Sandwell Metropolitan Borough Council: Climate Change evidence for Local Plan review

Literature Review

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Rev V2 (minor corrections on V1)

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Introduction

Bioregional & Edgars are appointed to provide Sandwell Metropolitan Borough Council (SMBC) with an assessment of options available within the local planning system to address climate change in Sandwell to inform Local Plan policy.

Local planning authorities (LPA) have a legal duty to mitigate climate change (deliver carbon reductions) through the planning process, and government planning policy confirms that 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 between today and 2050.

Our appointment to support SMBC in this effort comprises of the following workstreams:

Work Stream 1:

1. Literature review of powers, precedents, existing local carbon and climate strategies
    a. Review of Regulation 18 and 19 policies (suite of polices SCC1-SCC5)
2. Policy recommendations
3. Engagement with officers and/or members to inform them of the findings of the above at appropriate points during the work, so that decisions can be made about the use of these insights and the next steps of the work itself.
4. Liaison with the Council's third-party consultants on other matters such as viability, where necessary.

Work Stream 2:

5. Evidence Base, including:
    a. Proposed policy wording supported by:
        i. Literature review covering the powers, precedents, existing local carbon and climate strategies (from Output 1) to support policy approach
        ii. Any other evidence to support policy approach (costs etc).
6. Liaison with the Council's third-party consultants on other matters such as viability, where necessary.

This report comprises Part 1 of Work Stream 1. Later, when any gaps in necessary evidence for the preferred policy are uncovered, this report may either be adapted into a future version to fulfil Part 5, or else Part 5 may be fulfilled by a separate report containing only the additional evidence identified to be necessary.

To aid Sandwell MBC's decision-making for the new Local Plan, this piece of work explores:

- Defining 'net zero carbon' at different scales and how these fit together
- LPA duties to address carbon, as per the National Planning Policy Framework and Climate Change Act
- LPA powers to address carbon and energy granted by key pieces of national legislation, policy, and official guidance (and the limitations placed on how the LPA wields those powers)
- 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.

Glossary of terms and acronyms

BREDEM	Buildings Research Establishment Domestic Energy Model. A methodology for estimate calculations of the energy use and fuel requirements of a home based on its characteristics. BREDEM is the basis for SAP (see elsewhere in this glossary) 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.
GHG	Greenhouse gas (CO_2 and several other gases: methane, nitrogen dioxide, and fluorinated refrigerant gases). Often collectively referred to as 'carbon'; see above.
LETI	Low Energy Transformation Initiative. A coalition of built environment professionals working to establish and achieve the energy performance needed for net zero.
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.
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 be used 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 BREDEM model, but with fixed assumptions and thus less flexibility.
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 carbon dioxide (or other GHGs) so that it cannot perform its harmful climate-changing role in the atmosphere. Currently only achieved by trees/plants and soil. May be achieved by technologies in future.
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[1].
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.

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Defining net zero carbon buildings

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 the construction materials.

The 'National Calculation Methodologies' for buildings' energy use and carbon emissions are called **SAP (for homes)** or **SBEM (for other buildings)**. 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 energy (or total emissions, depending on the carbon intensity of different fuels used).
- 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[ii] 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[iii] 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 doesn't require better insulation and glazing to counter an inefficient form.

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

- **LETI operational net zero carbon:** A building that (each year) generates as much renewable energy as it uses, sometimes using grid electricity and other times sending renewable energy to the grid. The building must also be gas-free and meet specific 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.

Because the LETI and UKGBC definitions are for *actual* operational performance not just modelling, they require 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.

Building on the work by LETI and UKGBC, a unified industry definition is in the works by a coalition that includes LETI and UKGBC alongside BRE, RIBA, RICS, and other standard-setting professional organisations in the built environment sector. This **"UK Net Zero Carbon Buildings Standard"** will align with science-based trajectories needed for net zero by 2050 and a 78% reduction by 2035 in the UK. A draft version for beta testing is anticipated in Winter 2023/24; timelines for finalisation are unknown.

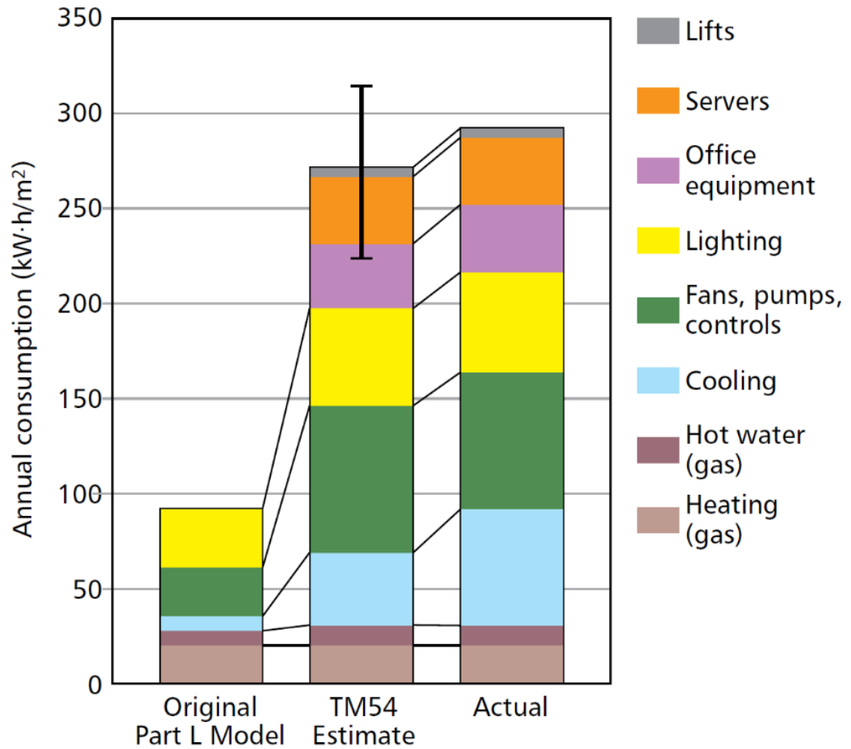


Figure 1: CIBSE graph that reveals the inaccuracies of Part L SBEM prediction of energy use, compared to a prediction using the CIBSE TM54 method, and the building's actual measured energy use in operation. This is for an office building.

[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 *into* 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

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 prescribed partners and organisations.

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. It includes policies that 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 it can set certain conditions around 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 standards cover a wide range of technical topics including quality of materials, structural design, drainage, contaminants, fire and electrical safety, acoustics, ventilation, sanitation, water efficiency, overheating, electric vehicle charging, as well as energy efficiency/carbon emissions. Building Regulations apply not just to new developments, but also to extensions and alterations.

The local plan must be in accordance with the National Planning Policy Framework (NPPF), which is set by central government (most recently in December 2023). 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 do not require planning permission. Some changes to existing land or buildings can occur via permitted development in some cases, without the need for 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:**
  - Fabric Energy Efficiency in kWh/m^2/year – this is a measure of the building's need for space heating
  - 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.
- **New requirement for 'energy forecasting' in non-residential buildings** –

Why must the Sandwell Local Plan 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[iv] by reducing greenhouse gas in the atmosphere[v,vi]. It therefore cannot just mean 'minimising the additional emissions from *new* development' – rather it requires an overall reduction in the net amount of emissions from all activities in Sandwell. 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 a low carbon future
- Provide a positive strategy to increase the use and supply of renewable and low-carbon energy.

The Climate Change Act 2008 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 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 2C 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 1C rise and is on track for a 3-4C 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[vii] shows that national government plans are insufficient to deliver all these necessary changes. The government's Net Zero Strategy was (2022) found unlawful[viii] 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. Therefore, in order to mitigate climate change in line with the Climate Change Act, the local plan will need to act ahead of national government action, 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.

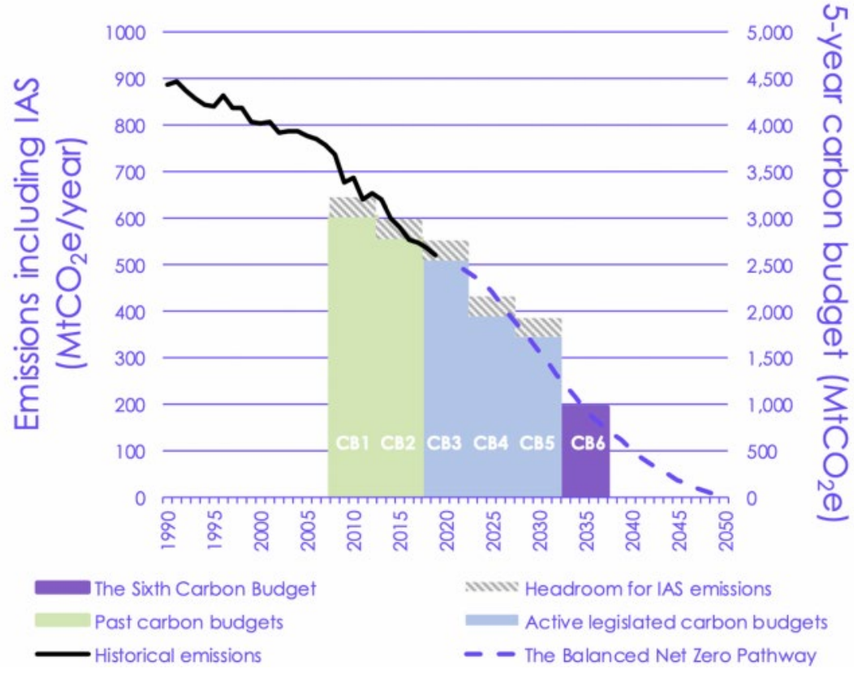


Figure 2: UK legislated carbon budgets under the Climate Change Act. From Committee on Climate Change (2020), The Sixth Carbon Budget: The UK's Path to Net Zero. "IAS" = international aviation & shipping.

How can the Sandwell Local Plan 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 large-scale 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 measures above where lacking.

