the development will be achieved".

However, this hierarchy does not include individual electric heating systems (albeit heat pumps may be considered "renewable heating"). In practice, this hierarchy pushes the use of existing gas heat networks over individual heat pumps, despite the fact that electric heat pumps (whether individual or network) are now lower-carbon than gas heat networks, thanks to decarbonisation of the electricity grid and the 300%-500% efficiency that modern heat pumps achieve (3-5 units of heat delivered per unit of electricity used). Connection to a gas heat network locks a building into fossil fuel use until the network may switch to a new heat source (if ever). By contrast, even direct electric heating will become zero carbon by 2030 if the Government's grid plans are realised (albeit direct electric heat is only 100% efficient thus much costlier to run than heat pumps or gas, therefore only suits highly insulated properties).

Example: Bristol emerging new local plan (published November 2023)

Notably, this does not repeat the very prescriptive hierarchy found in the adopted plan (above). Instead, it (policy NZC2) sets a heat hierarchy of only two steps:

1. Where possible, connection to an existing or new "classified heat network"
2. Communal or individual heating that is fossil fuel free.

Supporting text explains the criteria to define a "classified heat network" which include that "The heat supplied is from renewable and/or low carbon sources or has a decarbonisation plan to remove all fossil fuel heat generation from the network by 2030". This avoids the risk of indefinitely locked-in gas usage.

Energy hierarchy step 3: Renewable and low carbon energy at new buildings

The third step of the energy hierarchy typically used in previous local plan examples (see *Figure 15*) is to decarbonise energy supply: both electricity and heat. The Committee on Climate Change 2019 report ('UK housing: Fit for the future') identified that grid decarbonisation is a vital component in the trajectory towards net zero. Onsite renewable generation at new buildings supports this in two ways. First, it drives investment in additional renewable electricity, and second, it can simultaneously reduce peak and annual demand on the grid (if the selected energy generation technology produces energy at the time when the development needs to use that energy).

Requirements for renewable or low-carbon energy supply in local plan policy can be expressed as:

- A further **percentage reduction in carbon emissions** against the building regulations baseline, in addition to the percentage achieved through fabric (*see example from Milton Keynes*),

  or

- A 'Merton Rule'[15]; where the proposal must include renewable energy generation equipment on-site or near-site, sufficient to **meet a certain proportion of the building's own energy demand** (see example below from Solihull). This can be:
  - total energy,
  - or regulated energy only.

  This uses the Energy and Planning Act power to require a 'reasonable' proportion of the development's energy use to be from renewable sources in the locality.

The value of onsite generation has long been recognised in local planning policy, but has not been without its critics. It has sometimes been argued that the prescriptive nature of such policies may not be applicable for all sites and can occasionally lead to the installation of inefficient onsite renewables[cii]. Some sites may not be able to meet a very high requirement for renewables, such as if they are overshadowed (meaning solar PV panels would not work well), or if it is a tall building where there is a larger amount of internal floor space demanding energy but a relatively smaller roof space for PV.

However, a 100% renewable energy supply (whether on or off site) is a vital component of achieving net zero carbon buildings by the increasingly consensus-based industry definitions previously explained.

There is a growing number of adopted example policies that set specific targets for onsite renewable generation as part of a requirement for 'net zero carbon' or 'net zero energy' new buildings. In practice, these policies are often applied flexibly if the developer can show how and why it was not possible to meet the required metric and that they have pursued renewable energy measures to the greatest reasonable extent. If such a policy is adopted, it will be **important to upskill development management officers to be able to recognise the sort of site constraints** that would legitimately impede the ability to meet 100% of energy demand with on-site renewable generation, and to differentiate these from incidences where developers may make a claim of non-feasibility simply to save the cost or the time it may take to improve their designs to meet the target.

Defining 'low and zero carbon technologies'

If setting a plan policy requirement under this stage of the energy hierarchy, it will be necessary to define the types of measures that will count as 'renewable / low and zero carbon technologies'.

- Some technologies, such as solar PV panels, solar thermal and turbines, always count.
- Other technologies – such as heat pumps – may need the policy to clarify on where to account for these in an energy statement.

Heat pumps are not automatically zero carbon – they still use electricity to run, and the UK's electricity grid is not yet zero carbon (albeit grid electricity is now lower carbon per kWh than gas boiler heat is). Yet heat pumps are a low carbon heating system, thanks primarily to their high efficiency. They can deliver three to five times as much heat energy as they consume in electrical energy, because take ambient heat from outdoor air – thus there is a renewable element to the heat they deliver. To achieve this level of efficiency, they need to provide heat at a relatively low temperature. For a building to only need low-temperature heat delivery, that building needs to have low space heat demand – which is delivered through improved fabric (insulation, glazing and reduced air permeability[16]).

The developer could make the heat pump zero carbon by supplying its electricity from a renewable source such as rooftop solar panels, so long as they are generating the renewable electricity at the same time the heat pump is running or if the building can store the solar electricity in a battery for later use. You will need less energy from your solar panels to run your 300% efficient heat pump, compared to using your solar panels to run direct electric heating which can only ever be 100% efficient – therefore you do not need as many solar panels, resulting in savings in embodied carbon.

In some other precedent local plans, carbon savings from heat pumps are treated under the same step of the energy hierarchy as renewables – that is Step 3/'Be Green'. For example, London Plan draft energy guidance[ciii] asks that heat pumps be accounted for as a Step 3 measure, unless they are powering a heat network, in which case all heat from the heat network would be a Step 2 ('be clean') measure.

However, heat pumps could alternatively be counted instead as an 'energy efficiency' measure. That would allow a cleaner accounting for their benefits within Step 1 of the energy hierarchy, so that the energy efficiency policy can be aligned directly to the Future Homes Standard (i.e. a 75% reduction in carbon emissions via energy efficiency improvements, comprising of fabric improvements *and* the heat pump along with any other efficiency improvements, as per the Government's original indicative FHS specification consulted upon in 2020-22). The renewable energy requirement (Step 3 of the energy hierarchy) could then be more cleanly defined as "meet 100% of the remaining energy demand with on-site renewable *electricity* generation", offering a clear improvement beyond what the 2025 building regulations would have already entailed (which as previously noted, is too weak for the achievement of national carbon budgets) and thus actively helping to deliver climate mitigation.

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[15] The original Merton Rule (introduced in 2003) required only 10%, but more recently adopted and emerging local plans aim higher.

[16] Air permeability is the opposite of airtightness. As defined in Part F of Building Regulations, airtightness is "a general descriptive term for the resistance of the building envelope to infiltration with ventilators closed. The greater the airtightness at a given pressure difference across the envelope, the lower the infiltration".

Example: Sutton Local Plan (adopted 2018) Policy 31

In Policy 31, All proposed development must apply the Mayor's energy hierarchy in the following order:

1. Being built to 'the highest standards of energy efficient design and layout',
2. Supplying energy efficiently (low or zero-carbon heat networks and cooling networks),
3. Using on-site renewable energy to achieve a reduction in total CO^2 emissions (regulated and unregulated) of 20% in major developments or 10% in minor developments.

Example: Milton Keynes Local Plan 2019 (adopted)

Policy SC1 (Sustainable Construction) includes that:

All proposals of 11+ dwellings or non-residential space over 1,000m^2 must apply the energy hierarchy to achieve:

1. A ≥19% reduction on Building Regulations 2013 carbon emissions,
2. A further ≥20% reduction through renewables (onsite or a local network),
3. The developer must then pay to offset remaining carbon emissions (see 'carbon offsets' section further on in this brief).

Emerging example: Solihull Local Plan: Draft Submission Plan[civ] 2020

Policy P9, point 3, would require that:

At a site level, development must apply the 'energy hierarchy' to reduce energy demand for heating, lighting and cooling and minimise carbon dioxide emissions as follows:

- All new dwellings to achieve 30% reduction in energy demand/carbon reduction improvement over and above the requirements of Building Regulations Part L (2013) at the time of commencement up to March 2025.
- From April 2025 for all new dwellings to be net zero carbon.
- Minor non-residential development will conform to at least BREEAM Very Good and major non-residential development will conform to at least BREEAM Excellent.
- Provide at least 15% of energy from renewable and/or low carbon sources for all major housing developments and non-residential developments of 1000sqm or more

Please note that Solihull's draft plan was withdrawn from examination in Autumn 2024, but this was due to the Inspector's lack of confidence in the land supply, not the energy/carbon policies. It is therefore likely that similar energy/carbon policies will be included again when Solihull eventually comes to submit a revised plan with a revised land supply.

Alternative: More effective metrics for true 'net zero' buildings outside Building Regulations

There is a growing number of local authorities pursuing the industry-consensus approach (to achieving genuine net zero new build development as recommended by LETI, UKGBC, RIBA and others). The approach does not use baselines or % reductions based on previous iterations of Part L as in previously explored precedents. Instead the approach sets absolute limits on energy use, and requires this to be matched by 100% renewable energy. A policy following this approach sets three key requirements:

1. **Energy use intensity (EUI)** – the predicted total amount of regulated and unregulated energy used, per m^2 of floorspace.
2. **Space heating demand** – the amount of energy required to heat the building, per m^2 of floorspace.
3. **On-site renewable energy generation** – must match total energy use across the course of each year, in order to be a 'net zero' building.

Comparison of targets for residential development

Space heating demand (kWh/m^2/year)	Energy use intensity (kWh/m^2/year)	Target referenced
30	40	Cornwall Climate Emergency DPD (adopted 2023) Bath & North East Somerset Local Plan (adopted 2023)
15-20	35	Central Lincolnshire Local Plan (adopted 2023) Greater Cambridgeshire Draft Local Plan (emerging)
15-20	n/a	Committee on Climate Change (recommendation)
15	35	Low Energy Transformation Initiative (recommendation) CIBSE (recommendation) Good Homes Alliance (recommendation)

The EUI target includes all energy used by the building, importantly including unregulated energy, which Part L does not. EUI does however exclude contributions from renewable energy generation and does not consider electric vehicle charging in the calculation. Reducing the building's energy use is the primary aim of the EUI approach, which can then be supplemented to net zero by the requirement for renewable energy generation provision to match the energy demand of the building.

This **energy metric approach drives forward higher quality fabric and systems** installed in buildings. For example, high performance U-values are essential to achieve space heating demand targets set out above. Part L of Building Regulations does not however guarantee such high-performance since absolute energy targets are not set for certain building typologies. An additional benefit of this assessment is that **EUI can be easily monitored and verified in practice from meter readings**.

Additionally, a tight **EUI target essentially bans the use of on-site fossil fuels**, and more specifically, gas boilers for heating. Although explicitly stating the ban of gas boilers in policy wording may cause concern, the EUI target does this implicitly since gas boiler efficiency (c. 90%) will likely result in too large a contribution of overall energy use to result in a compliant EUI value. Contrarily, the **superior efficiency of heat pumps makes achieving the EUI target significantly easier**, as the technology can produce over 3 units of heat per 1 unit of electricity used.

Particularly **for more stringent EUI and space heating demand targets**, as proposed by Central Lincolnshire and Greater Cambridge, more than just the installation of a heat pump and high fabric efficiency will be required to achieve such targets. **To meet the more stringent targets, decisions must be made at an early stage of the development process to make appropriate decisions on form factor, glazing ratios and building orientation, which encompasses a fabric first approach**. These decisions will contribute towards the maximisation of energy demand reductions and the ability of the renewable energy generation system to create an on-site net zero energy balance.

This remedies a key weakness in Building Regulations, which fail to incentivise applicants to design a building with an inherently thermally efficient form or orientation because all of the Part L targets are not fixed targets but are set in relation to a building of the same size and shape as the proposed building.

To further strengthen a policy informed by this approach, a **robustly accurate energy modelling methodology will need to be used**. SAP 10.2, used for Part L compliance, is currently unable to accurately assess unregulated energy since the relevant equation is based on 1998 appliances, which clearly does not reflect modern efficiencies. It is therefore more difficult to comply with an EUI target using SAP because the proportion of unregulated energy, which can be up to 50%, is severely overestimated. SAP also frequently underestimates space heat demand by up to 270%, and SBEM has also been shown to generally underestimate overall energy use.

To mitigate such inaccuracies, an alternative energy modelling methodology is required to ensure design-stage performance values correspond to the as-built performance of the building. The industry-**recommended energy modelling method** to minimise such a performance gap is Passive House Planning Package (**PHPP**), which is used for the leading Passivhaus standard. Contrary to common misconceptions, PHPP can be used without needing to pursue the stringent Passivhaus certification process. An alternative accurate energy modelling calculation method, if used correctly, is **CIBSE TM54**. TM54 works by starting with the SBEM calculation and making adjustments to the inputs to reflect how the building will be used based on reasonable adjustments about occupancy and so on.

On-site renewable energy generation must match the EUI (multiplied by the floor space) to reach an on-site net zero energy balance. In the majority of cases, this has been shown to be technically feasible for EUI targets up to 40 kWh/m^2/year. The taller the building, the less likely it is that there will be sufficient roof space to match EUI. However, even for such taller, more shaded buildings, façade-mounted panels and other ground-mounted renewable energy technology should be considered.

Several examples are explored overleaf, which, although they take a similar approach, have received very different reactions from their respective Inspectors during examination.

In the precedents cited here, a difference may be noted between standards set for residential versus non-residential development. This an important aspect of the energy-based policy approach. The typical usage of residential buildings is less variable therefore relatively easy to predict and understand, whereas non-residential buildings can vary significantly in terms of energy use. For example, an office with computers at each desk (and potentially a computer server bank) will have a far higher energy consumption than a retail unit that primarily consumes energy only through lighting and heating.

Therefore, non-residential buildings need to be treated in isolation of the archetype assessed because the whole scope of non-residential buildings involves a very wide range of energy consumption levels associated with the unique activities of the occupier. Setting specific energy use limits per archetype is one approach that has been used, whilst setting a level of BREEAM certification acts as another. The latter approach may not be as stringent on energy use (as BREEAM does not set absolute targets for energy use or renewable energy and does not guarantee net zero carbon schemes), but ensures a wider range of sustainability issues are considered and addressed (for example, materials, management, water, biodiversity and other issues beyond energy use).