In this report, we focus on planning powers towards 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 only the methods used in Part L of Building Regulations (SAP or SBEM), despite their aforementioned shortcomings. However, the new non-residential Part L 2021 endorses the more accurate 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 requirement', nor does it define the term 'energy used at the development'. It therefore appears to empower the local plan to set requirements for renewable energy to meet a proportion of the new building's *total* energy, not just 'regulated' energy (glossary). In that case a method would need to be chosen to account for that unregulated energy, ideally in a way that works alongside the calculation for regulated energy. Several methods could be used: TM54 (as above), BREDEM, and SAP Appendix L. PHPP could also be used but may not be compatible with SAP/SBEM.

The Town & Country Planning Act 1990 gives two key powers often used for carbon reductions:

- Section 106[ix] enables the local plan to require payments from new development. These must be reasonable, proportional to the development, and necessary to make the development acceptable. This has sometimes been used as a mechanism to offset new developments' carbon.
- Section 61[x] 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 159b: "New development should be planned for in ways that … help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards".
- Paragraph 160a-b: "Plans should … provide a positive strategy for energy from [renewable and low carbon] sources … [and] consider identifying suitable areas for [these] and supporting infrastructure".
- Paragraph 196: "Plans should set out a positive strategy for the conservation and enjoyment of the historic environment, including … putting [heritage 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 (2023)**
  - Policies should 'reflect national technical standards' – this may influence the performance metrics or calculation methods that can be used in local policy around 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 through 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)
  - 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 is facing an ongoing legal challenge that it would inhibit 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 to deliver a certain amount of the carbon savings, as this is the first step of the 'energy hierarchy' (list of measures in order of most to least preferred):

- London Plan 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 (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.
- Solihull (Emerging): Provide at least 15% of energy from renewable or low carbon sources.
- West Berkshire (2012): Renewable/low carbon energy to achieve net zero total carbon emissions (regulated and unregulated) from 2016 for homes, or 2019 for other buildings, 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 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)	
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	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 (BANES) 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.

These policies 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) 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.

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
- London Borough of Merton 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 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) and Lancaster City Council were instructed by their Inspector 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 for this decision was their view that the proposed local energy targets (in Policy 2 – Net Zero Carbon Development) were not sufficiently justified by evidence and also conflicted with expressions of national policy (in the form of 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). The Salt Cross case was successfully challenged by a third-party organisation focusing on that interpretation of the policy's soundness. The case was heard in the High Court in November 2023. 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] was overtaken by the introduction of Part L 2021 and had been contradicted by subsequent expressions of national policy[xi]

A decision on whether the Salt Cross AAP can proceed to re-examination or adoption is likely to follow in coming months. But if re-examined, it will now face a new hurdle: 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. However, any future argument to overcome the new WMS may now be bolstered by the comment in that High Court decision that a WMS "cannot restrict the legal powers of the LPA under the 2008 [Energy and Planning] Act"[xii]. A further indication in favour of Salt Cross is some pre-action legal correspondence (as yet unpublished) between the Secretary of State and the legal representative of 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 that it is only a *material consideration* to be taken into account in the planning system, not a fixed constraint on how policy is expressed, despite the forceful language within the WMS.

Defining net zero carbon buildings

Because 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 Sandwell, 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 Sandwell 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 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. However, due to a Written Ministerial Statement (WMS) released in 2023 which purports to limit how local energy efficiency policies are expressed this 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[xiii] 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. We note West Midlands Combined Authority (WMCA) uses these terms interchangeably for its 2041 goal[xiii]

For the purposes of the local plan, we should consider the carbon account of three key entities: firstly **Sandwell Borough**, secondly **WMCA area, 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 the borough's carbon account, and how the borough's emissions fit within WMCA's carbon account, and then how this fits 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 Sandwell or the West Midlands to achieve their net zero goals, and Sandwell 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 CO2e 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 Sandwell or WMCA 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).

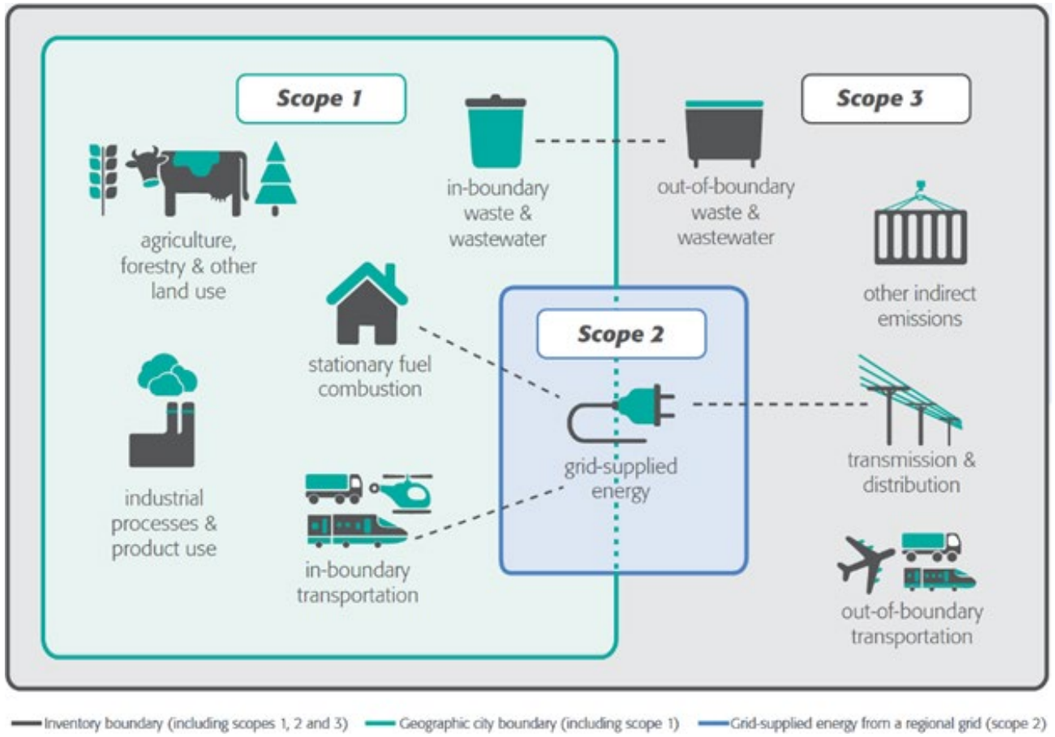


Figure 3: Various Sources of emissions according to Scope 1, 2 and 3.

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 a city. 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[xiv] to help local authorities make decisions. Until recently this counted CO_2 only, but **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/BEIS figures include **only local direct emissions** (including from land use and chemical use as well as fuel use) **and grid energy use**. They are not broken down into 'scopes', 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/BEIS figures are **broken down into several sectors**: industry, homes, commercial buildings, public buildings, transport, and land use/forestry ('LULUCF'). 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/BEIS 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 zero-out the area's emissions even if the green areas were expanded many times over.

The figures also reveal how important it is to plan for reduced car use and enable low-emissions deliveries – as transport is responsible for more than half the area's emissions.

Tyndall Centre local area carbon dioxide budgets (and SCATTER trajectories)

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.

These trajectories show the UK's **total CO_2 budget to 2100** if the UK is to pull its weight 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). This starts with the middle-range global carbon budget likely to limit global climate change to "well below" 2˚C, determined by the IPCC. The Tyndall Centre derives the CO_2 budget for the UK from this global budget, based on equity principles that account for our existing level of development and sectoral base, and the local budget is derived from the UK one. The resulting totals are split into five-yearly budgets. The Paris-compliant carbon budgets for Sandwell are shown here (Figure 4 and would be used up by the end of 2026 if emissions continue at the 2017 level.

This methodology **only covers CO_2 occurring 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, and breaks down the local area's emissions into 'scopes 1, 2 and 3' as per the GHG Protocol for Cities (previously explained, above) which Tyndall does not do.
- 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 Committee on Climate Change national carbon budgets, Tyndall does not assume that carbon capture technologies appear in future, as this would risk over-estimating the budget. If these technologies were to be developed in future, they could 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.

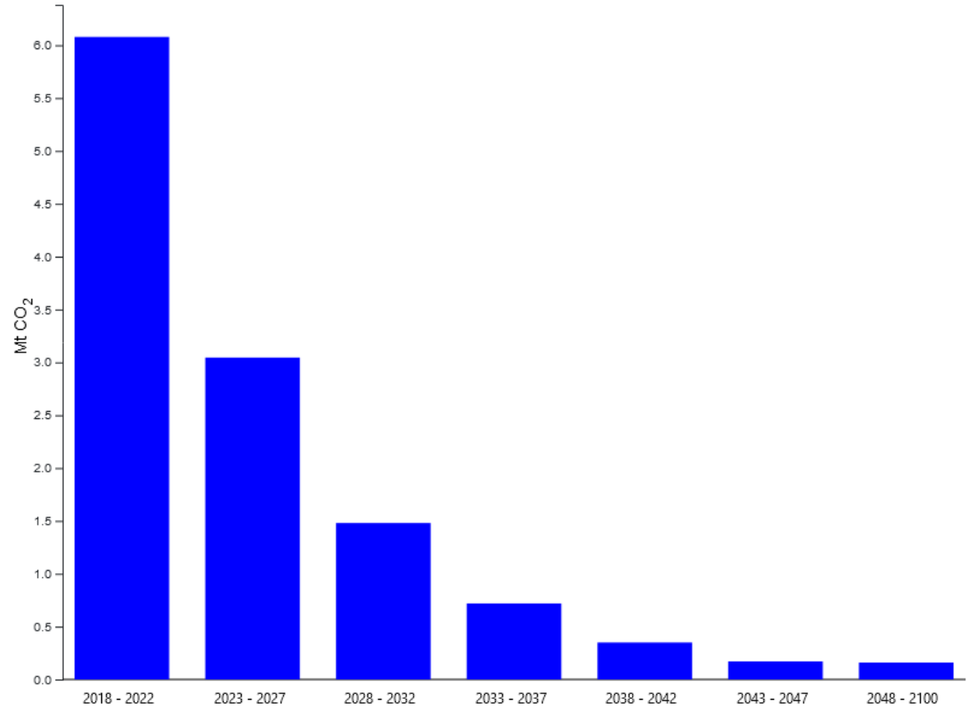


Figure 4 Sandwell's carbon budgets to 2100 (energy-only, CO2 only) compliant with the UK's commitment to the Paris Agreement. Calculated by the Tyndall Centre.[viii]

‘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 government policy are based on Part L and the associated calculation methods.