Example: Cornwall Climate Emergency DPD 2023 (adopted)

The Cornwall Climate Emergency Development Plan Document (DPD) was adopted in February 2023 and retained all key elements of its net zero carbon policies.

Policy SEC1 (Sustainable Energy and Construction) includes that (paraphrased):

1. Major non-residential development (over 1,000m^2) to achieve **BREEAM Excellent** (or "equivalent or better methodology")
2. New residential development to achieve all of the following:
   i. **Space heating demand of <30kWh/m2/year**
   ii. **Total energy consumption of <40kWh/m2/year**
   iii. **On-site renewable generation to match the total energy consumption**, with a preference for roof-mounted solar PV. Where it is not feasible or viable to include enough renewable energy generation to match total energy consumption, the development should pursue the following:
      - Renewable energy generation to be maximised as far as possible
      - Connection to an existing or proposed district energy network
      - **Offset the residual energy demand** by a contribution to Cornwall Council's Offset Fund.

This is supported by evidence in the form of energy modelling analysis[1] by expert green building engineers. This analysis used accurate energy modelling method (PHPP) to identify a range of energy performance targets that are feasible in Cornwall and can reach the net zero carbon target in a variety of ways (different combinations of fabric / energy efficiency and renewable energy measures). This evidence piece also compared the proposed 'net zero carbon' building performance options against how a building would perform if it simply met the Future Homes Standard.

The analysis included cost information for each modelled building that was then used in the viability assessment for the DPD. That viability assessment found that most residential development scenarios remained viable with the policies applied, and that the majority of the cost uplifts over the 2013 building regulations will be incurred by developers anyway in order to meet the new 2021 building regulations, even without the local plan carbon policy.

Contrarily to the Salt Cross AAP, the Inspector's report positively stated that the 2015 WMS has clearly been overtaken by more recent events.

Example: Bath & North East Somerset Local Plan Partial Update (adopted)

The Local Plan Partial Update (LPPU) was adopted in January 2023 and became the first local plan in the UK to set net zero energy standards for new housing.

Policy SCR6 sets identical standards to Cornwall for residential development and was informed by the same technical evidence base. As set out in the Sustainable Construction Checklist Supplementary Planning Document, PHPP is required for major development, whilst an option to use SAP with the Energy Summary Tool is available for minor residential development. The Energy Summary Tool adjusts outputs from SAP to reflect in practice performance. These options reflect the same approach as Cornwall. It is however important to note that the calculation approaches were not tested at examination as the requirements are set out in supplementary guidance.

A specific technical study for the Bath & North East Somerset (B&NES) area was not seen as necessary because Cornwall and B&NES share the same prominent housing typologies and climate patterns that influence the efficiency of solar PV to provide an on-site net zero energy balance.

A key piece of evidence that assisted B&NES to successful adoption was a letter received from DLUHC, which reiterated the fact that local authorities are able to set standards that exceed Building Regulations i.e. that exceed the standards set out in the 2015 WMS. The 2015 WMS was not explicitly stated in this correspondence from government, yet the clarification on exceeding Building Regulations all but confirms that the 2015 WMS is no longer relevant.

This view was directly stated in the Inspector's report:

"*The **WMS 2015 has clearly been overtaken by events** and does not reflect Part L of the Building Regulations, the Future Homes Standard, or the legally binding commitment to bring all greenhouse gas emissions to net zero by 2050.*

*I therefore consider that the **relevance of the WMS 2015 to assessing the soundness of the Policy has been reduced significantly**, along with the relevant parts of the PPG on Climate Change, given national policy on climate change. The NPPF is clear that mitigating and adapting to climate change, including moving to a low carbon economy, is one of the key elements of sustainable development, and that the planning system should support the transition to a low carbon future in a changing climate. Whilst NPPF154b sets out that any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards, for the reasons set out, that whilst I give the WMS 2015 some weight, any inconsistency with it, given that it has been overtaken by events**, does not lead me to conclude that Policy SCR6 is unsound, nor inconsistent with relevant national policies**."*

The logical view provided by the B&NES Inspector appropriately summarises the context of local authority powers to set their own energy efficiency standards. In contrast, the West Oxfordshire Inspectors' views represent inconsistency in decision making on net zero policies at PINS. As more local authorities propose ambitious policies that will need to be weighted against consistency with national policy, increased consistency should become apparent.

Example: Central Lincolnshire Local Plan (adopted)

The Central Lincolnshire Local Plan was adopted in April 2023. The adoption of this plan is significant as the energy requirements for Policy S7 and S8 are aligned with recommendations from LETI and the Committee on Climate Change.

Proposed Policy S7 (Reducing Energy Consumption - residential) includes that:

> "Unless covered by an exceptional basis … all new residential development proposals must include an Energy Statement which confirms in addition to the requirements of Policy S6 that all such residential units:
>
> 1. Can generate at least the same amount of renewable electricity on-site (and preferably on-plot) as the electricity they demand over the course of a year, such demand including all energy use (regulated and unregulated), calculated using a methodology proven to accurately predict a building's actual energy performance; and
> 2. To help achieve point 1 above, target achieving a space heating demand of around 15-20kWh/m^2/yr and a total energy demand of 35 kWh/m^2/yr … No unit to have a total energy demand in excess of 60 kWh/m^2/yr [which means] the amount of energy used as measured by the metering of that home, with no deduction for renewable energy."

The policy also includes a clause to address the energy performance gap:

> "The Energy Statement must include details of assured performance arrangements. As a minimum, this will require:
>
> a) The submission of 'pre-built' estimates of energy performance; and
> b) Prior to each dwelling being occupied, the submission of updated, accurate and verified 'as built' calculations of energy performance. [This] should also be provided to the first occupier … Weight will be given to proposals which demonstrate a deliverable commitment to on-going monitoring of energy consumption … which has the effect … of notifying the occupier [if] their energy use appears to significantly exceed the expected performance of the building, and explaining to the occupier steps they could take to identify the potential causes."

Proposed Policy S8 (Reducing energy consumption – non-residential) replicates the clauses except with a higher permitted total energy demand of 70-90kWh/m^2/year. The assured performance clause is also mirrored.

If a non-residential proposal can demonstrate why the metrics are not achievable, it can instead source renewable energy from off-site, pay the local authority to deliver equivalent renewable energy or other offsite infrastructure to deliver the appropriate carbon saving, or connect to a decentralised energy scheme.

Alternatively, a non-residential proposal may demonstrate achievement of BREEAM Excellent or Outstanding, instead of complying with the energy metrics.

Example: Merton New Local Plan (adopted 2024)

In April 2023, the inspectors expressed concerns in the Post-Hearings Letter[cv] around the viability mandatory energy use intensity targets, particularly for smaller development, that may negatively impact delivery. This relates to potential issues for small housebuilders in that the required expertise in energy-efficient construction may not be widespread.

The adopted plan Policy CC2.3 therefore includes only requires *disclosure* of Energy Use Intensity (EUI) for all proposals of 1 or more homes or 500m2 of floor space, and 5-year post occupancy monitoring for major development. Supporting text paragraph 2.3.18 explains that developments should calculate the EUI with (CIBSE) TM54, (PHPP) methodology or equivalent.

The supporting text also includes *non-mandatory* exemplary EUI targets that development proposals are advised to strive towards:

- Residential and multi-residential – 35 kWh/m^2/year
- Offices, retail, GP surgery, hotels and higher education – 55-70 kWh/m^2/yr
- Schools – 65 kWh/m^2/yr
- Hotels – 160 kWh/m^2/yr
- Light industrial uses – 110 kWh/m^2/yr

The targets match those developed by the London Energy Transformation Initiative to be consistent with achieving national net-zero carbon targets (paragraph 2.3.21) and proven feasible by energy modelling for a set of 18 London Boroughs including Merton (paragraph 2.3.22). In contrast, paragraph 2.1.14 notes that typical current Part L EUI is 140/kWh/m^2/yr.

Policy CC2.3 also includes the following **space heat demand** targets, with SAP:

Development type	Until 31/12/2022	01/01/2023 – 31/12/2024	From 01/01/2025
Block of flats & mid-terrace house	<43 kWh/m^2/year	39 kWh/m^2/year	15 kWh/m^2/year
Semi-detached, end-terrace & detached house	52 kWh/m^2/year	46 kWh/m^2/year	20 kWh/m^2/year
Non-residential (target flexible)	-	-	15 kWh/m^2/year

Supporting text paragraphs 2.3.9 – 2.3.13 explain that the gradual uplift allows time for developers to adapt, and that the 2022-24 targets reflect the Zero Carbon Hub 'interim fabric energy efficiency standard' and 'full fabric energy efficiency standard' which have been demonstrated to be feasible, viable, and achieved in several schemes in Merton.

In **Policy CC2.4**, proposals must use low carbon heat. Proposals must demonstrate "how the proposal has made the best potential use of roof space" to maximise renewable energy generation, which should meet "100% of energy demand … where possible".

Emerging example: Winchester Draft Local Plan (draft 2022)

This proposed submission underwent Regulation 19 consultation in March-May 2022[cvi] and was submitted to the Inspectorate in mid-November 2024.

Proposed Policy CN3 (Energy efficiency standards to reduce carbon emissions) would require that all residential development must demonstrate the following:

- **No on-site fossil fuels** for space heating, hot water or cooking.
- Space heating demand of **15 kWh/m^2/year.**
- Energy consumption (EUI) of the building(s) to less than **35 kWh/m^2/year.**
- **Passive House Planning Package or CIBSE TM54** to be used for predicted energy modelling.
- **On-site renewable energy generation to provide 100%** of the energy consumption required by residential buildings.

It appears in this Draft Plan that there is no option to offset shortfalls to the renewable energy generation and/or EUI target. No other authority has proposed the EUI approach without a last resort option to offset, although most evidence studies prove that the absolute energy requirements are technically feasible for the majority of housing typologies and therefore offsetting may not be required.

High-rise flat block is the primary typology that may struggle to meet on-site renewable energy requirements since there is limited roof space relative to the internal floor area. Given the housing mix in Winchester is unlikely to include this typology, this could explain why offsetting is not currently included in the Plan.

Emerging example: Greater Cambridge Local Plan (First Proposals 2021[cvii])

Policy CC/NZ *would require and guide net zero carbon new builds.* This will include:

- Space heat demand of 15-20 kWh/m^2/year in all new developments
- No new developments to be connected to the gas grid; all heating low-carbon
- Total energy use intensity targets to be achieved as follows:
    - Dwellings including multi-residential: 35 kWh/m^2/year
    - Office, retail, higher education, hotel, GP surgery: 55 kWh/m^2/year
    - School: 65 kWh/m^2/year
    - Leisure: 100 kWh/m^2/year
    - Light industrial: 110 kWh/m^2/year
- Proposals should generate at least the same amount of renewable energy (preferably on-plot) as they demand over the course of a year [including] all energy use (regulated and unregulated), calculated using a methodology proven to accurately predict a building's actual energy performance.

The need and deliverability of this policy is evidenced by a suite of net zero carbon evidence reports including:

- Local area carbon reduction targets that would represent a fair local contribution to the national net zero carbon transition and Paris Agreement
- Expert analysis by the Committee on Climate Change and various building industry experts about what must happen in the buildings sector to deliver the national net zero goal and interim carbon budgets – including proposed targets for heat demand, total energy use, and on-site renewable energy generation – and explaining how/why this is not delivered by building regulations (current or incoming)
- Technical feasibility studies which modelled whether it was possible to reach the proposed zero carbon energy balance in the typical types of development expected to come forward in the plan period (based on applying a range of energy improvement measures to real recent development proposals that received permission) – this showed that the targets were feasible
- Cost modelling to show the cost uplifts to meet the modelled energy improvement measures, as above, for inclusion in the viability assessment.

The supporting text notes that the alternative – having no policy and relying instead on incoming uplifts to building regulations – would fail to fulfil the plan's statutory duty to help fulfil the Climate Change Act and would fail to play Greater Cambridge's role in helping the UK fulfil its commitment to the Paris Agreement to limit climate change to 1.5C or 2C.

The plan was in its relatively early stages as of May 2022. It completed its First Proposals/Preferred Options consultation in 2021. Due to delays (related to water availability and transport; unrelated to the energy/carbon policies), the indicative timetable as of March 2024 is that this plan will follow the Government's new revised planning regime in 2025 onwards.

Emerging example: Leeds City Council Draft Local Plan (2023)[cviii]

Policy EN1 Part B *would require new development to be operationally net zero.*

All development must demonstrate a space heating demand of 15 kWh/m^2/year.

Energy use intensity required targets vary significantly between typologies, as set out below:

- All residential development – 35 kWh/m^2/year
- Offices, retail, GP surgery, hotels and university facilities – 55 kWh/m^2/year
- Schools – 65 kWh/m^2/year
- Leisure – 100 kWh/m^2/year
- Light industrial uses – 110 kWh/m^2/year
- Research facility – 150 kWh/m^2/year

On-site renewable energy generation is to deliver an annual net zero carbon balance (including regulated and unregulated emissions).

Additional secondary requirements:

- Calculations must be carried out using an approved building modelling software such as IES-VE, SBEM and PHPP.
- Gas boilers and direct electric resistive heating will not be supported.
- Expected official UK government electricity grid carbon intensity values to be used instead of static SAP10.2 factors.
- Offsetting at a cost of £248/tCO_2 – rising to £280 by 2030 to reflect further predicted grid intensity reductions.

Policy EN1 Part B goes further than similar recently adopted policies, since it prescribes EUI targets for non-residential typologies alongside residential. The policy is also explicitly refers to the use of gas boilers, whereas other policies rely on the energy targets themselves to rule out gas boilers and direct electric heating.

Emerging example: Bristol City Council Draft Local Plan (Publication version November 2023)[cix]

Policy NZC2 requires new development to be operationally net zero based on absolute energy limits.

All development will be expected to:

- Achieve a maximum 15-20 kWh/m^2/year space heating demand
- Achieve a maximum 35 kWh/m^2/year energy use intensity – new homes and other forms of accommodation to achieve
- Comply with operational energy/carbon requirements of BREEAM 'Excellent' – major non-residential
- Provide on-site renewable electricity generation with an output equivalent to at least the annual energy consumption of the development
- Development should provide onsite renewable energy of 105 kWh/m^{2}fp/year

In the case of Policy NZC2, offsetting is a last resort option for energy use intensity instead of on-site renewable energy generation – price set at £99/MWh or 9p/kWh. See *previous section* for further information.