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 buildings). These calculations are submitted to building control.

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. A new version “Part L 2021” was implemented from June 2022, and a further version is expected to arrive in 2025 (the Future Homes Standard). These uplifts come with changes to the ‘notional building’[xv]. For Part L 2021, this has some small improvements to fabric (insulation/glazing) and solar panels applied to the roof, but it still has a gas boiler. Together these make the target emission rate about 31% lower than it was in Part L 2013. In Part L 2025 the notional building has a heat pump and much better fabric, but no solar panels. Together these measures will make the target emission rate about 75% lower in 2025 than in 2013 (or about 64% lower than it is with Part L 2022).

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 consultation on the Future Homes Standard 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.

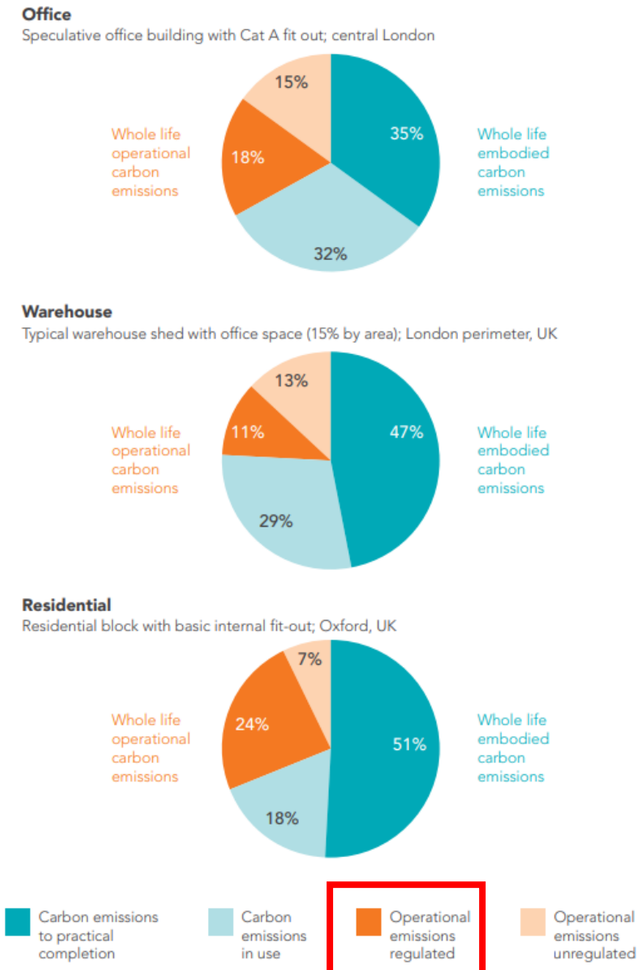


Figure 5 Figure 5 Diagram showing a breakdown of whole-life carbon emissions for three building types. Building Regulations Part L only looks at the orange segments - and even then quite inaccurately. Source: UKGBC.

‘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[xvi]
- 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[xvii], 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[xviii] 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[xix] confirms that off-site renewable energy supply does not have to be via a long-term power purchase agreement[2], 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 at the time of writing (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.

[2] 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.

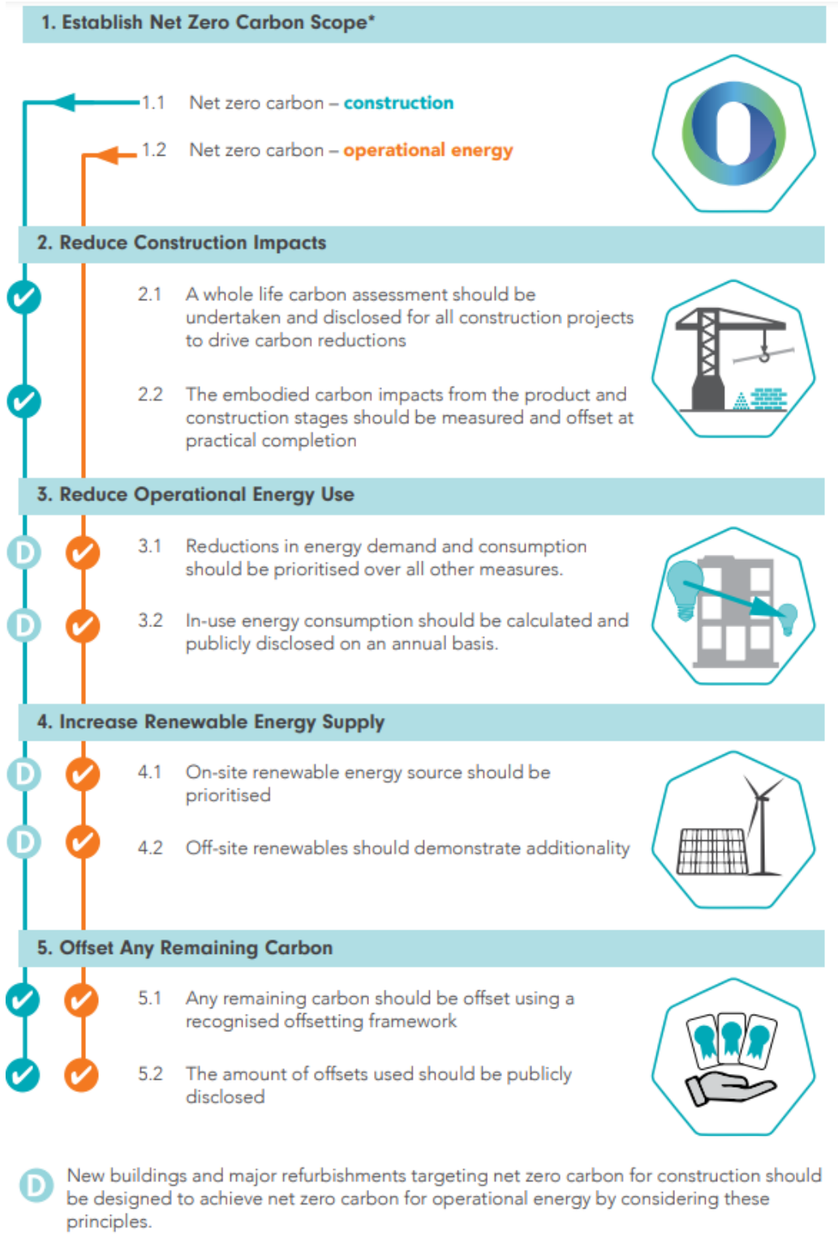


Figure 6 UKGBC Net Zero Carbon Buildings Framework Definition - twin track diagram.

Low Energy Transformation Initiative (LETI) Net Zero Operational Carbon

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

Its definition[xx] 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[xxi]), such as Passivhaus Planning Package (PHPP)[3]
- 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 for Sandwell.

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

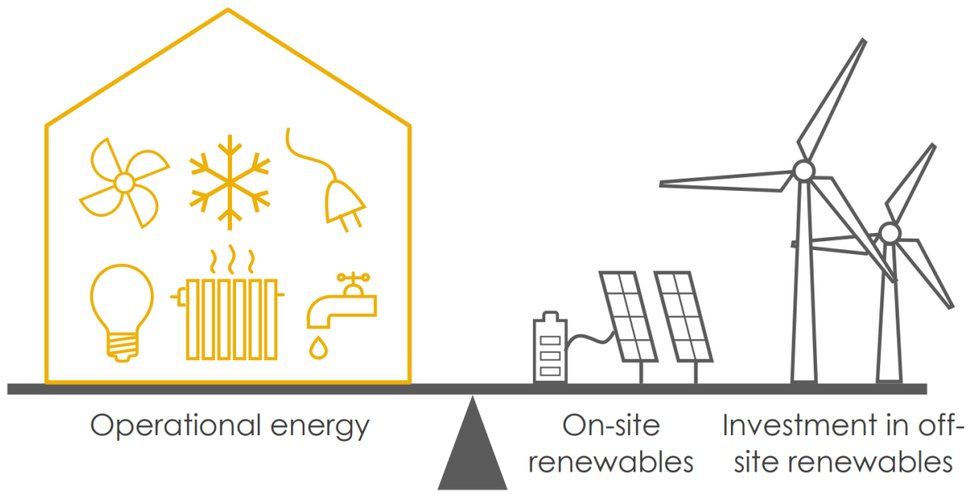
LETI also recommends annual reporting of energy use and renewable energy generation on site for 5 years to verify the net zero carbon status, and that embodied carbon should be separately assessed and reported. It offers separate targets[xxiii] for embodied carbon, but does not expect the embodied carbon 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 now endorsed the LETI definition of net zero carbon[xxiv].

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

Building on the work by LETI and UKGBC, a unified industry definition is in the works by a coalition that includes LETI and UKGBC alongside BRE, RIBA, RICS, and other standard-setting professional organisations in the built environment sector. This "UK Net Zero Carbon Buildings Standard" will align with science-based carbon goals including net zero by 2050 and a 78% reduction by 2035 in the UK. A draft version for beta testing is anticipated in Winter 2023/24; timelines for finalisation are unknown.

[3] 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.



Net zero operational balance

Figure 7: Diagram of LETI net zero operational balance. From LETI Climate Emergency Design Guide.