The key policy element here that is unique to similar emerging examples is the expectation of a certain amount of renewable energy based on the footprint of the building. Best practice for this metric is currently 120 kWh/m^{2}fp/year. Setting a target for this ensures that it is easy for planning officers to assess whether a development has truly maximised all available roof space. In most cases, if on-site roof top solar PV generation is predicted to be lower than the target set out, it can be assumed that all opportunities for generation have not been maximised from the earliest stage of the scheme.

Now that confirmed examples and emerging policies have been explored thoroughly, it is clear what the Local Plan can achieve. The successfully adopted examples form an approach that the equivalent Buckinghamshire policies could follow, including standards on:

- Energy Use Intensity
- Space heating demand
- On-site renewable energy generation
- Potentially an additional technical certification for non-residential buildings such as BREEAM.

To ensure it is clear that on-site renewable energy generation has been truly maximised, a target using a kWh/m$^2_{\text{building footprint}}$/year could be set.

Links between energy-based policy approaches and climate adaptation

In addition to the key energy metrics for these policies, the Local Plan for Buckinghamshire could ideally seek to incorporate measures on climate adaptation, most notably overheating risk, which is linked to energy efficiency. An overview of overheating risk and how it could be integrated into policy is explored below.

Overheating risk becomes a greater concern as buildings (necessarily) become more energy efficient and thermally insulated. Overheating risk can decrease comfort or even safety of residents. Integrating overheating assessment requirements into policy alongside operational energy/carbon requirements works towards a well-rounded policy approach, that can address mitigation and adaptation holistically.

Building Regulations Part O offers either a simplified method or a dynamic modelling method to assess overheating, but the more effective 'dynamic method' is not necessarily required although it provides more detailed information on specific risks and their locations within a building. Alternatively, CIBSE TM52 and TM59 overheating risk assessment methodologies provide a robust approach for accurately assessing and mitigating such risks, which could be implemented as policy alongside operational energy/carbon measures. Requiring that new development appropriately integrates the cooling hierarchy into design decision-making also best ensures that overheating risks are considered throughout the entire decision process, allowing for more effective measures to be selected. The cooling hierarchy prioritises passive measures to reduce overheating risk, instead of allowing active cooling measures to be installed, such as air conditioning units that will unnecessarily increase energy demand and impact Energy Use Intensity levels.

Although a 2021 Written Ministerial Statement claims that now Building Regulations Part O (Overheating) has been introduced "there will be no need for policies in development plans to duplicate this", we note that Part O does not make mandatory the more effective full dynamic overheating modelling approach exemplified by CIBSE TM52 and TM59 as above. Therefore, a policy would not 'duplicate' Part O if the policy simply requires that this more detailed overheating risk mitigation approach (CIBSE methods) should be utilised.

Overheating and operational energy/carbon should ideally be considered together, for example to ensure that the development does not increase overheating risk by excessively pursuing solar gain to reduce heating demand, and that the design does not require energy use for active cooling now or in future climate conditions. Therefore, it is important that passive cooling measures are prioritised and active cooling measures are only used as a last resort because their use will increase energy consumption and subsequent associated carbon emissions. Design elements such as building form, orientation, shading and passive ventilation should be decided at the earliest possible stage to ensure passive measures are maximised and overheating is sufficiently addressed.

Carbon and energy offset payments

This section considers the principles of offset approaches as they have been (or could be) used in local plan policy. This firstly covers *carbon* offsetting, then *energy* offsetting as a slightly different approach.

Carbon offsetting

Carbon offset payments are sometimes set as a Section 106 requirement in order to make a development's unavoidable carbon emissions acceptable by funding off-site actions to mitigate them.

Carbon offset payments from developers were pioneered by Milton Keynes in 2008 and later adopted by Ashford and Islington, then across London, and now also Reading. These funds are meant to deliver actions that will prevent or remove the same amount of carbon that the development will emit over a certain number of years. Several key differences arise in how this kind of policy can work:

- Calculation and scope
- Pricing
- Collection and spending.

Calculation and scope

Key differences here are:

- Whether to offset **only regulated** carbon emissions as calculated by SAP or SBEM (national calculation methods), **or also unregulated** emissions (and how to calculate these if so)
- **Number of years** of carbon emissions that the developer should pay for
- **When the calculation should be performed** – i.e. at the time of planning application, or on completion or post-occupation to ensure the offset amount reflects reality.

Some local planning authorities in London and elsewhere also seek offsets for unregulated emissions. Where local plans require *carbon* offsetting to 'net zero' we have not found any examples that use any method other than SAP / SBEM to calculate the *regulated* portion of the carbon emissions that must be offset (although some seek offsetting of the *unregulated* portion using a different method). However, some energy-based policies that offset energy and not carbon use tools such as PHPP when calculating the amount of offsetting required for policy compliance (see 'energy offsetting' overleaf).

Pricing

- Either tied to a **nationally recognised 'carbon price'** such as the BEIS carbon valuation,
- Or the **cost of delivering local projects** that would remove or prevent the same amount of carbon.

London's recommended offset price is based on a 2017 study by AECOM. This explored a range of costs to enact carbon-saving projects, minus the amount of 'copayment' that can be secured (e.g. if homeowners pay part of the cost towards insulating their home, and the fund pays the rest). These projects mostly consisted of retrofitting existing buildings with insulation or renewables. It concluded:

> "Given the wide variability in the costs and carbon savings for potential carbon offsetting projects combined with the uncertainty in the percentage copayments that could be secured, it would be difficult to assemble sufficient evidence … to analytically derive a robust [London-wide] carbon price based on the cost of offsetting projects. As such, the approach adopted in this study is to … base [offset] prices … on a **nationally recognised carbon pricing mechanism**".

The AECOM study on pricing notes that offsetting [within the London Plan policy approach] must be considered in viability studies and could be varied by the location in the same way that CIL zones differ. The London Plan 2021 lets boroughs set their own price, noting that "a nationally recognised non-traded price of £95/tonne has been tested as part of the viability assessment for the London Plan". However, that 'nationally recognised non-traded price' of carbon is updated annually[cx] – and would today (2024) be £403/tCO_2 if that AECOM exercise were repeated today. 2018 Mayoral guidance notes some LPAs have based their price on the average cost of local projects to save carbon, e.g. Lewisham (£104/tonne), which is re-tested in a local viability assessment.

We note that it is important that viability assessments must not 'double count' the cost impact of net zero carbon policy: that is, the viability assessment should firstly consider the cost of meeting policy requirements for carbon reductions on-site through improvements to the building, and then only apply the cost of offsetting where there is any *remaining* carbon.

Collection and spending of offset payments

London mayoral guidance (2018) notes that offset payments should be collected via Section 106 agreements in the usual way and by the same team, and that:

> "LPAs generally choose to take **payment on commencement of construction** on site. Some choose to **split the payment**, with 50 per cent paid post-construction and 50 per cent prior to occupation. This is up to the LPA to determine. However, taking payment later than commencement of works can mean a high degree of uncertainty as to when funding will be received and is unlikely to enable carbon savings from the offset fund to be delivered before the development is occupied, creating a delay in offsetting a development's carbon impact. LPAs should also **note the time limits that apply to discharging Section 106 agreements and ensure funds are collected and spent in this time period**."

One potential pitfall is that carbon offset payments received via S106 agreements have sometimes had to be returned after not being spent in the allotted timescale. National Planning Practice Guidance notes that:

> "[S106] agreements should normally include clauses stating when and how the funds will be used by and allow for their return, after an agreed period of time, where they are not."

This can be avoided. London's 2019 annual report on the use of offset funds notes that in that financial year, "No LPAs reported returning offset payments to developers" and also that "The GLA would not expect offset payments to be returned in any instance and expects LPAs to be collecting offset payments for all applicable developments and identifying suitable projects for spending funds." The 2020 report similarly indicates no incidences of payments being returned. The respective reports for years 2021 and 2022 each indicate only one incidence each year. The 2023 issue does not state the incidence in that year but focuses more on how London's LPAs are overcoming challenges in spending the offsetting funds, including streamlining their processes for fund governance, growing their internal capacity to administer the fund its projects, leveraging external match funding, promoting the fund internally and externally, and allocating funding to specific projects or services.

The Centre for Sustainable Energy notes that developers can ask for a refund of carbon offset payments that are unspent within 5 years. To avoid this, it recommends setting up:

> "defined structures and processes to stimulate new markets and opportunities for carbon saving measures … [Creating] an open application process to stimulate and attract carbon saving projects from council departments, the market and community that would be unviable without subsidy, for example community energy projects or insulation schemes. Applications should be proportionate to the scale of the funding provided, the emissions to be saved and the risk profile of projects."

> "Programmes of standardised measures, low unit cost, low risk and lower variability of carbon savings (such as the many domestic insulation programmes, run by council housing departments) should be required to apply to the fund just once as a whole programme, with detailed implementation targets, specifications, predicted carbon savings and reporting processes and timetables. Once approved, it should be as simple as possible for residents, communities or businesses to access funding through these programmes."

The 2018 London mayoral guidance encourages LPAs to pool Section 106 carbon offset payments rather than committing to spend them on specific projects. When the guidance was written, local planning authorities were only permitted to pool up to five S106 payments towards the same project, but this restriction was removed in 2019 and this can now be pooled with CIL payments too. Councils using either CIL or S106 must publish an infrastructure funding statement annually. When setting the carbon price, the Local Planning Authority should factor in a cost to administer the fund and set up a pipeline of projects to be funded.

Energy offsetting as a means of carbon offsetting

Due to the rising number of local authorities setting standards based on the approach set out in the previous section (with fixed energy targets and 100% renewable supply), energy offsetting is becoming more prominent. In this context, it is preferred over *carbon* offsetting because the cost of offsetting is based directly on residual kWh (£/kWh), instead of tCO_2 (£/tCO_2). Carbon intensity factors (see glossary) of the grid or other energy sources are not required for calculations when energy is offset (instead of a carbon offset), which leads to a **more direct reflection of exactly what is being offset**. Carbon factors for offsetting are often quickly outdated, and are somewhat crude in their estimation since they are annually averaged and do not reflect seasonal grid intensity variations. Planning decisions on carbon offsetting could also face a stumbling block around uncertainty about what the grid carbon factor will be by the time the development is completed; energy offsetting avoids this problem.

Energy offsetting **simplifies the process for project selection** due to the absence of carbon factors, since it becomes easier to assess how many kWh a new rooftop solar PV installation will produce, for example. This better ensures that the residual kWh that were not mitigated on-site **can be directly measured and mitigated** off-site through a funded project through an energy offset fund.

With *carbon* offset funds, several types of project including energy efficiency, retrofitting, and renewable energy could be appropriate for the delivery of those offsets, because the residual amount of CO_2 is not directly assigned to a particular measure. In some cases even tree planting is proposed despite uncertainty about its longevity, or transport measures despite uncertainty that this will deliver the required CO_2 savings in reality. This uncertainty can result in political disagreement about how to spend the fund on competing priorities, and administrative complexity in assembling a portfolio of projects, thus the required amount of carbon mitigation may not be swiftly (if at all) achieved.

When *energy* needs to be offset, it is usually due to a technical inability to deliver the required on-site renewable energy generation. This **makes it a simple decision to spend the fund** on off-site solar PV installations, preferably on existing buildings, which should aim to at least generate the residual on-site kWh. Through this simplified system, energy offsetting can become a reliable mechanism to ensure that any residual on-site renewable energy generation is wholly mitigated elsewhere.

Making offsetting effective for the overall transition to a net zero UK and Buckinghamshire

It should be explicitly noted that offsetting in all cases (whether carbon or energy) **should strictly be a last resort only acceptable in exceptional circumstances**. The risk of offsetting is that it may increase the burden on existing area-wide decarbonisation plans and use up low hanging fruit resources that are needed to balance out other unavoidable emissions in the area that cannot be reduced at source. **Additionality must therefore be the primary consideration** of both offset approaches to ensure that the offset funding delivers something that would not have otherwise been created.

To best guarantee offset mechanism effectiveness, a locally-specific net zero offset price should ideally be set, which should be based on the cost of existing delivered renewable energy schemes of varying size. Subsequently, an appropriate price should be set to sufficiently deliver the residual kWh not mitigated on-site. In recent examples, prices to achieve this have been set at 9-12p/kWh.

Assuming the current electricity emissions factor in SAP10.2 (136 gCO_2/kWh), an estimated net zero local offset price - £652/tCO_2 for Bath & North East Somerset Council – was close to double the price of the 2023 BEIS Green Book valuation of £378/tCO_2. This represents the importance of a correctly set price, which otherwise risks insufficient funds to deliver the residual on-site energy elsewhere.

A recent (2022) study by the Centre for Sustainable Energy (CSE) for West of England (WoE) authorities determined the cost of energy offsetting based on 131 domestic rooftop PV installations that were delivered through the Local Authority Delivery Scheme (LADS), which was managed by Bristol City Council's energy service. The installation costs of solar PV projects through the LADS scheme well represents the costs of energy offset fund projects that are likely to occur in the WoE in the future, particularly due to the average installation capacity of 3.37kWp. The subsequent median installation cost under the LADS scheme was £2,180/kWp, in contrast to the BEIS installed cost statistics for 4-10kWp solar PV installations (2020-2021) value of £1,586/kWp. This again reiterates the importance of establishing a *locally-specific* and *up-to-date* offset price, as in the example above nationally-averaged costs produced a price 25% lower than the local cost. Using the £2180/kWp median installation cost value, an offset price (including 15% administration costs for the fund) of 9p/kWh was estimated by CSE, which can be considered a local net zero energy offset price for the West of England authorities.

Energy performance gap

The energy performance gap is the difference between the predictions for a designed building's energy use, and the amount of energy it actually uses in operation. This is due to three factors:

1. Poor methods used to predict the energy use of a building (including poor calculations, incorrect assumptions, and exclusion of 'unregulated' energy loads)
2. Errors in construction which lead to worse airtightness or thermal envelope
3. Errors in system operation, and user behaviour different to assumptions (for example, turning up space heating while opening windows to dry laundry, not using heat system as intended, spending more time in the building than anticipated, or bright lighting left on overnight).

Unfortunately, the calculation methods used in Building Regulations Part L (SAP and SBEM) are very poor predictors[cxi] of the actual energy use of a building. SAP and SBEM are compliance tools[cxii], not really tools to predict energy and carbon performance (even though they purport to be). This is not only due to out-of-date carbon factors used for different energy sources, but the entire methodology.

For this reason, recalculating SAP on completion[17] will not prove that the building *performs* to the same metrics as in the SAP output (kWh/m^2 and CO_2/m^2), only that it is *built* as designed in terms of installed specification of insulation, heating system and renewable energy generation. The nation-wide lack of post-occupation energy monitoring means that both developers and planning/building control enforcers are often unaware of the scale of difference between SAP outputs and actual performance.

Point (2) above relates to how imperfections in the construction process can lead to worse energy performance than predicted. For example, a building may leak a lot of heat if insulation is incorrectly installed, or if a hatch to a cold loft is put in the wrong place and then moved, leaving holes in the air tightness membrane. Lower-spec products or poor substitutions may sneak in – for cost-cutting reasons, supply difficulties, or simply because the right person was not on site at the time[cxiii].

Methods to address the performance gap

There are energy modelling methods that give much more accurate predictions than SAP/SBEM, such as the **Passivhaus Planning Package (PHPP)** and the **CIBSE TM54** method. However, it is not entirely clear whether local planning authorities are legally empowered to require conformance with standards set using these alternative calculation methods because of definitions in the powers granted by Planning & Energy Act 2008 (discussed). The Local Plan may be able to **require *reporting* of predicted energy use using these methods** (subject to viability linked to the cost of the modelling), but it is uncertain whether the plan could require the building to *achieve* a certain metric using them (although please note the new examples from Bath/North-East Somerset, Cornwall and Central Lincolnshire have all successfully required this, sometimes through supplementary guidance). Of the two, TM54 is likely to be more clearly supported by the 2008 Act as it uses building regulations Part L as a starting point[cxiv] and is now recognised in Part L 2021 for non-residential as a valid method to fulfil the new requirement for accurate energy forecasting).

There are also several quality assurance processes that can be applied during construction to avoid the unnecessary errors that can cause the building to perform worse than expected. Examples include:

- BEPIT (Building Energy Performance Improvement Toolkit) – a set of checks during construction that identify and remedy defects in the construction at every stage up to completion
- Passivhaus process – in addition to using accurate energy modelling, a Passivhaus project undergoes a series of stages during design and construction which improve the build quality
- NEF/GHA Assured Performance Process™ – this maps to the five stages of the RIBA Plan of Work (inception to verification) and involves expert impartial review by accredited assessor.
- Soft Landings – recommended by the UKGBC (as above) but discounted by some local planning authorities as an acceptable 'quality assurance' method (see example of Milton Keynes).

There may be other suitable quality assurance processes. These **must** be based on quality of energy performance, not just generic building quality. Buckinghamshire Council would need to decide on a case-by-case basis whether these are acceptable based on their individual merits and evidence that they are effective (verified by track record of previous projects' post-completion testing or post-occupation energy monitoring).

The Local Plan **could require the use of these processes, subject to viability** (again relating to the cost of appointing qualified professionals to undertake these processes). Proposals could submit:

- **Energy modelling:** evidence to be submitted in energy statement with planning application, and recalculation of this if any relevant details are changed at reserved matters / amendments. (This would be necessary in any case to demonstrate compliance with energy intensity targets even at design stage, even without an in-use verification requirement.)
- **Quality assured construction:** evidence to be submitted along with other documentation to gain sign-off on completion from building control and discharge of planning conditions.
- UKGBC Policy Playbook recommends "a recognised performance gap / assured performance tool will be used to minimise the potential performance gap between design aspiration and the completed development. The effectiveness of measures will be reviewed and ratified as part of the post-completion discharge of conditions".
- **Evidence requirements in the case of no 'quality assured construction' scheme relating to energy use:** set a standalone requirement to carry out air tightness tests whilst the air barrier is still accessible as a construction requirement, if the full use of specific third-party quality assurance schemes would make necessary development unviable.

Verifying energy performance post-completion

Post Completion certificates can be issued once Planning Conditions are discharged. Local Authorities can condition to ensure that buildings are performing as anticipated; however, this would require engagement with the main contractor outside of their practical completion contract. Examples have sought this through an Area Action Plan and site-specific allocations.

There is debate about whether it is reasonable to hold developers accountable for carbon impacts of unregulated energy use, which would be untested by Part L SAP and largely out of their influence in terms of unconfirmed occupant fit-out, operational hours, occupancy, and other third-party factors.

[17] As-built SAP calculations have been used by several local authorities to determine the final amount of offset payments the developer must provide, but it does not verify performance or change the energy performance gap. Relying only on SAP will always mean the developer offsets far less carbon than the building will actually emit – although it does simplify the offset decision-making and data gathering process.

These uncertainties are larger in non-residential buildings, where there is a wider range of variation in how the buildings are used compared to residential building use patterns which tend to be more homogenous and predictable. However, even for non-residential, reasonable assumptions can be made about many of these uncertain factors, in order for the developer to include the appropriate amount of renewable energy in the design, even if the metered data in any post-occupation monitoring turns out to vary from the design-stage assumptions.

The following pre-completion testing requirements would help in the assurance of as-built performance against the design standard. Outline costs[18] are provided:

- Air tightness testing ~£1000 per property
- Thermographic testing[19] ~£400 per property
- U Value testing ~£400 for a dwelling (3 weeks per property)[20]

- Post-occupancy evaluation testing: ~£5000[21]. (if applied to scalable developments >c.50 dwellings, the economy of scale would reduce the cost burden through sample testing only).

[18] Communities and Local Government (2008), Performance Testing of Buildings BD 2535
[19] Thermographic surveys can only be completed during the heating season. Where building completion occurs outside that season, the applicant could commit test at the earliest opportunity and perform remedial measures where needed. Homeowners must be fully informed.

[20] Accredited construction details are to be checked through thermographic testing performed according to BS EN 13187: 1999 Thermal performance of buildings. Qualitative detection of thermal irregularities in building envelopes. Infrared method. Identified locations with deviations from expected performance are further investigated through a borescope survey and remedial works performed if practical.
[21] https://www.pollardthomasedwards.co.uk/download/PTEpost-occupancy_evaluation2015_LR.pdf

Example: Milton Keynes Local Plan 2019 (adopted)

Policy SC1 includes that:

- K. 5 All proposals of 11+ dwellings or non-residential space over 1,000m^2 must
    - "implement a recognised quality regime, which assures that 'as built' performance (energy use, carbon emissions, indoor air quality, and overheating) matches the calculated design performance", and
    - "Put in place a recognised monitoring regime to allow the assessment of energy use, indoor air quality, and overheating risk for 10% of the proposed dwellings for the first five years of their occupancy, and ensure that the information recovered is provided to the applicable occupiers and the planning authority..
- The Sustainable Construction SPD explains that a 'recognised quality regime' must include
    - (1) modelling of different scenarios at design stage and issuing performance targets such as kgCO2e/year or energy use (which must use expected usage profiles rather than standard ones, and should ideally include Dynamic Simulation Modelling using the National Calculation Methodology [SAP or SBEM] as a baseline),
    - (2) processes and plans in place to ensure everyone in construction and dwelling management knows how to avoid common reasons for the performance gap,
    - (3) suitable fabric testing and iterative feedback mechanisms,
    - (4) demonstrating that the 'as built' targets set are achieved, and
    - (5) third-party verification that the quality regime has been carried out.
- The SPD also asserts that the quality regime must ensure the post-occupancy data will be available by implementing a suitable metering and monitoring strategy that can deliver performance data to compare with the designed performance targets.
- The SPD also notes that two suitable regimes are the Quality Assurance sections of Home Quality Mark ONE, and BSRIA Soft Landings Framework.
- The above specified requirement for the 'quality regime' means that the developer must also test the 'as-built' performance and submit data to the Council. A report is then submitted to both occupiers and to Milton Keynes Council, which states the performance gap metric and identifies any reasons for deviation from predicted energy usage, carbon emissions, indoor air quality and overheating performance, as well as specific actions that have or will be taken to reduce the gap.

Example: Greater London Energy Monitoring Guidance 2020 (adopted)

The 'Be Seen' energy monitoring guidance (April 2020) requests that[cxv]:

"Analysis guided by CIBSE TM54, which recommends using a tailored Part L model for the estimates of regulated and unregulated loads, should be undertaken and its findings should be reported in the 'be seen' reporting webform. A TM54 analysis gives more accurate predictions of a building's energy use. This approach also aligns with the reporting requirements under the GLA's Whole Life-Cycle Carbon (WLC) Assessment Guidance. The CIBSE TM54 findings should therefore also be used to represent the regulated and unregulated energy requirements for non-residential uses of Module B (operational energy use) of BS EN 15978."

Example: B&NES and Cornwall 2023 (adopted)

Supplementary guidance from Cornwall Council, and the Sustainable Construction Checklist SPD from B&NES respectively set out compliance and reporting frameworks for the councils' recently adopted net zero homes policies.

Both documents recognise the inaccuracy of SAP to accurately assess building energy performance, particularly with policies that assess energy use intensity and space heating demand. To resolve issues with SAP and subsequently minimise a performance gap, the councils take the same approach, which provides two options to developers for new build residential applications:

- **Passive House Planning Package** (PHPP) – suitable for all residential development
- **SAP + Energy Summary Tool** – suitable for minor residential development

PHPP is the preferred option for any size of development, but it is a requirement for major residential development.

The option for SAP to be used alongside the Energy Summary Tool is offered as a benefit to developers, so that the use of familiar Part L software can continue for minor residential development. The use of the Energy Summary Tool ensures that final outputs from SAP for energy use intensity and space heating demand reflect genuine in practice performance.

It is important to note that these requirements, which have the intention to reduce the performance gap, were not subject to deep interrogation during Examination.

Example: Merton New Local Plan (adopted November 2024)

Merton's new local plan[cxvi] Policy CC2.3 includes a range of non-mandatory but highly encouraged space heat and energy use intensity targets. It also requires that the developments' energy use intensity must be disclosed (at design stage and pre-occupation, using calculations with (CIBSE) TM54, (PHPP) methodology or equivalent.

The supporting text explains that these calculation methodologies help to reduce the performance gap because they generate much more accurate predictions of energy use, compared to the SAP methodology used to fulfil Building Regulations Part L.

Emerging Example: Solihull Draft Local Plan (draft 2021)

Draft Policy P9 requires that all major developments must "implement a recognised quality regime that ensures the 'as built' performance (energy use, carbon emissions, indoor air quality, and overheating risk) matches the calculated design performance of dwellings as specified above [a 30% reduction on Part L 2013 commencing from now, and net zero carbon for all new development commencing from April 2025]".

Please note that Solihull's draft plan was withdrawn from examination in Autumn 2024, but this was due to the Inspector's lack of confidence in the land supply, not the energy/carbon policies. It is therefore likely that similar energy/carbon policies will be included again when Solihull eventually comes to submit a revised plan with a revised land supply.

Setting effective energy performance targets is crucial, yet it is equally important to ensure that they are effectively implemented in practice. Therefore, policies need to be in place to address and monitor the energy performance gap. As shown in the examples above, policies in this area address accurate energy performance calculations, assured performance processes throughout construction, and post-occupancy monitoring mechanisms.

Existing buildings – decarbonisation via on-site improvements and via standalone renewable energy development for a cleaner grid energy supply

There is less clear direction in legislation, and fewer examples available, to demonstrate the acceptability of seeking energy and carbon improvements in existing buildings compared to new ones.

The variety of types, ages, uses and conditions of existing buildings make it impractical to devise universal requirements for their energy and carbon performance that could be reasonably sought through local plan policies. It is difficult or impossible to retrofit them to the same energy performance standard as new builds can achieve, and the workforce has a shortage of skills to do this effectively.

The decarbonisation of existing buildings is actually a more important challenge compared to new buildings, simply due to scale. This is supported by the fact the approximately 1/3 of the districts' emissions are from existing buildings. The Committee on Climate Change has shown[cxvii] (and Government has recognised[cxviii]) that in order for the UK to meet its legally binding carbon reduction goals, it is vital that the existing building stock must be decarbonised via three main courses of action:

- Upgrades to building fabric and other energy efficiency measures
- Switching from gas or oil boilers to low carbon heating (largely heat pumps; some heat networks; and a small role for hydrogen in some areas in the future)
- Decarbonisation of the electricity grid via increases in wind and solar electricity generation to allow phase-out of fossil fuelled power stations.

The rollout of insulation and low carbon heating to existing buildings ('energy retrofit') have been far slower than predicted and needed[cxix]. Heat pump rollout in particularly must be vastly accelerated[cxx]. Costs for these technologies are decreasing and will continue to do so, particularly with Government grant assistance. It is important to note however that fabric measures should be prioritised initially before heat pump installation to avoid excessive energy use; this is to ensure heat retention as heat pumps operate at lower temperatures than conventional gas boilers. These measures are vital for net zero, and will deliver economic and wellbeing benefits in the long term if implemented correctly.

Take-up of solar panels to existing homes dropped steeply[cxxi] since the closure of the Feed-In Tariff scheme in 2019. Solar PV installations are however now back on the rise due to householders becoming increasingly concerned about the cost-of-living and energy crises.

Local plans also have only a very limited influence on the carbon and energy performance of existing buildings, as they can only seek changes to buildings where the building owner is seeking to require a change to the building that requires planning permission.

However: The planning system can (correctly or incorrectly) be perceived by building owners as yet another obstacle to retrofitting, on top of the cost, disruption, and risk of building damage. Owners may (wrongly) assume that all changes need permission, or that permission is likely to be refused. Buckinghamshire's Climate Change Strategy confirms this was raised during public engagement surveys as a reason why some locals had not made energy efficiency improvements to their homes. Building owners' willing action and investment is essential to the net zero carbon transition, and therefore it is vital that the planning system becomes a facilitator and not an obstacle to this.