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

National and international commitments to address climate crisis

The UK is a signatory to the international Paris Agreement 2015, brokered via the United Nations. This commits all signatories to ensure global average temperatures rise is limited 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 carbon emissions, as there is a limited 'carbon budget'[xxv] 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[xxvi].

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.

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 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 five-yearly carbon budgets[xxvii] mean that compared to the 1990 baseline, the UK must achieve a 78% reduction by 2035 (this would be roughly equivalent to a 65% reduction compared to current levels, which would require an average drop of about 4.3% a year[4]).

The 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 7*), 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 8* - therefore the buildings and energy sectors should not rely on tree planting to make up for insufficient reductions in their own energy use and emissions).

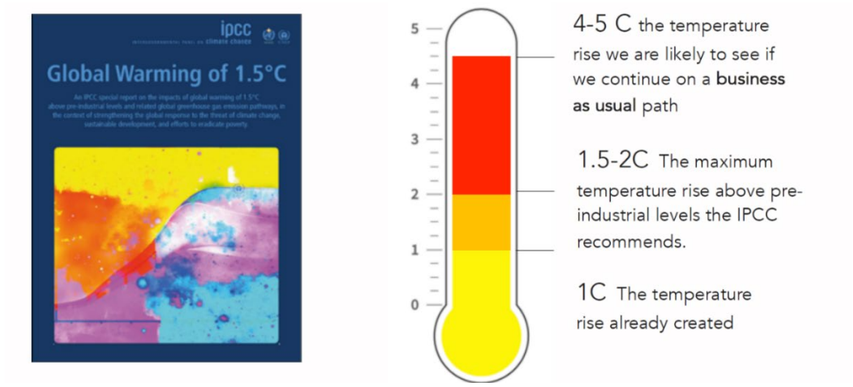


Figure 8: Special Report on 1.5C by IPCC, and diagram of the potential range of climate change to 2100 (Diagram credit: Etude, 2021).

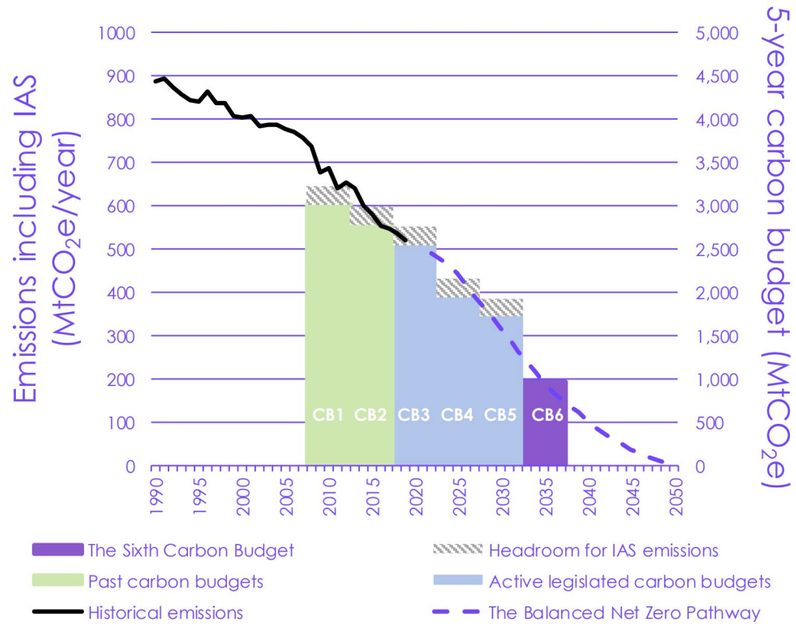


Figure 9: UK legislated carbon budgets under the Climate Change Act. From Committee on Climate Change (2020), The Sixth Carbon Budget: The UK's Path to Net Zero. "IAS" = international aviation & shipping.

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

The UK's five-yearly carbon budgets also come with **progress reports** detailing a **combination of actions necessary to stay within the budgets**[5]. 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[xxviii] (and ideally be zero carbon[xxix]), 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[xxx])
- **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
    - **Add energy storage to the system**, including batteries, hydropower, and hydrogen
    - **Maintain or restore 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[xxxi]
- **Increase woodland cover to 18% of UK land**, up from 13% today, and restore peatlands.

Committee on Climate Change analysis found that the **government's policy plans are insufficient to deliver the full suite of necessary actions for the carbon budgets**[xxxii]. The 2021 building regulations do not rule out gas (and many buildings granted under the 2021 regime will actually be completed post-2025). The Future Homes Standard (2025) is expected to deliver gas-free new homes, but will not deliver a low enough space heat demand[xxxiii] nor make buildings net zero carbon from first operation, nor include any regulation around low-carbon materials or material efficiency.

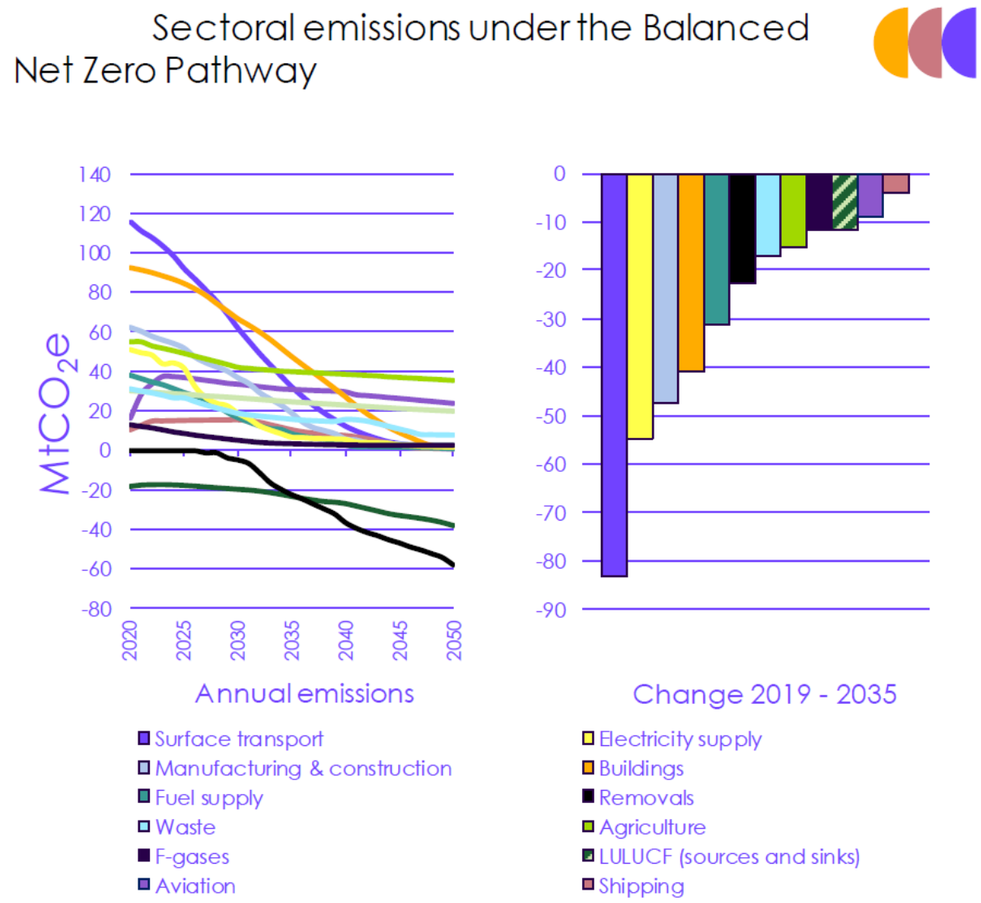


Figure 10: Committee on Climate Change Diagram showing how the carbon emissions of each sector must fall to achieve the 'balanced' pathway towards net zero carbon in 2050 and meet carbon budgets. From Committee on Climate Change (2020), *The Sixth Carbon Budget: The UK's path to net zero*.

[5] It is important to note that the CCC carbon budgets, while challenging, are really the minimum we must do to play our fair role in preventing catastrophic climate change. Other expert analysis of the UK's true 'fair share' of the global carbon budget has found[5] that the carbon budgets should be about half the size of the budgets that the CCC permits. These experts (at the Tyndall Centre) argue that if the UK does not stick to that fair share, it would be failing in its commitment to the Paris Agreement. Beyond the 'fair share' question, the CCC budgets also include future carbon removals through technologies that do not yet exist, and also 'carbon allowances' through emissions trading schemes. Tyndall Centre experts find it wiser to exclude both in case the technologies fail to emerge and because the emissions trading schemes are based in economy, not the science of global carbon budgets.

The role and commitments of Sandwell Metropolitan Borough Council

In 2019, the UK government committed to become net zero by 2050. Net zero means all of the greenhouse gases emitted into the atmosphere must be removed. This is to slow down and eventually stop the earth heating up, causing global disruption.

In recognition of the urgency to tackle climate change, Sandwell Council declared a Climate Emergency in 2020. SMBC have committed to:

- be a carbon-neutral Council by 2030
- be a carbon-neutral Borough by 2041

Working together with residents of Sandwell during an eight-week public consultation on climate change and air quality in early 2020, SMBC understood that that many participants were very concerned about these topics. This helped shape Climate Change Strategy and Action Plan.

The Climate Action strategy serves as a roadmap for Sandwell to make its fair contribution to tackling climate change by achieving carbon neutrality.