The National Planning Policy Framework confirms that (paragraph 152): "The planning system should support the transition to a low carbon future … [by] encourag[ing] the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure". It also confirms that (paragraph 158) when determining applications for renewable and low carbon development, the local planning authority should not require the applicant to demonstrate the overall need for renewable energy, and should approve the application if its impacts are acceptable or can be made so. This supports a permissive approach towards proposals for the addition of carbon-saving and renewable energy measures to existing buildings.

The role of local plan policy in reducing existing buildings' carbon therefore has two main strands:

1. Removing the actual or perceived planning barriers to energy retrofit changes to buildings.
2. Allocating or identifying sites suitable for renewable energy generation and distribution in order to decarbonise the energy that existing buildings use.

Point 1 (a permissive, supportive approach) could be pursued through the following tools:

- A local plan policy that explicitly encourages energy efficiency and carbon improvements to existing buildings with significant weight attached to those benefits, and signposts the reader to further guidance about how to make such changes acceptable in heritage-sensitive settings
- Supplementary planning guidance that clearly explains the range of retrofit measures that can be effective in improving energy performance of existing buildings, which kinds of changes are acceptable in different settings, how to make acceptable changes in heritage settings (referencing available expert guidance[cxxii]), and advising which changes simply do not need permission in most settings
- A Local Development Order giving blanket permission to specific changes in geographic locations that are not considered heritage-sensitive – such as certain acceptable types of upgraded windows, doors, external insulation, or heat pumps visible from the street.

One further option is to seek 'consequential improvements' when changes are being made to a building that require planning permission. This could expand on Building Regulations requirements for the same. We have identified one example for this. However, discussions with energy officers at that local authority reveal that this has not proven very effective because very few relevant proposals pass over their desk, and the improvements can only be applied to the part of the building that is undergoing works, not the whole building – which can render some retrofit measures ineffective (such as airtightness). Still, the Local Plan can encourage low-carbon measures to be integrated into the areas of the building where permission is needed, and use of the energy hierarchy in design decisions.

Point 2 (proactive promotion of renewable energy generation and low-carbon energy distribution) could be pursued through the following tools:

- Spatial strategy (allocating or identifying suitable locations for such renewable energy features and potential low carbon heat network locations, in consultation with citizens, local business, conservation bodies and the electrical grid District Network Operator) – this can help to de-risk the prospect for potential investors, site owners and developers of renewable energy
- Infrastructure Delivery Plan – ensuring the electrical grid District Network Operator is ready to make the capacity upgrades necessary to serve a growing proportion of all-electric, gas-free, solar-exporting buildings, electric vehicles, and suitably located large-scale renewable energy
- A Local Development Order that gives blanket permission to add solar panels to buildings in locations not considered heritage-sensitive, expansion of strategic low carbon heat networks.

Example: Using a Listed Building Consent Order to enable easier solar PV installation in listed buildings: Kensington and Chelsea (2022)

The Royal Borough of Kensington & Chelsea is the first council in the UK to issue a Listed Building Consent Order, which gives consent for solar PV on the majority of Grade II and Grade II* listed buildings without a requirement for listed building consent.

Certain conditions must be demonstrated on:

- Positioning
- Materials
- Fixings
- Protecting the appearance of fabric of the listed building

Providing the conditions are demonstrated, a far simpler application compared to a usual listed building consent application is required. This makes solar PV installations a more attractive and less time intensive prospect for householders in Kensington and Chelsea.

Emerging example: City of York Draft Local Plan (2018)

Policy CC1 of this emerging local plan confirms that:

“Renewable and Low Carbon Energy Generation and Storage: Proposals for renewable and low carbon energy storage developments will be supported and encouraged. Developments should be sited a suitable distance from major residential areas and have suitable fire suppression procedures”.

The policy also explains why storage is crucial, acknowledges that this is an emerging field and commits the council to work with experts to understand what the options are and develop an SPD which will include safety considerations.

This plan has been in examination since 2019, and is still undergoing main modifications and associated consultation in 2024. However, the CC1 policy stance already formed the basis of a 2019 planning approval for a 50MW battery storage development in greenbelt, due to its location (near a substation) and its contribution to sustainable development, innovation, and energy resilience.

Examples (various): using Local Development Orders to expand renewable and low carbon energy systems and promote energy retrofit

Swindon Borough Council has used LDOs to promote the growth of renewable energy generation and use, both on specific sites and in borough-wide terms. Examples include:

- A borough-wide LDO for non-domestic air source heat pumps and district heating
- Hydrogen and electric vehicle charging stations (specific sites) –
- Identifying specific sites for solar photovoltaic arrays including solar farms. The LDO on solar farms has been particularly successful, by de-risking the process. It was created by issuing a ‘call for sites’ and then assessing these sites against various criteria.

Across several London Boroughs, an LDO was created to make it easier to deliver heating and cooling networks. By removing the need to make a separate application for each new network section, this makes the network more flexible for new connections and reduces the costs of expansion. It also creates a common standard for new heat networks.

Milton Keynes local plan 2019 indicates a willingness to use LDOs to encourage wide scale energy retrofit.

Actively welcoming energy and carbon improvements to existing buildings

The following policies are not intended to be strict requirements, as the local plan cannot require changes to existing buildings where no permission is needed. Yet they are examples of how to signal a positive stance by the council towards retrofitting, offering confidence to potential applicants and steering officers to take seriously the benefits of energy retrofitting when weighing up impacts.

Example: Cornwall Climate Emergency Development Plan Document (adopted 2023)

This emerging plan has been through Regulation 19 consultation, underwent independent examination in Summer 2022[cxxiii], and was adopted in early 2023.

Policy SEC1 (Sustainable Energy and Construction) includes that:

> Significant weight will be given to the benefits of development resulting in considerable improvements to the energy efficiency and reduction in carbon emissions in existing buildings.
> Proposals that help to increase resilience to climate change and secure a sustainable future for historic buildings and other designated and non-designated heritage assets will be supported and encouraged where they:
> 1. conserve (and where appropriate enhance/better reveal) the design, character, appearance and historical significance of the building; or
> 2. facilitate their sensitive re-use where they have fallen into a state of disrepair or dereliction (subject to such a re-use being appropriate to the specific heritage asset).

Example: Milton Keynes Local Plan (adopted 2019) [cxxiv]

Policy SC1 (Sustainable Construction) includes that:

> "Proposals which would result in considerable improvements to the energy efficiency, carbon emissions and/or general suitability, condition and longevity of existing buildings will be supported, with significant weight attributed to those benefits."

Supporting text notes that:

- "existing domestic buildings contribute 28% of the Borough's carbon dioxide emissions (1.5 tonnes of CO_2 per capita in 2014). Along with other non-domestic buildings, retrofitting the existing building stock in the Borough presents a significant opportunity to help meet the strategic carbon dioxide reduction target of 57 per cent by 2030".
- Policy SC1 recognises the benefits that retrofitting buildings can bring [e.g. fit-for-purpose housing as well as carbon reductions], giving significant weight to them … in order to help achieve Strategic Objectives 11 [delivery of housing that meets needs] and 13 [mitigation of climate change]. The Council will encourage retrofit improvements to existing buildings … on an individual and area-wide basis. Where appropriate the Council may employ Local Development Orders to support area-wide schemes".

Emerging example: Wokingham Draft Local Plan Update 2020

Draft Climate Change Policy SS8 confirms the plan will "support retrofitting existing buildings with measures to improve their energy efficiency and generate onsite renewable energy".

Supporting text notes that "Proposals to sensitively refurbish or retrospectively improve the performance to reduce their energy use and improve comfort will be supported. Interventions to upgrade historic buildings should be undertaken sensitively in recognition of their heritage value."

This is supported by policy DH7 (Energy) which includes that:

> "Development proposals which would result in considerable improvements to the energy efficiency, carbon emissions and/or general suitability, condition and longevity of existing buildings will be supported, with significant weight attributed to those benefits[*]. The sensitive retrofitting of energy efficiency measures and the appropriate use of micro-renewables in historic buildings, including listed buildings and buildings within conservation areas will be encouraged, providing the special characteristics of the heritage assets are protected."

Emerging example: Greater Cambridge Local Plan (draft 2021[cxxv])

Policy GP/CC is titled 'Adapting heritage assets to climate change'.
The proposed policy direction includes that it will:

- "Require retrofit works to be carried out in accordance with the BSI PAS 2035 framework and Historic England guidance for energy improvements to heritage assets
- Require proposals to take a 'whole building' approach to undertaking works to heritage assets to enhance environmental performance"
- Support proposals which seek to undo the damage caused by previous inappropriate interventions […]
- Give consideration to measures that will reduce carbon **emissions** and assist with [climate] adaptation … (for example external shading or … flood protection).
- The plan will also direct residents to further guidance on how to approach works to older homes."

Supporting text notes that need for this policy is evidenced by the local plan's Net Zero Carbon Study which showed that existing buildings cause one-third of the area's greenhouse gas emissions and thus "we cannot meet our climate targets without reducing emissions and energy usage in all our homes", given that "the Committee on Climate Change have concluded that at least 90% of existing buildings in the UK should have energy efficient retrofits for the UK to meet its zero carbon targets".

It emphasises the relevance given the local plan area's high proportion of homes that are historic or Listed. It notes that such improvement to existing buildings reduces running costs and increases the lifespan of the building, and that "Policy is therefore needed to support owners of heritage assets to undertake sensitive works to address the performance of their buildings, in line with best practice guidance for heritage".

Embodied carbon

Embodied carbon means the carbon that was emitted in the production and transport of building materials, and their assembly on site. It can also include the emissions associated with maintaining and eventually disposing of a building too. If the latter are included, this is termed 'whole-life embodied carbon'.

These emissions rise largely from fossil fuel energy use to extract and process raw materials such as minerals and metals, then transport them. There can also be emissions from chemical processes to produce building elements (such the carbon dioxide that is cooked-off minerals to make cement) or from the breakdown of the material at the end of its lifespan.

Embodied carbon makes up a very large share of the total carbon emissions caused by the creation and use of a building across a typical 'design lifetime' of a building, usually 60 years (see UKGBC pie charts diagram previously referenced). Many commonly used building materials like ordinary cement, steel, aluminium and zinc have inherently high embodied carbon because of how they are produced. Vice versa, plant-based materials like timber can have less than zero embodied carbon because the tree absorbed carbon dioxide from the atmosphere and this is locked up in the material for as long as it is in use.

Unlike operational energy and carbon, there is currently no mechanism to address embodied carbon in national building regulations or other national legislation for planning and building. Still, embodied carbon is relevant for the net zero goals of the UK and Buckinghamshire because some of materials or products will have been produced here, and all will have been transported within the country or the local authority's geographical area, and energy will be used during construction.

In the absence of a national regulatory approach to address embodied carbon and without a specific local planning power granted to address it, some local plans have nevertheless taken steps to ensure embodied carbon is not entirely neglected.

Example plans have taken one or both of the following approaches:

- Requirement to assess the building's embodied carbon, reported within the planning application
- Requirement to provide narrative about what steps are being taken to minimise embodied carbon, such as reusing existing buildings, use of lower-carbon materials, or efficient design to reduce material use.

Our review has only identified one adopted and one emerging plan that require a development to achieve a specific numeric target for embodied carbon, whether a limit or a % improvement on a baseline; see B&NES and Bristol examples below. This may be because of a lack of explicitly granted powers, and the 2015 Written Ministerial Statement that directed local plans not to set 'additional technical standards' for the sustainability of housing. It may also simply be because this is an emerging area where local planners do not yet feel confident to set these requirements, robustly justify them at inspection, or interpret whether developers have sufficiently demonstrated compliance.

There is an industry standard method to calculate a building's embodied carbon: the RICS Whole Life Carbon Assessment for the Built Environment[cxxvi], which builds on the relevant British/European Standard (BS EN 15978). This RICS method splits the building's whole-life embodied carbon into a series of 'modules':

- Modules A1 – A5: 'Cradle to completion stage' (from raw material extraction through to completion of the building)
- Modules B1 – B5: The 'use stage' of the building (such as maintenance, repair, replacement and refurbishment)
- Modules C1-C4: 'End of life stage' (deconstruction, demolition, transport, waste processing, and final disposal).

It is important to note that the RICS / EN15978 approach assumes that any carbon that was sequestered by trees and stored in timber is released during the C1-C4 modules. In reality this may be avoided if the timber is eventually reused. This means that a whole-life carbon assessment may not recognise the full benefit offered by timber buildings, which is that the timber would lock up carbon for most of this century. This is a critical period[cxxvii] in which we are at risk of reaching tipping points for feedback loops of runaway climate change – such thawing permafrost releasing huge amounts of methane, or large areas of rainforest dying back. It matters not only *how much* carbon is emitted, but *when*.

Therefore it makes sense to set targets that exclude modules C1-C4, to give timber buildings the 'credit' for the carbon they will lock up for many decades. B1 – B5 also include many assumptions about uncertain future actions, therefore may need to be omitted from any planning targets due to a lack of robust justification.

Using the RICS 'modules', other building industry specialist bodies have created benchmarks and 'good practice' targets expressed in kilogrammes of embodied carbon per square metre of floor area:

RIBA Climate Challenge embodied carbon targets[cxxviii]: Includes all RICS modules **A1-C4.**

-	Business as usual	2025	2030
Homes	1200 $kgCO_2e/m^2$	<800 $kgCO_2e/m^2$	<625 $kgCO_2e/m^2$
Offices	1400 $kgCO_2e/m^2$	<970 $kgCO_2e/m^2$	<750 $kgCO_2e/m^2$
Schools	1000 $kgCO_2e/m^2$	<675 $kgCO_2e/m^2$	<540 $kgCO_2e/m^2$

LETI Embodied Carbon Primer targets[cxxix]: RICS modules **A1-A5 only**.

-	Business as usual	2020	2030
Homes	800 kgCO2e/m^2	500$kgCO_2e/m^2$, (400 including sequestration)	300$kgCO_2e/m^2$ (200 including sequestration)
Office or school	1000 $kgCO_2e/m^2$	600$kgCO_2e/m^2$ (500 including sequestration)	350$kgCO_2e/m^2$ (250 including sequestration).

Bath & North East Somerset Council (see example below) has adopted an embodied carbon policy that requires a target to be met, yet this does not go as far as the LETI standards. However, it forms a highly important example that it is possible to justify such a target.