Ambitious Targets, Science-Based Approach:

- Sandwell has set ambitious yet achievable targets, aiming to become carbon neutral within its own activities by 2030 and across the entire borough by 2041.
- These targets align with scientific recommendations for limiting global warming below 1.5°C, as outlined in the Paris Agreement

Two-Pronged Approach: Mitigating and Adapting

- **Mitigation:** This strategy focuses on reducing greenhouse gas emissions in several key areas:
    - **Council Estate and Operations:** Implementing energy efficiency measures in council buildings, transitioning to renewable energy sources, and adopting sustainable procurement practices.
    - **The Built Environment:** Encouraging energy-efficient construction practices, promoting building retrofits, and supporting green spaces within developments.
    - **Transport:** Encouraging and incentivising sustainable modes of transport like cycling, walking, and public transport. Exploring electric vehicle charging infrastructure and cleaner fuel options.
    - **Waste:** Reducing waste generation, promoting recycling and composting, and exploring innovative waste management solutions.
- **Adaptation:** This strategy also recognises the need to prepare for the unavoidable impacts of climate change:
    - **Strengthening Resilience:** Developing strategies to manage increased risks of flooding, heatwaves, and extreme weather events.
    - **Protecting Natural Capital:** Investing in green infrastructure projects that absorb carbon dioxide and promote biodiversity.

Collaboration is Key:

- This strategy recognises the importance of collaboration to achieve its ambitious goals.
- SMBC wants to work closely with local communities, businesses, and institutions to develop a holistic approach to addressing climate change and air quality.
- Sandwell is also seeking to align its efforts with regional initiatives in the Black Country and West Midlands, and advocate for national policies that support progress towards its targets.

Detailed Action Plan and Continuous Improvement:

- A detailed Climate Change Action Plan accompanies the Climate Change Strategy, outlining specific actions and milestones for achieving carbon neutrality.
- The Action Plan will evolve as technological advancements, policy changes, and new opportunities for action emerge. Sandwell is committed to continuous improvement and adapting its strategy based on the latest information and best practices.

Context of Sandwell Borough

Sandwell is a diverse metropolitan borough with a young population, faces challenges of lower-than-average income and educational attainment. While progress has been made, transportation emissions remain high, impacting air quality and public health. Residents experience shorter lifespans and are more vulnerable to climate change's health consequences.

Strengths and Opportunities:

- Strong community spirit and a thriving voluntary sector position Sandwell for collaborative action.
- Extensive green space and a large car-free population create opportunities for promoting sustainable transportation.

Climate Change and Health Nexus:

Climate change poses risks through extreme weather events, food and water disruptions, and worsening air pollution. Conversely, actions addressing climate change, such as improving energy efficiency and reducing transport emissions, can directly enhance public health.

Covid-19 and Green Recovery:

The pandemic underscored existing inequities and the need to prioritize the health of vulnerable populations. A "green" recovery that prioritises sustainability is essential to avoid exacerbating climate change and its associated health impacts.

Air Quality and Public Health:

Sandwell exceeds legal limits for air pollution, particularly nitrogen dioxide, linked to respiratory issues and heart disease. Reducing air pollution aligns with reducing greenhouse gases and improving public health.

The strategy advocates for a holistic approach, addressing climate change, air quality, and public health in a unified manner. Collaboration with local communities, businesses, and regional partners is crucial for success. The strategy prioritises actions that benefit the most vulnerable residents, promoting a just transition to a healthier and more sustainable future.

Key headlines and suggested commitments made within this Climate Change Strategy and action plan document include, of which the most relevant to planning:

- **Promoting Renewable Energy:** Integrating renewable energy measures like solar panels into new council homes
- **Climate-Conscious Procurement:** Considering climate change during council contract assessments (construction, maintenance, refurbishment) aligns with the National Planning Policy Framework (NPPF) that emphasises sustainable procurement in construction projects.
- **District Heating Exploration:** Investigating heat networks, which efficiently distribute heat from a central source, is supported by the NPPF's encouragement of low-carbon and renewable energy sources in heat provision.
- **Resident Engagement:** Continuing partnerships with energy-saving schemes for residents.
- **Private Sector Influence:** Encouraging private landlords and residents to improve the energy efficiency of their homes through grants and schemes.
- **Regional Collaboration:** Working with the Combined Authority to influence the design of new buildings and reduce the carbon impact of construction supply chains aligns with the NPPF's call for collaborative planning at a regional level.
- **Circular Economy Platform:** Creating a platform for local businesses to interact and support the circular economy aligns with the NPPF's encouragement of efficient use of resources and promoting the circular economy where feasible.
- **Eliminating Landfill Waste:** Investigating ways to eliminate the remaining 7% of landfill waste demonstrates Sandwell's commitment to diverting waste from landfills and maximising resource recovery, a key principle of the circular economy.
- **Energy Innovation Zones:** Considering the potential location of Energy Innovation Zones (EIZs) aligns with the NPPF's encouragement of innovation in low-carbon technologies and infrastructure.
- **Low-Carbon Vehicles:** Encouraging the use of lower-carbon vehicles through policies and infrastructure development
- **Vulnerability Mapping:** Developing a GIS mapping system to identify areas with the most vulnerable residents during climate events aligns with the emphasis on using spatial data to inform planning decisions and identify areas at higher risk.
- **Policy Review:** Evaluating current planning policies to ensure they align with climate adaptation objectives, including flood risk management, aligns with the NPPF's requirement for planning policies to be kept up to date and reflect the latest climate change projections.
- **Natural Capital Regulations:** Establishing regulations regarding natural capital in new developments and ensuring replacement for tree loss aligns with the NPPF's requirement for planning policies to protect and enhance biodiversity and deliver environmental benefits.

The Strategy should also be read alongside regional documents including:

- West Midlands Climate Change Adaptation Plan 2021-26[xxxiv] – This plan was produced by Sustainability West Midlands (a nonprofit membership organisation with members in the private, public and third sectors) in collaboration with the Environment Agency. This document's purpose is to set out "the climate change adaptation actions that should be considered for implementation by decision makers in the West Midlands, to ensure that our natural environment, people, infrastructure, buildings and businesses are prepared for the impacts of climate change, including greater incidence and severity of flooding, a higher likelihood of water scarcity and more intense and prolonged heatwaves".
- West Midlands Circular Economy Route Map (2021) – this recognises the vital role the region has to play in promoting decarbonisation of the manufacturing sector and opportunities within the green industrial revolution.

Separately, academic experts at the Tyndall Centre[xxxv] have conducted a similar exercise for all local areas of the UK but with different assumptions about the fairest way to derive the local budget, and the activities that should be accounted for at national level rather than local level. Unlike the national carbon budgets that are legislated through the Climate Change Act 2008, the Tyndall Centre does not presume that carbon removal technology will appear in the future. The Tyndall budgets also are devised with a more explicit focus on the 'Paris Agreement's equity principle – that is essentially that richer countries make more drastic carbon cuts due to their greater ability and responsibility for the historic emissions already changing the climate. The Tyndall budgets are CO_2-only (no other gases) and energy-only (i.e. no emissions or removals that are not fuel-related e.g. land use). They show only reductions at source, not 'net zero' where emissions are compensated for by removals.

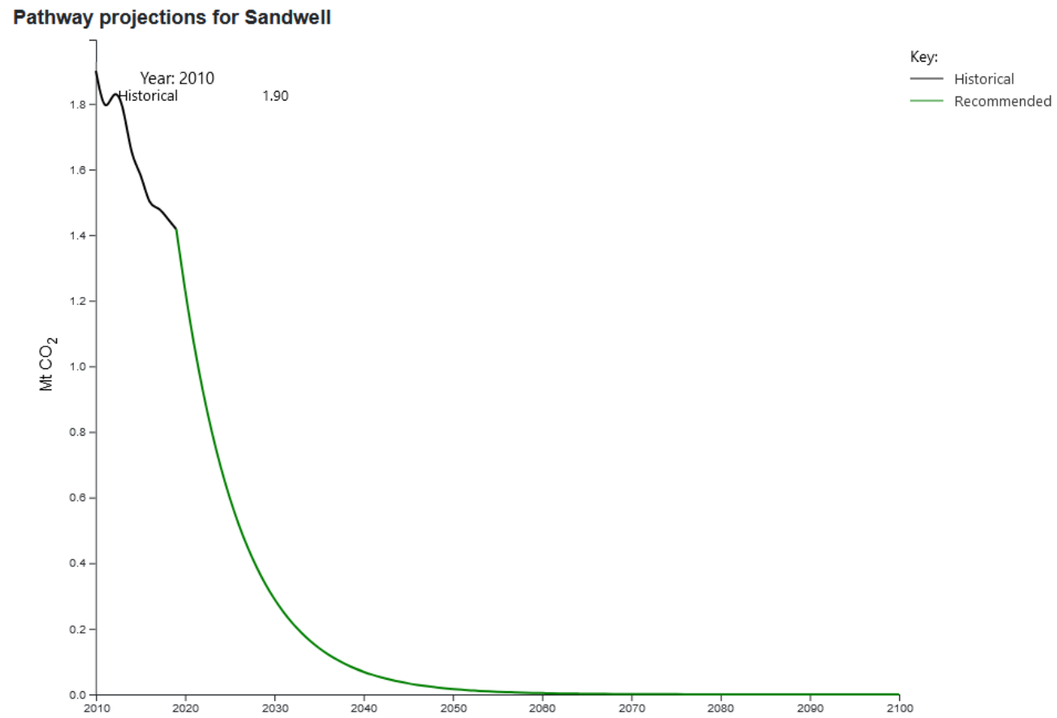


Figure 11: Emissions reduction pathway for energy-only CO_2 emissions to fulfil carbon budgets for Sandwell from 2018 to 2100 compatible with the Paris Agreement. Tyndall Centre (2023).

The Tyndall Centre's recommended pathways to net zero within the Sandwell carbon budgets are represented in *Figure 9, respectively*. To avoid exceeding the Tyndall carbon budget, Sandwell emissions would need to fall sharply starting from the 2018 baseline. This pathway amounts to a required annual 13.1% reduction to energy-related CO_2.

The challenge of bringing forward net zero carbon new buildings, scaling up retrofit of existing buildings, and decarbonising transport and the wider energy system, will not be possible without the support of the local plan. By shaping what kind of development happens and where, the local plan can help to realise Sandwell's ambitions.