LETI/RIBA levels of target could still inform supplementary planning guidance, to educate developers and allow planning officers a point of comparison to assess the relative merits of schemes' embodied carbon reports submitted by developers.

If a local plan were to seek to require any of the LETI or RIBA embodied carbon targets, it is likely there would be challenges from the development sector consultees. One likely objection is the argument that such a requirement may inhibit the delivery of housing targets due to the volume housebuilding industry's failure to become familiar with this vital exercise until now.

The LETI and RIBA baselines are derived from a range of existing project data. Their future targets may also be based on case studies that would justify the planning policy, especially on technical feasibility.

RICS may be able to provide estimates of the typical cost of embodied carbon assessments and the number of professionals who are able to conduct such assessments.

We also note that further evidence is continually emerging on this topic, which could help the planning justification for such targets. For example, in early 2022, the UK Green Building Council[cxxx] found that a real-world large low rise residential development in south-west Cambridgeshire achieved a 20% reduction in embodied carbon reduction at masterplan level compared to a typical baseline, with only a negligible impact on capital costs (0.6%). This was achieved through simple changes such as reducing the area of asphalt in favour of low-carbon permeable paving and using swales to reduce the need for other drainage infrastructure.

Beyond the assessments conducted within (separate reports) Tasks 3 and 4 of this evidence base, further relevant data could begin to be assembled by the local authority if it firstly adopts a local plan requirement for major developers to simply *report* on their embodied carbon using the RICS methodology, and ideally also any costs associated with steps taken to reduce embodied carbon as a percentage of overall costs. From these, local benchmarks for 'business as usual' and 'best practice' could be derived for inclusion in a subsequent local plan policy or supplementary planning document. This is an important next step for Buckinghamshire if an embodied carbon policy is successfully adopted.

Example: New London Plan 2021 (adopted)

Policy SI 2 includes that:

F. Development proposals referable to the Mayor should calculate whole lifecycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Example: Bath & North East Somerset Council Local Plan Partial Update (adopted, 2023)

Policy SCR8 of requires that large scale development (>50 dwellings or >5000m^2 of commercial floor space) achieves an embodied carbon target of 900 kgCO_2/m^2 for RIBA modules A1 – A5 (upfront embodied carbon). The target only includes the following building elements:

- *Substructure*
- *Superstructure*
- *Finishes*

The policy requirement was selected because it is predicted to be cost neutral, as set out in the evidence study produced by WSP.

There is no last resort option to offset any shortfall of embodied carbon emissions to the required target.

Emerging example: Bristol Local Plan Review (draft 2022)

Policy NZC3 of this draft plan requires that new development will be expected to achieve the following targets as a minimum:

- Residential (4 storeys or fewer) - <625 kgCO_2e/m^2
- Residential (5 storeys or greater) - <800 kgCO_2e/m^2
- Major non-residential schemes - <970 kgCO_2e/m^2

The requirements are based on the RIBA Climate Change targets for 2025 Homes, 2030 Homes and 2025 Offices.

Any shortfall against the embodied carbon targets will be offset at a cost of £373/tCO_2 – the BEIS Green Book 2023 value. Embodied carbon offsetting and target setting at this level has yet to be tested at Examination. Additionally, the £373 price is based on operational emissions and has not been calculated based on embodied carbon, which could be seen as a flaw in the approach.

To conclude: The Local Plan can (and should, for the sake of mitigating climate change in line with the Climate Change Act) look to set embodied carbon targets, given that solely requiring embodied carbon reporting is insufficient to deliver emissions reductions that align with net zero targets locally and nationally. An ambitious target should be set to limit the 'upfront embodied carbon emissions carbon' (modules A1 – A5). Including modules B and C could pose an additional unnecessary risk to policy adoption because these are reliant on many assumptions during the operational and end-of-life stages of a building. Additional requirements such as pre-demolition audits should be set to ensure that retrofit of existing buildings is promoted for new development where appropriate, instead of demolition and subsequent embodied carbon emissions.

Justifying the requirements: Necessity, feasibility and viability

Necessity and feasibility

The **necessity** for net zero carbon policies is clearly demonstrated by the previous sections' exploration of the scale and urgency of the climate crisis, the changes necessary to deliver the UK's legislated Net Zero Carbon 2050 goal and legislated carbon budgets (Climate Change Act), the absence of suitably ambitious national regulation or other incentives to deliver those changes, and the Local Plan's legal duty to proactively pursue carbon reductions (Planning & Compulsory Purchase Act) in line with the Climate Change Act 2008 (National Planning Policy Framework).

The Royal Town Planning Institute[cxxxi] points out that "Where local plan policy which complies with the duty [to mitigate climate change] is challenged by objectors or a planning inspector on the grounds, for example, of viability, they must make clear how the plan would comply with the duty if the policy were to be removed". This is because that duty stems from the Planning and Compulsory Purchase Act and Climate Change Act (supported by powers in the Energy and Planning Act). Formal legislation holds more weight than other government guidance that might seek to limit local plans' requirements.

Nevertheless, for a plan to meet the NPPF soundness test of being 'positively prepared to meet the area's objectively assessed needs for housing', the inspector will expect evidence that the carbon policies' cost impact does not prevent the delivery of the required housing targets. In addition, the NPPF paragraph 159 still requires local requirements to reflect national technical standards. This was reiterated through the WMS2023 (as previously discussed) which emphasises that energy efficiency policies in particular must be accompanied by a 'robustly costed rationale that ensures development remains viable, and that any improvements to energy efficiency is set against SAP.

The **feasibility** of identified measures is demonstrable through case studies and modelling. Evidence of feasibility of similar performance requirements is found in supporting documents of several pioneering recent and emerging plans cited throughout this report. The evidence bases for local plan documents in Greater Cambridge (emerging)[cxxxii], Central Lincolnshire (adopted 2023)[cxxxiii] and Cornwall (adopted 2023)[cxxxiv] (among others) all have studies showing that 'true net zero' requirements can be fulfilled in typical new buildings types in these areas. In these studies it was shown how recent local new builds could have complied with the policy without changing the form or orientation of the building – only needing to add reasonably improved fabric, a heat pump, and solar panels that fit within the roof area.

In addition, feasibility in general is evidenced by the fact that all measures have been previously delivered by the building design and construction industry in the UK before today (low heat demand via effective insulation and airtightness; accurate energy modelling; heat pumps or other low carbon heat; well-oriented solar panels; Section 106 offset payments; embodied carbon assessment).

The only potential policy components whose feasibility might be difficult to prove are the enhanced energy reporting and embodied carbon reporting. These skills are present and growing in the sector, but may not be mainstream outside of London projects and so there might be a bottleneck of skilled professionals available to conduct these. The impact of this bottleneck depends on the rate and scale of development that comes forward (in any local plan areas making a competing demand for these skills, as these services can be performed remotely). If development takes the form of fewer but larger applications consisting of broadly similar house types, these can be assessed efficiently via representative sampling. The skills bottleneck may be more impactful if housing comes forward via smaller and more varied applications that each need a separate assessment.

It should be noted that these specialist skills to meet net zero carbon policies will be a far smaller factor in housing delivery compared to the overarching construction labour shortage[cxxxv] which constrains the whole sector today. As national housing targets in 2020-21 were thought to already be too large for the workforce to deliver[cxxxvi], and as the new national government has since revived mandatory housing targets that are expected to be even higher in most local areas, energy/ carbon modelling should not be assumed the deciding factor in the feasibility of delivering housing.

Additionally, for the UK to hit its legally binding carbon reduction targets, it will be vital for the specified energy targets to be achieved in reality, which will not be possible unless the industry swiftly develops these skills and deploys them as a standard practice in the vast majority of development. The policy requirements would stimulate the industry to expand its capacity to fulfil them (similar to commentary noted in the FHS Consultation Response, paragraph 2.40, 2.60, 2.61, 2.62).

In the absence of data to show whether there is or is not enough capacity in the industry to deliver these reports, a cautious approach could be to require the enhanced energy & carbon modelling only in major developments. If this choice is made, a required minimum specification could be devised for minor and householder proposals that would be likely (if not guaranteed) to deliver the required targets.

Viability of required improvements to the building

The cost of meeting building energy performance targets should be considered within a whole-plan viability assessment. Despite a range of precedent policies on carbon reduction, there is not a consistent approach to transparently assess the cost of policy compliance. Some viability studies (for policies seeking reductions of 35-50% on Part L 2013) have variously applied cost uplifts of:

- £5/m^2 for 'BCIS Energy + Carbon' although it is not explained how this reflects the policy requirements, and somehow reaching £25,000/dwelling for fully zero carbon homes.
- £15,000 per dwelling for a bundle of sustainability measures including carbon and renewable energy– without clarifying the breakdown, or how this cost of policy compliance was identified.
- 1% uplift to overall costs to allow for professional fees, and BCIS cost data reflecting the construction cost of the Code for Sustainable Homes Level 4.

These precedents were successfully adopted, so their viability assessments must have been deemed sound by the Planning Inspectorate for the purpose of those plans' policies.

Nevertheless, it would be more robust to use more transparently evidenced cost uplift data, specific to Buckinghamshire's policy proposals once those have been defined.

- The strongest way to assess viability impacts would be to commission a study of up-to-date cost uplifts specific to Buckinghamshire for a range of building types expected to arise during the plan period. This would ideally show the cost uplift compared to the current baseline (Part L 2021).
- However, there are also several sources of credible evidence on the cost uplifts for a range of building energy performance standards at or close to 'true net zero' operational carbon. For example, there are published cost evidence bases for recent energy-based local plan policies in Greater Cambridge (emerging), Central Lincolnshire[cxxxvii,cxxxviii] (adopted), Essex[cxxxix], and a collection of London boroughs[cxl]. It may be possible to adapt this data for the Buckinghamshire context, if Buckinghamshire decides to take a policy approach similar to that taken in these plans; for example by finding the % cost uplift from the baseline of current building regulations in those local plan areas and translating this into a % cost uplift that could be applied to today's base build cost in Buckinghamshire. Alternatively if Buckinghamshire decides to take a policy approach based on – for example – meeting the Future Homes Standard and then adding sufficient renewable energy or offsetting to zero-out the remaining carbon emissions, a cost estimate for this could be derived from national cost assessments for the Future Homes Standard in combination with national data on the cost of solar panel installations and the national valuation per tonne of carbon.
- This is recommended to be explored as an evidence gap to be filled during the next steps of this net zero carbon policy creation and evidencing.

Carbon reductions as an issue of design quality

There is evidence that the National Planning Policy Framework since 2021 has led the Planning Inspectorate to place a greater focus on design quality. An analysis[cxli] of appeals from July 2021 – early 2022 found that inspectors were no longer dismissing poor design as a reason for refusal simply because of a shortfall in housing land supply, and that the likelihood was very low of the developer being awarded costs if their application is refused on design grounds.

The relevant parts of the NPPF (still present in the December 2024 edition) state that:

- "Development that is not well designed should be refused, especially where it fails to reflect local design policies … [and] Significant weight should be given to … outstanding or innovative designs which promote high levels of sustainability". (Paragraph 139)

- "Local planning authorities should seek to ensure that the quality of approved development is not materially diminished between permission and completion". (Paragraph 140)

This is likely to be most relevant to the setting of bold local plan policies on the topic of embodied carbon and the use of specific processes to reduce the energy performance gap. This is because:

- Embodied carbon is related to design quality through durability, heritage. biophilia[22] and generally 'innovative design which promote[s] high levels of sustainability'.
- Energy performance gap remediation processes are created solely for the purpose to 'ensure that the quality … is not materially diminished between permission and completion'.

However: It is important to note that this stance by Inspectors may change course given the increasing pressure to deliver higher housing numbers as a result of the new Government's return to mandatory housing targets.

[22] 'Biophilia' refers to humans' innate attraction to the living natural world, and wellbeing benefits experienced via exposure to it. Renewable materials like timber can support this and also reduce embodied carbon, reflected in today's growing focus on biophilic design in architecture.

Beyond the building: Reducing carbon via spatial choices

The local plan's spatial strategy is a vital tool for the minimising the carbon emissions caused by new growth, and potentially even making reductions on the district's existing annual carbon emissions. Because this document was produced primarily to support the formulation of policy for net zero carbon buildings (including via their energy supply), we do not go into as much depth here as we have done for buildings. However, this is an incredibly important topic in terms of what planning can do to enable the transition to a net zero carbon future, and it is recognised that Buckinghamshire as a unitary authority may have more scope to influence transport carbon than a local planning authority would if it were the lower of a two-tier local authority structure. Therefore for completeness we give an overview here.

The Planning Practice Guidance section on climate (as previously cited) confirms that location of new development is an appropriate carbon reduction measures in local planning: "The distribution ... of new development and the potential for servicing sites through sustainable transport solutions, are particularly important considerations".

The key ways in which the local plan's spatial choices can support the net zero carbon transition are:

1. Transport – shaping the spatial pattern of new growth to reduce the use of cars and increase the viability of public transport services
2. Renewable energy – proactively enabling development of generation, storage and distribution (covered in the previous section on how existing buildings can be decarbonised)
3. Protecting green infrastructure that removes or stores a significant amount of carbon, such as forests, grassland, peatland, or other high-carbon soils
4. Density: this has a smaller impact than points 1 and 2, but higher-density developments generally have smaller sizes per unit, which means less floor space to heat and light. Higher density can also make settlements more walkable by reducing sprawl between destinations. (However, appropriate density is very much a site-specific issue and therefore we do not here cover this topic further as it is less suited to generalisable recommendations or replicable precedents).

We therefore next provide commentary on the points on **transport** and **green infrastructure**.

Allowing growth only where the transport carbon emissions can be minimised

Transport is now the UK's largest emitter of greenhouse gases – representing 29% of total emissions across the UK[cxlii] (compared to buildings excluding electricity use 20%, industry 14%, electricity supply 11%, fuel supply 8%, agriculture 12%, and waste 5%). In Buckinghamshire, transport is responsible for an even greater proportion at 40% of emissions (as previously noted). Moreover, transport carbon emissions had barely fallen in the past decade before 2020 (unlike the homes sector and electricity generation sector). This is because the small increases in vehicle efficiency (and electric vehicles) were outweighed by an overall increase in miles driven. The sharp drop in transport emissions during the 2020 pandemic bounced back in 2021 by half the level it had fallen, and has since remained at or over that 2021 level. A switch to electric vehicles is underway but it will be many years before EVs make up the majority of new vehicles, let alone the majority of vehicles on the road (as the ban on sales of new fossil fuelled cars and vans is not till 2035[cxliii] or 2030 in the new Government manifesto, whereas the last fossil fuelled cars will be still in use for 14 years[cxliv] after that).