A local plan that achieves dramatic carbon reductions will help to avoid contributing to the risk of Sandwell's residents being impacted by financial and health-related harms that would come with climate change. The Committee on Climate Change[xxxvi,xxxvii] has found (and UK central government has recognised[xxxviii]) that the changing climate brings risks of harm to the UK population's health, wellbeing, and economy in coming decades, all of which could affect SMBC's citizens. These include:

- 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[xxxix], and whereby native UK wildlife may struggle to compete with invasive species that move in as our climate becomes milder.

The Setting City Area Targets and Trajectories for Emissions Reduction (SCATTER) project provides an alternative pathway and approach for Sandwell to set realistic decarbonisation targets. This tool analyses current emissions and sources, then models' pathways achievable with currently available technologies.

SCATTER Scenarios:

- **Low Ambition Pathway:** Assumes Sandwell follows national policy guidelines and does not implement additional decarbonisation measures beyond what's mandated.
- **High Ambition Pathway:** Assumes Sandwell exceeds national policy on both energy supply and demand by implementing a range of interventions detailed in Appendix 1 of the SMBC climate change strategy. But includes. Intervention such as from 2021 all new build properties are built to passivhaus standand, by 2050 80% of homes have undergone a deep retrofit etc...)

The SCATTER Modelling Results for Sandwell:

- **National Policy's Impact:** The modelling starkly highlights the challenge of achieving local targets without national support. With minimal action (Low Ambition), Sandwell achieves only a 17.6% reduction by 2050.
- **High Ambition Potential:** The High Ambition pathway offers a significant reduction (89.8% by 2050), but requires substantial local effort and supportive national policies.

What are the limitations of SCATTER Modelling:

- **Scope 3 Emissions:** SCATTER excludes Scope 3 emissions (occurring outside the borough but impacting its carbon budget, e.g., aviation and shipping). Regional collaboration is crucial to address these.
- **Residual Emissions:** Even with the High Ambition pathway, Sandwell might still emit around 22% of its 2019 baseline emissions in 2041. Offsetting strategies might be necessary to achieve net-zero by 2041.

The SCATTER tool can provide a valuable roadmap for Sandwell's decarbonisation journey. By pursuing the High Ambition pathway, exceeding national policy where possible, and collaborating with regional stakeholders, Sandwell can significantly reduce its emissions. Exploring offsetting strategies and influencing national policy on aviation and shipping are also critical for achieving net-zero by 2041.

If the local plan does not take all possible steps within its grasp to achieve rapid and drastic carbon reductions, it would arguably be failing to deliver not just on its carbon reduction duties, but also its duties to protect the natural environment and the wellbeing of its population. The local plan's duties and powers to address carbon are explored next.

National Policy expectations and legal duties of the local plan to address carbon reductions in the local area and the UK as a whole

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[xl], primarily by reducing the level of greenhouse gas in the atmosphere[xli],[xlii]. 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 previously, if a 2°C global limit is breached, we 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 previously noted, 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 contain assessments of carbon performance against the carbon budget regime set out in the Climate Change Act".

National Planning Policy Framework (NPPF) 2021

This document[xliii] 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:

- **157:** "The **planning system should support the transition to a low carbon future** … 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".
- **158:** "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".
- **159:** "New development should be planned for in ways that … help to reduce greenhouse gas emissions, such as through its location, orientation and design".
- **160:** "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".

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.

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[xliv] 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 Climate Change Act goal and carbon budgets. The section on renewable and low carbon energy[xlv] 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 may soon hold decisions over onshore wind over 50MW[xlvi]. (*Note: As of 2020, energy storage of over 50MW is now the domain of the local planning authority, except pumped hydro[xlvii]).

Potential tension with other duties

These carbon reduction duties are often in tension with the local plan's other duties – 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 previously discussed) – 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.

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

As previously explained[6], this report's primary focus is to support policy on the carbon emissions of buildings, which are responsible for a large share of local area carbon emissions. 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 grid energy supply.

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 same pieces of legislation and policy, but this time sets out how these documents define the powers available to local plans to meet the duty of addressing climate change, as well as the powers available to meet net zero.

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 can and should be used is given 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.

Most definitions and requirements for 'net zero carbon buildings' in 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 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 (see previous section on national and alternative definitions of zero carbon).

Town and Country Planning Act 1990

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

- Section 106[xlviii], 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 example local plans to require carbon offsetting payments from new development.
- Section 61[xlix] 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[l] included provision for the Building Regulations to be amended to require provision for off-site carbon abatement measures. This was in relation to the erstwhile 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.

National Planning Policy Framework (December 2023)

This national policy document, updated December 2023, 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 appear 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)

[6] Please note that this document focuses mostly on the carbon impact of **buildings**. 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 would be part of Sandwell's overall carbon emissions – and would therefore need to be reduced to zero in order to hit the national goal of net zero carbon by 2050 (or 2030 for the local target). Nevertheless the transport carbon is not considered part of the carbon that belongs to the building itself, thus it 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".

- 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 statements of national planning policy, where relevant).

It also reaffirms the ways in which the local plan (and whole planning system) can mitigate climate change. Beyond the NPPF paragraphs 157-160 in the previous section, the following paragraphs also become relevant to the question of which interventions are considered appropriate by the NPPF:

- **Paragraph 163**: "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".
- **Paragraph 196**: "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 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 159b**: "Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards."
- **Paragraph 157c** 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' would largely mean the building regulations Part L uplifts in 2021 and 2025, and perhaps also the electric vehicle charging requirements that are being introduced through the new Part S of building regulations.

National Planning Policy Framework Update Consultation (2022-2023)

The National Planning Policy Framework (NPPF) consultation[li] ran from 22 December 2022 to 2 March 2023, in the context of the Levelling Up and Regeneration Bill, to primarily seek views on proposed changes to the NPPF and the approach to preparing 'National Development Management Policies' (a completely new element in the planning system, which forms one of the proposals laid out in the Levelling Up & Regeneration Bill - see summary later in this document). The key points from the 2022-23 NPPF consultation relate to:

1. Onshore wind development

A positive amendment to text relating to the repowering of onshore wind states that LPAs should approve applications for the repowering and life-extension of existing renewables sites. This is however arguably the only helpful change on this topic, primarily because footnote 63 continues to take a negative stance to onshore wind development by treating it differently to other types of energy development. As per the current NPPF, this draft NPPF continues the uniquely negative treatment of onshore wind in that its acceptability depends on demonstrating through consultation that it has 'community support', and prior identification of suitable areas in the local plan or in an SPD. A lack of clarity remains over what constitutes sufficient 'community support'. For the purpose of enabling local plans to fulfil their legal duty to mitigate climate change, it could be argued that footnote 63 should be removed to relax barriers experienced by onshore wind development and so that the technology has equal opportunities for growth. Alongside the climate imperative there is also a socioeconomic argument for this especially in context of the recent energy price volatility, given that onshore wind is one of the cheapest forms of energy generation[lii].

Other changes to footnotes 62 and 63 propose that onshore wind applications could be granted permission through Local Development Orders, Neighbourhood Development Order and Community Right to Build Orders. Additionally, it is suggested that supplementary planning documents could be used as a resource to identify suitable sites for onshore wind, instead of through a development plan.

2. Replacement of Supplementary Planning Documents

The proposed reforms to the planning system would replace supplementary planning documents (SPDs) with Supplementary Plans; existing SPDs would expire after a new-style plan has been adopted. The replacement of SPDs is a concern for local authorities as they provide valuable supplementary information on parent policies and guidance on how to achieve them. SPDs enable a deeper explanation and description of policy wording within Local Plans, which can strengthen an overall policy approach towards improved delivery. The expiration of existing SPDs will increase plan-making complexity and place resourcing constraints on local authorities, particularly as proposed Supplementary Plans will be subject to an additional process of examination.

3. Increased weight given to energy efficiency improvements in existing buildings

The insertion of paragraph 161 is a positive move, since it emphasises the importance of that retrofitting existing buildings, which is a key necessary step towards staying within the bounds of the 6th carbon budget. Conservation areas and listed buildings will still be treated more cautiously however, due to the sensitive relationship between heritage and carbon-reducing alterations.

4. The removal of the need for justification to be demonstrated in plan making

A fundamental amendment to the NPPF, the potential removal of the need for policy justification, has created concern among those working in planning. The current requirement that plans must be justified is currently one of key four tests that must be demonstrated for a plan to be found sound.

The removal of the test could adversely impact the quality of housing delivery, particularly in sustainable places, because allocations will not necessarily need to be justified. If plans no longer must be justified, it has been recommended by the Town and County Planning Association that the test should, as a minimum, be replaced with a requirement for a robust evidence base and demonstrate that various policy options have been considered. However, the recent Levelling Up & Regeneration Bill consultation indicates that this requirement for evidence will not be entirely removed. Further information on this is expected in coming months but a lack of clarity on this decision remains.

5. Insufficient reference to the 2008 Climate Act

In the context of climate change, a significant gap remains in the changes to the NPPF text, which is that there is insufficient reference to the legally-binding 2008 Climate Act and subsequent carbon budgets and the exact role that local plans can and must play towards achievement of those legally binding reductions. Without a clear direction set by the Act, policy informed by the NPPF will not necessarily be measurable against the UK 2050 net zero target.

Nevertheless, the draft NPPF update still retains the existing paragraph that confirms that plans' climate mitigation and adaptation should be "in line with the objectives and provisions of the Climate

Change Act 2008", therefore the carbon budgets passed under the aegis of that Act should still form a good logical basis for development of local plan policy that brings forward the actions necessary to fulfil them. However, this argument may be weakened in concert with the proposed removal of 'justification' as a test of soundness – given that such policies are argued to be justified by evidence showing that they are necessary to fulfil the carbon budgets.

National Planning Policy Framework Partial Update (2023)

The updated NPPF primarily reflect desired changes to onshore wind development. Other elements outlined above relating to the NPPF consultation have not yet been updated or clarified.

The changes amend paragraphs 157 – 160, with the most notable change being that the impacts of onshore wind development must now be 'appropriately' addressed, replacing previous wording that required impacts to be 'fully' addressed. Another change is that SPDs can be used as a resource to identify suitable sites for wind development, although it is currently unclear whether the wider role of SPDs will be sustained in future NPPF iterations. These minimal changes offer a slight relaxation for onshore wind development, but are insufficient to allow onshore wind development to come forward with equal ease as other energy technologies.

Planning Practice Guidance (PPG)

The PPG section on Climate Change[liii] 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 confirms that:

- Local planning authorities hold decisions on renewable energy development of ≤50MW [From 2016, onshore wind over 50MW is also now a local planning decision[liv]]
- 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 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[lv] (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 on this change, it would remove local plans' Energy and Planning Act powers to require higher energy standards. It stated that meanwhile, local plans should not set policy requiring any level of the Code nor other standard in layout, performance or construction and that local authorities were 'expected' not to set conditions requiring more than the 19% reduction.

This, along with the tension between the duties for carbon and viability/housing delivery, has caused many to discard policies – or else to adopt only nominal 'zero/low-carbon' policies that stop far short of requiring carbon improvements to the extent that would have been technically feasible.

However, these changes to building regulations and the Energy and Planning Act are, as yet, still not implemented. As a result, the 2015 statement should carry limited weight with the planning inspector. There has since been successful adoption of several local plans that go well beyond the supposed limit of a 19% reduction on Part L 2013 (London 35%; Reading 35%; Milton Keynes 39%). London (among others) also requires other standards relating to 'construction, internal layout or performance' such as the Home Quality Mark or BREEAM, despite the 2015 ministerial statement. Developers in these locations have for many years proven able to consistently comply with these higher standards.

The 'interim uplift' to Part L of building regulations in force since June 2022 (see 'Future Homes Standard consultation response') now makes the 2015 Ministerial Statement obsolete, because the new Part L already delivers a carbon saving greater than the supposed 19% limit. Relatedly, a recent planning inspectorate appeal decision expressed the view that the 2015 Ministerial Statement is 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 several recent successfully adopted plans that further diverge from the WMS2015. Bath & North East Somerset Council, Cornwall Council and Central Lincolnshire Council recently adopted ground-breaking new housing policies that require an on-site net zero energy balance and specific absolute targets for energy efficiency. These plans were supported by evidence of feasibility and viability. The Inspectors' examination reports considered the 2015 WMS and found it no longer relevant. Bath also received a letter from Government reaffirming local plans' power to exceed Building Regulations standards. Correspondence with Bath indicates no drop in housing applications in 2023 (with the policy) compared to 2022 – in fact, the number was higher in 2023

Legal advice [lvi] **in the 'net zero evidence' suite produced for Essex Design Guide** (to support more effective 'true operational net zero' policies) similarly concludes that "Despite the 2015 WMS remaining extant and despite the failure to update the Planning Practice Guidance, it is clear that the Government does not consider that they constrain [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. In my view, the right approach is that adopted in the Report on the Examination of the Cornwall [DPD]: The 2015 WMS should not be accorded any weight".

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[lii] on the basis that the decision placed too much weight on the WMS2015 which had been overtaken by Part L 2021.

Finally, it is also important to note that **this WMS of 2015 was then overtaken and replaced by a subsequent WMS of 13th December 2023.** That latter WMS is 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" (National Planning Policy Framework).

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 above) had used alternative metrics that are 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 unduly quickly if written only for a 'specified version of SAP' to placate the WMS. The HEM recently underwent consultation alongside the FHS consultation – therefore 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 could not currently be robustly assured that these would be feasible or their cost uplifts assessed, 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 constraining on how policy is expressed and implemented, the WMS sets a tone that is generally discouraging (albeit not prohibitive) towards any local policy that goes beyond "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 in local plan consultations and examination. However, the WMS does not actually prohibit the use of 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 might be possible to diverge from the WMS' stipulations if a strong case can be made that following the WMS would prevent the local authority from fulfilling its legal obligation to 'contribute to the mitigation of climate change' imposed by the Planning & Compulsory Purchase Act. This argument could be further strengthened 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, too, should hold far more material weight than the WMS, as the NPPF undergoes extensive public consultation before adoption – whereas the WMS2023 was released without any consultation or democratic process. There may also be other formal statements of national policy (e.g. around energy efficiency targets) whose achievement the WMS2023 would inhibit.

Government has not indicated that there was any assessment of how the WMS would affect the ability to fulfil those climate mandates, nor advised which should take priority where they are in conflict.

The most robust evidence for this argument is energy and cost modelling to demonstrate the difference that would occur as a result of following the WMS stipulations as opposed to using the more accurate energy metrics. 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)
- 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 may also be relevant to any other local plan objectives about the affordability of home running costs, as opposed to the up-front price of buying or renting a home.

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, both in written form and verbally, 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 pressure to comply with the WMS.

Regarding the WMS' effect on local plans' powers, we note a recent High Court decision[i] (February 2024) overturned a planning inspector's decision based on a *different* WMS. The decision confirmed that the 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 therefore difficult to predict how this would be interpreted by a planning inspector or the court, as

there would appear to be something akin to a 'circular reference' in that the Planning and Energy Act could be interpreted 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'.

However, we note that legal challenges are underway against the WMS2023. A non-profit and local authority have won permission from High Court[ii] to hear their case that the WMS2023 is an unlawful overreach of Government power. Similarly, the Secretary of State had to defend itself in pre-action legal correspondence against a similar case raised in a pre-action letter by a coalition of local authorities and 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 Michael Gove 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
    - Support this 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 over a certain threshold so as 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.

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 - 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).

Written Ministerial Statement on brownfield development, February 2023

A statement was made by Michael Gove on 19th February 2024[v] which 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[vi].

This Statement indicates the 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[vii], 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 linked above also notes that the Government is 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 from commercial to housing.

Future Homes Standard Consultation Response (2021)

This document 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)

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

In December 2023, Government commenced a new round of consultation on the standard that is to be adopted for new homes' energy and carbon from 2025. As this is a consultation only, looking at multiple options for future regulation, its contents presumably do not yet constitute a formal statement of national policy. This consultation ran until 6th March 2024, therefore it is unlikely that Government will digest the responses and release its response (which would constitute a national policy statement) in time for it to be considered within the present scope of net zero carbon local plan support work for Sandwell.

However, we here summarise the content of the current consultation to inform Sandwell of the potential future national policy direction that could be implied. This could further strengthen the evidence of need for local policy, because the current approaches described in the FHS consultation do not meet the standards needed for the national carbon budgets as described previously.

This new consultation puts forward two options that Government may adopt as the Future Homes Standard, both of which are significantly weaker than the previously drafted standard that had been described in 2021. Essentially, these are the weakest two options from the range of six 'Contender Specifications' that had been devised[ii] by the Future Homes Hub (a collaboration involving major developers along with various industry professional bodies and central government observers).

The two options now on the table are shown in Table 3. 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.

Part L 2021 (today's standard)	FHS (as previously indicated in 2021)	FHS (2023 consultation) Option 1	FHS (2023 consultation) Option 2
Fabric: [see Table 3]	Fabric: [see Table 3]	Fabric: All U-values identical to Part L 2021. Small improvement to airtightness.	Fabric: No changes therefore no improvement on Part L 2021.
Heat: Gas boiler.	Heat: Air-source heat pump.	Heat: Air-source heat pump and wastewater heat recovery	Heat: 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 2] • Heat bill/year: £640 • DFEE: 19.3 – 55.9 kWh /m^2 /year	Results: [Carbon - see Table 2] • Heat bill/year: Unknown • DFEE: 13.5 – 51 kWh/m^2/year	Results: • Carbon emissions in semi-detached home: 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: • Carbon emissions in semi-detached home: Not given. • Heat bill/year: £1,220 • DFEE: Identical to Part L 2021.

Table 3: Future Homes Standard options consultation 2023-24 , compared to current standard and previously indicated FHS

The Levelling up and Regeneration Act 2023 *(LURA)*

This Act received Royal Assent in late October 2023. It will affect the planning system in a variety of ways, the most relevant of which for carbon are:

- The Act reiterates the 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'.
- The Act as passed in 2023 does not appear to directly end the use of Section 106 or the Community Infrastructure Levy. However, Schedule 12 (Part 1) grants powers to 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)."
- Therefore it appears that until the Secretary of State creates the new Infrastructure Levy Regulations which may change how S106 is permitted to be used, we will not know whether S106 will still be usable for the purpose of raising carbon offsetting funds, or for any other purposes related to reducing the carbon emissions impact of development.
- **New 'national development management policies' (NDMP)** with which local plan policies must not be inconsistent. The Act 2023 does not confirm the content of the DM policies. It only states that (Chapter 2, point 94):
- "A "national development management policy" is a policy (however expressed) of the Secretary of State in relation to the development or use of land in England, or any part of England, which the Secretary of State by direction designates as a national development management policy"
- 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".
- A previous consultation suggested that an NDMP for carbon measurement and reduction could be set. Carbon is not mentioned at all in the Act text as passed, so we cannot determine yet whether this could affect the ability of LPAs to set their own standards on carbon reduction and energy efficiency in new buildings.
- **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.
- The Act as passed in 2023 (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'".
    - 'Appropriate authority' is defined as the Secretary of State and/or a devolved authority.
    - "'Environmental protection' means … protection of the natural environment … from the effects of human activity" – and this definition, along with the definition of 'natural environment, mentions chalk streams specifically.
    - 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 logically be implied to include the climate – as this is a natural cycle or process.
    - However: Neither climate nor carbon is specifically mentioned anywhere in Part 6. Therefore it is unlikely that the Act's 'Environmental Outcomes' will affect the way the local plan can choose to pursue climate mitigation.

What is Sandwell's current approach, and how have other existing and emerging local plans used those powers?

The context of Sandwell's Local Plan

The 2021 Census estimates that Sandwell has 341,900 residents, a rise of 11.0% since 2011. This compares with a rise of 6.3% in England and Wales. The borough's population is predicted to grow at a faster rate than both the population of the West Midlands and the national average and is forecast to increase by 30,000 people between 2016 and 2030.