There is therefore a strong climate justification to devise a spatial strategy to focus the bulk of development in locations where there is a realistic likelihood of low car use, in particular on public transport corridors and walkable urban locations, and to refrain from allocating any sites where driving will be the only realistic option. Walkable sites also enable more efficient land use due to reduced parking area, while growth in urban locations can share existing infrastructure and thus avoid embodied carbon associated with new infrastructure. Where other considerations constrain this approach (such as green belt designations preventing growth around well-served railway stations or bus routes) there may be grounds to review the relative merit of those designations compared to the climate imperative. This should not be done lightly and should be supported by analysis to explore the differences in carbon emissions that would result in growth in different locations.

Transport carbon emissions are largely determined by *where* the development takes place as opposed to what policies are imposed to regulate the quality of each development itself. Once the location is set, it is difficult or impossible for the developer or the local plan to effectively influence the transport habits of the occupants and their associated carbon emissions. Recognising this, emerging local plans are taking steps at a very early stage of plan development to ensure that transport carbon emissions are considered from the outset of spatial strategy design and not as an afterthought.

This is a serious problem for the UK's carbon budgets: Recent analysis[cxlv] by the New Economics Foundation has found that since 2009, "New builds have become more and more car-dependent … in all regions outside London." It notes that although one factor has been an increasing share built in rural areas, there has also been rising car dependency of new builds in small- and medium-sized urban areas, as these have increasingly "tended to be located in peripheral areas without good [non-car] connections to nearby cities and towns". This trend has been driven by factors including lower political opposition to remote sites, greenfield land being cheaper, a lack of early transport infrastructure planning, high public spending on road infrastructure to serve these developments rather than on public transport, and in some case local policies requiring excessive parking which makes driving easier.

To avoid locking-in long-term avoidable carbon emissions of car-dependent locations, spatial choices can be informed with evidence to show how much carbon could be saved by choosing to direct growth to locations that are inherently conducive to public transport and active travel. This gives a quantifiable value to the carbon savings, thus allowing them to be more fairly and transparently weighed alongside other considerations such as ecology, landscape or impact on existing residents.

Emerging Precedent: Greater Cambridge Local Plan

In 2020-21, the emerging Greater Cambridge Local Plan was in the early stages of identifying the possible options for its spatial strategy. There were several broad spatial categories reflecting the potential areas where new growth could occur. There was also a range of housing growth numbers (low, medium, high).

Greater Cambridge Shared Planning service commissioned comparative modelling of the carbon emissions of buildings and transport in different types of location: urban, suburban, public transport corridors, new towns, villages.

This modelling used publicly available data on the local area's energy use and emissions of buildings and transport, combined with a locally-specific transport model. It also took into account the different locations' typical densities, home sizes and amount of new infrastructure that would be needed along with housing.

The potential sites being considered for growth were categorised into these different types of location. A range of options were tested, with homes spread in varying proportions across different types of location.

This revealed[cxlvi] a very large difference in carbon emissions in the plan period depending on where homes were built. Importantly, it showed that the carbon emissions difference (between growth in the most versus least car-dependent locations) was just as large as the difference that would be made by applying zero-carbon buildings policies.

Village-led growth had far higher carbon emissions than any other option. Growth on public transport corridors was nearly as low-carbon as urban growth, and both were better than new settlements. Applying a range of carbon reduction policies (for buildings and transport) would halve the total emissions, except in villages because more of their carbon due to transport, which is influenced more by location than policy.

This informed the further refinement of the growth options. The modelling was repeated[cxlvii] for the refined options. Both were taken into account in the sustainability appraisal[cxlviii]. As a result, the proposed preferred option is led mainly by growth on public transport corridors and urban areas, and does not include significant development in villages (only where they are well connected to existing transport and employment.)

Example Central Lincolnshire Local Plan (adopted 2023)

used the same approach as Greater Cambridge, with same consultant team conducting analysis[cxlix] to compare the carbon impacts of its various spatial growth options.

Here, the difference between locations was less pronounced. This was partly because the spatial options in Central Lincolnshire were less starkly 'urban' or 'rural' but more blended, and partly because the Lincolnshire growth locations did not include areas with such an unusually high level of cycling and low car use as urban Cambridge has.

Quantifying and protecting the carbon sequestration value of green landscapes

Green infrastructure for carbon sequestration is relevant in Buckinghamshire as an area with a particularly large proportion of green landscape including parts of the Chilterns Area of Outstanding Natural Beauty (AONB). This green infrastructure has a small but significant effect on reducing the district's overall greenhouse gas account. National figures show that in Buckinghamshire as of the latest figures (2022, released in 2024), forest and grassland remove an amount of greenhouse gas equivalent to 5% of the emissions that the local plan area's other sectors cause. This is a proportionally slightly smaller achievement than the national picture, where the UK's forest and grassland recapture 7% of the UK's overall annual greenhouse gas emissions.

There is therefore a good argument that the site allocations process should be designed to direct new growth away from woodland and high-carbon grassland – unless developing a particular greenfield site would give greater carbon savings for other reasons, for example if the site is on a well-served public transport route that would dramatically reduce car use compared to delivering that new growth elsewhere.

Beyond trees and grass, soil can also be a huge store of carbon which can be emitted if the soil is drained or otherwise disturbed – for instance during groundworks or excavation. For example, natural wetland (especially peatland) is a rich store of carbon that has been sequestered over many years by plants growing there, and stored thanks to being submerged in water. If drained, peatlands start emitting large amounts of greenhouse gas. Data on the distribution of high-carbon soils in the local plan area might justify decisions not to allocate these sites, or development management policies to mitigate and compensate for losses of soil carbon. An initial look at publicly available data[cl] on soil carbon appears to show that most of the area's soils are not particularly high-carbon but there are some strips of peaty soils running north-west to south-east from Aylesbury and High Wycombe area through the Chilterns.

By contrast to the minimal amounts of peaty soil, DEFRA mapping shows significant scatterings of woodland area, especially in the south of Buckinghamshire (coinciding with the Chilterns AONB) but also some notable parts of the north and west of Buckinghamshire.

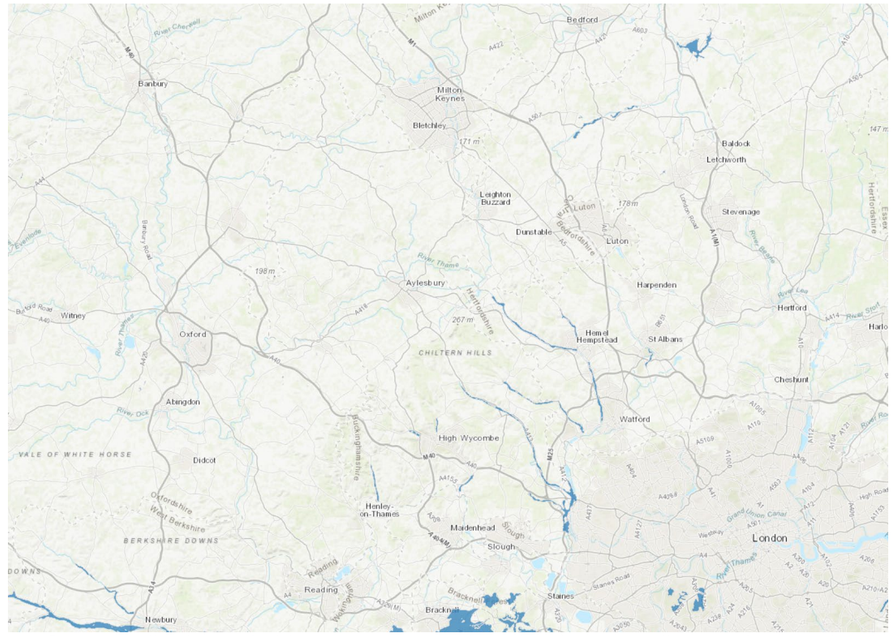

Figure 16: Map of peaty soils shown in blue. From: Natural England Peaty Soils Location (England). https://naturalengland-defra.opendata.arcgis.com/datasets/Defra::peaty-soils-location-england/explore?location=51.766558%2C-0.6

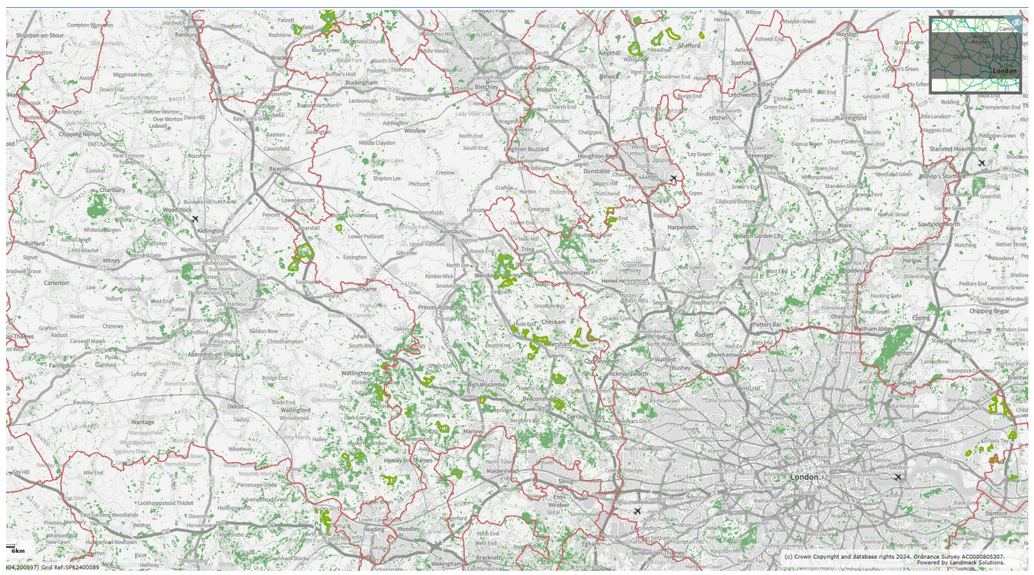

Figure 17: Map of various types of woodland in Buckinghamshire, in green. From: https://magic.defra.gov.uk/magicmap.aspx

Emerging precedent: Greater Cambridge Local Plan (First Proposals 2021[cli])

Policy CC/CS will:

- "Support the creation of land and habitats that play a role as carbon sinks and protect existing carbon sinks from development in particular undisturbed or undrained peat"
- "Promote approaches that minimise soil disturbance, compaction and disposal during construction projects".

The details of how this policy will be structured are not yet available.

However, the First Proposals document explains that it is supported by (and will draw on) an evidence base including:

- Net Zero Carbon Study
- Green Infrastructure Opportunity Mapping Report – this took an 'ecosystem services' approach to identify existing and potential green infrastructure, of which one of the ecosystem services is carbon sequestration. This included approximate mapping of soil carbon and above-ground carbon in vegetation.
- Natural England (2021) report on Carbon Sequestration and Storage by Habitat (report NERR094).

It is noted that although many carbon-rich land areas will already be protected by nature conservation policies or designations, this is not true for all existing or potential carbon sinks. The policy is therefore needed because the Net Zero Carbon Study had shown that additional land-based carbon sequestration will still be necessary in the UK's net zero carbon future, even after all possible actions have been taken to reduce carbon emissions at source.

Emerging precedent: Central Lincolnshire Local Plan Review

This proposed plan underwent Regulation 19 consultation in Spring 2022[clii].

Aware of the region's widely distributed peatland as well as other green infrastructure, the Central Lincolnshire planning team commissioned specialistscliii to map the area's peatland and estimate the potential amount of carbon that is stored, removed, or emitted by those areas.

It found that while the area of peatland is small, its degraded condition means that it has a meaningful impact on overall emissions (potentially amounting to more climate impact per year than the operational carbon emissions of all the proposed new housing for which the plan must make room). As a result, the emerging plan is proposing Policy S16[cliv] [note: now Policy S17] which will require assessment and mitigation or compensation of the carbon impacts of development on any carbon sinks including peat.

However, carbon sinks do not appear to have been a criterion in the sustainability appraisal for site allocations as only 2% of the land was identified peatland and thus not expected to be a common issue confronting many sites.

While not yet adopted and therefore not yet a full legal precedent, this approach could be relevant to other local plans with substantial amounts of high-carbon soils, woodland, grassland or other natural carbon sinks.

Proposed Policy S17 (carbon sinks) includes that:

> "Existing carbon sinks, such as peat soils, must be protected, and where opportunities exist they should be enhanced in order to continue to act as a carbon sink.
>
> Where development is proposed on land containing peat soils or other identified carbon sinks, including woodland, trees and scrub; open habitats and farmland; blanket bogs, raised bogs and fens; and rivers, lakes and wetland habitats*, the applicant must submit a proportionate evaluation of the impact of the proposal on either the peat soil's carbon content or any other form of identified carbon sink as relevant and in all cases an appropriate management plan must be submitted."

It also states that: "The demonstration of meaningful carbon sequestration through nature based solutions … will be a material consideration in the decision-making process. Material weight in favour of a proposal will be given where the net situation is demonstrated to be a significant gain in nature based carbon sequestration … Where a proposal will cause harm to an existing nature based carbon sequestration process, weight against such a proposal will be given … with the degree of weight dependent on the scale of net loss." The text refers the reader to the carbon soil mapping, and Natural England report NERR094 to assist in identifying the significance of carbon sinks.

Appendix 1: Detail of UK Net Zero Carbon Buildings Standard (as per draft for beta testing, released late 2024)

UK Net Zero Buildings Standard mandatory targets (replicated from UKNZCBS pilot version: Annex A for targets, and section 5.3.5.1 for exemptions to renewable electricity minimum targets)

Theme	Subtopic, metrics and caveats	New builds	Existing buildings & retrofit

Operational energy limits	**Energy Use Intensity***
	
	Metric: kWh energy use / m^2 floorspace / year*. (all energy use except EV charging and 'heavy process loads' already covered by the UK Emissions Trading Scheme e.g. industrial process emissions).
	
	*Except in data centres, where the metric is PUE (Power Usage Effectiveness: ratio of power entering the facility to power used by the facility's ICT).
	
	In all sectors and whether new build, retrofit 'one go' or retrofit 'step by step', these limits gradually tighten each year, from 2025 to 2050, referring to the year in which works are commenced on site.
	
	Must be measured using actual energy metered data covering 1 full year of full occupancy.
		Different limits are set for:
		• Commercial Residential: student, or care home
		• Culture/Entertainment: performance; 'collection'; archives
		• Data Centres: low utilisation; high utilisation
		• Healthcare (reflecting "NHS-NZ Standard")
		• Higher Education
		• Homes: single family, or flats
		• Hotels
		• Offices: general, call centres, trading floors
		• Retail: supermarket; high street; food & beverage (with/without catering); landlord areas; retail warehouse
		• Schools: early years; primary; secondary including SEN
		• Science/Technology
		• Sports/ Leisure: dry, wet, or fitness
		• Storage/Distribution: unconditioned; conditioned; cold store
			Two options:
			• **"Retrofit in one go":** Achieving the 'end point' EUI limit from the first instance of verification. Apply the limit for the year in which onsite works commence.
			• **"Retrofit step by step":** A retrofit plan over time that meets intermediate EUI limits, then the 'end point' EUI limit by 2040.
			  ○ The applicable 'end point' EUI limit is that of 2040.
			  ○ The applicable intermediate limits are those in which the intermediate steps are commenced.
			
			Different limits are set for the same categories as in 'new build', except that the 'healthcare' category is further divided into:
			• Healthcare: acute trust;
			• Healthcare: care trust;
			• Healthcare: community trust;
			• Healthcare: mental health & learning trust;
			• Healthcare: ambulance trust.

Operational energy limits (continued)	**Space heat demand** Metric: kWh heat demand / m^2 floorspace / year.	Different limits are set, for only a small subset of types at present: • Commercial Residential and Culture/Entertainment: ○ All 15kWh/m^2/year, regardless of commencement date. • Homes: Single family (20kWh/m^2/year regardless of date). • Homes: Flats (15kWh/m^2/year regardless of date).	None stated.
Up-front embodied carbon limits	**Embodied carbon intensity per m^2 floor.** Metric: $kgCO_2e/m^2$ floorspace (GIA). Scope & calculation methodology: RICS Whole Life Carbon Assessment, modules A1-A5. Excludes the embodied carbon renewable electricity generation equipment. Solar PV specifically has a separate limit of 750$kgCO_2e$/kWp system size. Limits slowly tighten each year, from 2025 to 2050. The applicable year's limit is the one in which works are 'commenced' on site. The commencement date is "the date of the most recent New Works or Retrofit Works to have taken place in that building."	Different limits are set for: • Commercial residential, • Culture / worship / entertainment, • Data centres, • Healthcare, • Higher education, • Homes, • Hotels, • Offices, • Retail, • Schools, • Science & technology, • Sport & leisure, • Storage/distribution.	Different limits are set for: • Commercial residential • Culture / worship / entertainment: Performance, or 'other' • Data centres, • Healthcare, • Higher education, • Homes: Single family homes, or flats • Hotels, • Office: Whole-building, or Shell & core • Retail, • Schools, • Science & technology, • Sports & leisure, • Storage & distribution. Must cover all works in the 5 years up to the date of assessment, including works that were commenced before the 5-year start date.

Theme	Subtopic, metrics and caveats	New and existing buildings
Global Warming Impact of Refrigerants	**Global warming impact per kg of refrigerants** used in the building's systems, expressed as equivalent amount of CO_2. Metric: $kgCO_2e$ / kg of refrigerant.	677$kgCO_2e$/kg refrigerant, for all sectors and project types (new/existing/retrofit); regardless of year of commencement of works. However: The guidance document notes that this figure may be updated in future iterations of the UKNZCBS.
Renewable *electricity* generation (minimum target)	**Amount of renewable energy generation per m^2 *footprint*** of the building.** Metric: kWh / m^2 footprint / year. **Not to be confused with m^2 of floorspace.	Scotland: • Single family homes and single storey storage/distribution: 60kWh / m^2 footprint / year • All other building types: 30kWh / m^2 footprint / year Middle & North England, Northern Ireland & Wales: • Single family homes and single storey storage/distribution: 65kWh / m^2 footprint / year All other building types: 40kWh / m^2 footprint / year South England (including Buckinghamshire): • Single family homes and single storey storage/distribution: 75kWh / m^2 footprint / year All other building types: 45kWh / m^2 footprint / year

Certain constraining circumstances can allow buildings to comply with UKNZCBS without fully meeting the above renewable electricity targets, including:

UKNZCBS triggers to waive renewable electricity targets	New builds	Existing buildings & retrofit
• *Planning or legal constraints, e.g. heritage (conservations or graded I/II listing; not local listings)*	✓ *Valid reason for reduced renewable electricity in new builds*	✓ *Valid reason for reduced renewable electricity in existing buildings*
• *Available space on site*	✓ *Valid reason for reduced renewable electricity in new builds* ✓ *Disapply the renewable electricity target entirely if space only permits <1kWp in single family homes or <4kWp in other buildings)*	✓ *Valid reason for reduced renewable electricity in existing buildings* ✓ *Disapply the renewable electricity target entirely if space only permits <1kWp in single family homes or <4kWp in other buildings)*
• *Building's annual operational energy use is less than what would be annually generated if the renewable electricity target were met*	✓ *Valid reason in new builds (to reduce renewable electricity target to only equal the building's annual energy use)*	✓ *Valid reason in existing buildings (to reduce renewable electricity target to only equal the building's annual energy use)*
• *Overshadowing of roof*	✓ *Valid reason for reduced renewable electricity in new builds*	✓ *Valid reason for reduced renewable electricity in existing buildings*
• *Grid connectivity constraints (e.g. grid capacity issues or limited access to grid)*	✓ *Valid reason for reduced renewable electricity in new builds*	✓ *Valid reason for reduced renewable electricity in existing buildings*
• *Lack of access (for installation & maintenance)*	× *Not a valid reason for noncompliance in new builds*	✓ *Valid reason for reduced renewable electricity in existing buildings*
• *Lack of structural strength (not being able to bear the weight of equipment, e.g. solar PV)*	× *Not a valid reason for noncompliance in new builds*	✓ *Valid reason for reduced renewable electricity in existing buildings*
• *Existing rooflights taking up roof space*	× *Not a valid reason for noncompliance in new builds*	✓ *Can be valid reason for reduced renewable electricity in existing buildings*

Appendix 2:
Detail of provisions in the Levelling Up & Regeneration Act whose impact is yet to be clarified by Government

Previously in this report's chapter "How can the Local Plan for Buckinghamshire take action towards achieving net zero carbon?" it was noted that the Levelling Up and Regeneration Act 2023 (LURA) contains several provisions that could potentially change the scope of the local plan's ability to require improved energy and carbon performance in new development.

In that chapter we noted only that those LURA changes have the scope to impact how the local plan can address these issues, and that it is as yet uncertain as the implementation of those LURA provisions are dependent on secondary legislation, regulation and national policy statements.

We here provide more detail on the various available consultations, policy statements and so on that may help foretell what the range of impacts may be.

New 'National Development Management Policies'

The Act empowers national Government to set 'national development management policies' (NDMP) with which local plan policies must not be inconsistent. The Act itself does not confirm what they will cover, but states that (Chapter 2, point 94):

- An NDMP "is a policy (however expressed) of the Secretary of State in relation to the development or use of land in England … which the Secretary of State by direction designates as a [NDMP]"
- Before making, modifying or revoking an NDMP, the Secretary of State must:
    - Consult with relevant parties on this unless it is a) an immaterial change to the NDM policy or b) it is 'necessary, or expedient …to act urgently'.
    - "Have regard to the need to mitigate, and adapt to, climate change".

The Act's own text does not mention carbon. Yet a 2024 consultation by the previous government suggested it might set an NDMP for carbon measurement and reduction. The new Government's mid-2024 consultation[clv] confirms intent create NDMPs, but not whether these may cover carbon/energy.

Therefore, it is not yet clear if the NDMP regime will affect local plans' ability to set their own carbon and energy performance standards.

Changes to how Developer Contributions may be used

Section 106 & Community Infrastructure Levy (CIL) may be largely replaced by 'Infrastructure Levy' set by gross development value (GDV).

The Levelling Up * Regeneration Act does not scrap Section 106 or CIL, but it has been indicated that it may be used to scale-back S106's role to limited purposes[clvi]. This may alter the ability to use Section 106 to raise carbon/energy offset funds (as it has been in several precedents). The new IL charging schedule would still be set locally and require an infrastructure delivery strategy outlining how funds will be spent. It may apply to permitted development as well as full plans[clvii].

- The Act's Schedule 12 (Part 1) empowers the Secretary of State to "make regulations providing for … a charge to be known as Infrastructure Levy (IL)" and that these IL regulations "may include provision about how the following powers are to be used":
    - a. Community Infrastructure Levy
    - b. "section 70 of TCPA 1990 (planning permission),"
    - c. "section 106 of TCPA 1990 (planning obligations)"
    - d. "section 278 of the Highways Act 1980 (execution of works)."
    - Schedule 12 also establishes that the regulations must require the IL funds to be used for infrastructure, which includes "facilities … for the mitigation of … climate change".

A 2023 consultation[clviii] proposed to keep S106 for "matters that cannot be conditioned", infrastructure provision as payment-in-kind of the new Levy, or where GDV is unknown. It mentioned that "new buildings that go beyond national or local environmental policy could have the value of sustainable technologies [deducted from] Levy liabilities". No conclusion to this consultation is available as of January 2025.

Thus until the Secretary of State creates the new IL Regulations, it is unknown whether S106 will still be usable for the purpose of raising carbon offsetting funds, or for any other purposes related to reducing developments' carbon impact.

However, these S106/IL reforms were proposed by the previous government. The new government indicates1 it will not implement the new IL and instead "focus on improving the existing system of developer contributions".

It remains to be seen whether these 'improvements' will affect the scope for S106 as a carbon/energy offsetting tool.

A new ‘Environmental Outcomes Report’

The new ‘Environmental Outcomes Report’ may replace the existing system of Sustainability Appraisals, Strategic Environment Assessments and EU Environmental Impact Assessment. The outcome topics are yet to be clarified but may conceivably include carbon.

The Act (Part 6) establishes that “Regulations made by an appropriate authority … may specify outcomes relating to environmental protection in the United Kingdom or a relevant offshore area that are to be ‘specified environmental outcomes’”. In relation to this:

- ‘Appropriate authority’ is defined as the Secretary of State or devolved authority.
- “‘Environmental protection’ means … protection of the natural environment … from the effects of human activity”.
- The definition of ‘natural environment’ names ‘living organisms … their habitats … [unbuilt] land, air and water … and the natural systems, cycles and processes through which they interact”. This could cover the climate as a natural process.
- However: Neither climate nor carbon is specifically mentioned in Part 6.

Before the Act was passed, an early 2023 consultation on Environmental Outcomes Reports[clix] gave a list of “potential matters that could be reflected as outcome[s]”, none of which is carbon or energy, yet “the government expects that the matters not in [that] list … will be picked through regime specific outcomes” and was “reviewing how EORs could be used … to help support efforts to reduce the carbon impact of development … [and] the role tools like environmental assessment should play in … crucial issues like … net zero”. No consultation response is available.

An early 2024 (former) Government response to a review of environmental assessment regimes did not mention carbon/energy. The new Government’s Summer 2024 planning consultation[clx] does not mention environmental outcomes.

Therefore it appears unlikely that the Act’s ‘Environmental Outcomes’ approach will affect the local plan’s scope to require carbon reduction standards for developments.

Supplementary Planning Documents (SPDs) to be replaced with “Supplementary Plans”

Until the LU&R Act, the production of supplementary documents with significant but less material weight than the formal development plan documents (local plan itself) was established in the Town and Country Planning (Local Planning) (England) Regulations 2012.

The LU&R Act does not specifically mention SPDs, but provides for the creation of a new type of document, ‘Supplementary Plans’, which the former Government’s 2023 consultation[clxi] had explained are intended to replace SPDs entirely. That consultation noted that:

- Supplementary Plans will have the same weight as the rest of the local plan and therefore will be subject to similar consultation and examination requirements.
- However, they “are not intended to be used routinely”, instead the priorities should be addressed as far as possible within the main local plan document, while the Supplementary Plan route should only be used to “react and respond positively to … exceptional or unforeseen circumstances that need resolving between plans”, giving the example of “an unexpected regeneration opportunity or introducing new site-specific policies including in relation to design, infrastructure or affordable housing”.
- “[Existing] SPDs will remain in force until planning authorities adopt a new style local plan or minerals and waste plan”. Therefore, any extant SPD will remain implementable so long as its content remains consistent with policies adopted through the new emerging local plan (assuming this new local plan is adopted within the ‘old style’ planning regime, for which the draft plan must be submitted to the Inspectorate by December 2026[clxii], a deadline recently pushed back from June 2025).

However, as of January 2025 no response to that 2023 consultation has yet been published, and – as the online text of the Town & Country Planning Regulations 2012, cited above, still refers to SPDs (and is stated to be up to date with all known changes implemented to date).

Additionally, the December 2024 NPPF also still retains existing NPPF references to SPDs in several places, despite having been published more than a year after the LU&R Act was passed. Prior to that confirmed NPPF publication, the summer 2024 NPPF consultation’s text (in which the actual consultation questions were asked[clxiii]) does not contain the words ‘SPD’ or ‘supplementary’.

It is therefore still uncertain whether SPDs will remain a useful tool to assist implementation of any local plan policies aimed at carbon reduction.

Any such SPD is likely to only hold much weight if it is consistent with the new Local Plan for Buckinghamshire and if that local plan were submitted to the Inspectorate within the deadline for the existing planning regime (now December 2026). Buckinghamshire’s timeline for its new Local Plan indicates a submission in early-to-mid 2026.

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