Across Sandwell, 80.8% of households lived in a house or bungalow, 19.1% lived in a flat, maisonette or apartment at the time of the 2021 Census. This compares with 77.9% and 21.7% respectively in England & Wales. Of which 21.0% of Sandwell's households rent their accommodation from the Local Authority, compared with 8.3% in England & Wales

The Indices of Multiple Deprivation (IMD) in 2019 shows Sandwell's average deprivation score ranked it as the 12th most deprived local authority in England, out of a total of 3174 and this position is declining from previous studies. Sandwell was 13th most deprived local authority in 2015. Overall, 60% of Sandwell's LSOAs fall within the worst 20% nationally, and 97% within the worst 60% nationally, clearly displaying the high levels of deprivation prevalent in large parts of Sandwell.

Sandwell has many growing and productive businesses and a higher-than-average proportion of its businesses are small, but residents are not always able to take up opportunities related to those employment and economic activities. Sandwell also has a limited amount of the type of high-quality land needed to enable businesses to expand and grow in the borough's industrial core.

The latest UK local authority emissions estimates indicate that Sandwell has lower per capita carbon dioxide (CO2) emissions compared to the West Midlands and the national average (see table below – source DBEIS 2022 statistics).

	Total CO_2 emissions estimates (kt CO_2)	Per Capita CO_2 emissions (t CO_2)
Sandwell	1259.1	3.8
West Midlands	26,314.5	4.4
National Total	305,992.7	4.6

Figure 12: per capita CO2 emissions per person.

The following table details the annual total electricity consumption, and installed capacity and generation of renewable energy sources from 2014-2021 within Sandwell.

Calendar year	Total electricity consumption (GWh)	Installed renewable energy capacity (MW)	Renewable energy generation (MWh)*
2014	1,362	8.9	10,286
2015	1,338	12.3	17,861
2016	1,268	13.7	12,442
2017	1,303	35.1	13,573
2018	1,284	35.3	18,390
2019	1,245	36.7	10,834
2020	1,173	36.8	11,332
2021	1,179	39.6	19,023

Figure 13: Capacity of renewable energy installed in Sandwell 2014-2021

The capacity of installed renewable energy sources continues to increase year-on-year. Almost all the renewable energy generated in the borough is from solar PVs and municipal solid waste. These sources generated 10,190MWh and 8,834MWh in 2021 respectively.

Other relevant policies or strategies within SMBC

SMBC belongs to the West Midlands Combined Authority (WMCA) a strategic alliance of 18 councils working together to action change across the region, overseen by the Mayor of the WMCA Richard Parker (formally Andy Street).

This devolved form of governance grants powers to the WMCA to take a strategic lead in policy making in certain areas (including climate change) and also for the management of funds allocated from central government for regional initiatives including: economic development, transport, regeneration, education and training and retrofitting.

In regard to climate change, the WMCA declared a climate emergency in 2019 and set about the Five Year Plan with the target of reaching net zero carbon emissions by 2041. The Five Year plan sets goals for:

- Retrofitting 1.1 million homes to improve energy efficiency and replacing fossil fuel boilers with heat pumps.
- Generate 830 MWp of rooftop solar PV generation
- Retrofit 73,400 commercial buildings to improve energy efficiency and replacing fossil fuel boilers
- Generate 705 MWp of rooftop solar PV generation

Sandwell's adopted Local Plan

The adopted Local Plan covering Sandwell Metropolitan Borough is the Black Country Core Strategy (adopted in 2011). The policies relating to the mitigation of, and adaptation to climate change is listed and summarised below:

- ENV3 Design quality; required dwellings meet Code for Sustainable Homes Level 3 or above and for non-residential to achieve BREEAM 'very good'.
- ENV5 Flood Risk, Sustainable Drainage Systems and Urban Heat Island; outlined the need for a sequential and exception test for the location of developments, and outlines SuDs principles and mitigation to reducing the effect of urban heat islands.
- ENV7 Renewable energy; provides support of the development of renewable energy resources and sets the requirement for major developments to provide 10% of the residual energy demand through renewable or low carbon energy generation on-site of using off-site sources. Flexibility on delivering on the requirement is left as reducing the % target or a commuted cash in lieu sum.
- WM5 Resource management and new development; outlines that new development should reduce waste and maximise the use of materials with low environmental impacts.

Sandwell's emerging Local Plan (Reg 18) policies

The policies contained within the Reg18 Local Plan in relation to the mitigation of, and adaptation to climate change is listed and summarised below:

- SCC1 Increasing efficiency and resilience; the policy focused on sustainable design principles including orientation, fabric measures, green and blue infrastructure including sustainable drainage and circular economy principles on material use.
- SCC2 Energy infrastructure; require for major schemes to maximise opportunities for decentralised energy.
- SCC3 Manging heat risk; required consideration to minimising heat gain and urban heat islands through design and sets out the cooling hierarchy.
- SCC4 Flood risk; sets out the sequential and exception tests for the location of developments alongside flood mitigation
- SCC5 Sustainable drainage and surface water management; requires all developments to employs SuDS and set limits to reduce the rate of runoff.
- SCC6: Renewable and low carbon energy and BREEAM standards; supported low or zero carbon energy generation and set the requirement for minor developments to provide 10% of the estimated energy demand through renewable or low carbon energy generation, and for major developments the requirement was for 20% of estimated energy demand. The policy also set BREEAM standards for non-residential developments, with BREEAM 'very good' required up to 2029 and 'excellent' thereafter.

Sandwell's Local Plan Reg 18 Consultation

In response to the suite of policies contained within the Regulation 18 draft, the following matters were raised through the public consultation:

- Several respondents noted that the policies need to better reflect the impact improvements to energy efficiency, and the generation of low carbon heat or power can have on designated assets, and the historic character of the district (largely canals).
- One respondent noted that policy CC1 would benefit from being more prescriptive and in terms of the assessment criteria.
- Respondents from the housebuilder sector noted that they would prefer to see that national standards are followed (those laid out in Building Regulation), rather than individual targets set at a local level. The WMS of December 2023 was also referenced. The trust of the comments outlined that policy that goes beyond current or planning Building Regulations is currently unjustified.
- A respondent noted the choice over district heating technologies and the cost of implementation, noting that the large majority currently run on gas (fossil fuel), and those will need to be transitioned to be low carbon, as such connection to an existing source is not without its difficulties, nor does it deliver the benefit of lowering carbon which is the overarching reason for the policy. In addition, incorporating new low carbon district heating or energy generation is current cost prohibitive.
- In respect of district heating, one respondent also noted the relationship to the price the consumer will pay for energy, and it not being as competitive or cheap as the consumer marketplace.
- One respondent commented on the threshold for incorporating district heating (major threshold), and that no further thresholds were suggested in the policy, which may have a more proportionate response to incorporating such technologies. In addition, policy SCC1 is ambiguous in its language over 'opportunity for decentralised energy provision'.
- Policy SCC2 is not clear on expectations for developers and is not clear on what the threshold is for development.
- The Canals and River Trust outlined that canals play an important role in surface water discharge (and are higher up the drainage hierarchy than sewers) but that specific measures need to be considered: pollution control, controlling discharge rate and suitable mitigation measures for system failure.
- Respondents' comments that the 10 and 20% included in policy SSC6 (energy generation) was not evidenced, nor justified from a viability perspective.
- One housebuilder noted that the 10 and 20% requirement for renewable energy generation should be applied flexibly and not mandated as other sources, e.g. large scale renewable provision off site, and the decarbonisation of the grid has not been taken into account.
- There was support for the inclusion in BREEAM very good and rising to excellent through the local plan period.

Emerging Sandwell Local Plan (Reg 19) policies to date

Emerging Sandwell policies signify a starting point for policy improvements to be made. As detailed above, there has been a change in policies within the Climate Change Chapter since Regulation 18, and draft policies emerging under the Regulation 19 consultation draft are considered below.

Policy Ref	Policy wording	Comments	The scope to amend
Suite of climate policies (SCC1 -5)		In general, the structure of the climate change policies does not follow a logical sequence. For example, the flood risk policies disrupt the flow of policies concerning building standards and energy infrastructure. Thresholds and requirements for residential and non-residential developments could be clearer within the policy – this was noted in some comments received at Reg 18. .	Recommend seeking to employ a hierarchical approach to climate change policy structure: 1. Energy efficiency and minimising energy demand through siting, orientation and design. Incorporates policies SCC2*. 2. Low carbon or zero carbon energy infrastructure. Incorporates policies SCC1 & SCC5 3. Offsetting (if this can be secured) 4. Flooding 5. Sustainable drainage *Alternatively, policy SCC2 (overheating) could remain a standalone policy that would mutually cross-refer to the energy efficiency policy and the LZC energy policy. If so, the standalone overheating policy would appear after the offsetting policy in the suite outlined above
SCC1 Energy Infrastructure	Decentralised energy networks and district heating provision 1. Any development including ten homes or more, or non-residential floorspace of 1,000m2 or more must include *opportunities for decentralised energy provision within the site,* unless it can be demonstrated that the development is not suitable, feasible or viable for district heat or decentralised energy networks. 2. Where there is existing decentralised energy provision available close to the site, the development will be expected to link into it, or should be designed to accommodate a subsequent connection if a source has not yet become operational. 3. Where developers can demonstrate to the satisfaction of the Council that a link to an existing or committed decentralised energy source nearby is not viable, the local authority will support the provision of alternative onsite carbon elimination measures that can be incorporated into the scheme (Policy SCC5). 4. Proposals intended to deliver decentralised networks and related infrastructure will need to prevent or minimise any adverse impacts on the historic environment by ensuring that they protect the significance of heritage assets, including their setting. Onsite energy provision	The wording of the policy is unclear as refers to the 'opportunity' for decentralised energy, rather than stating that this is required. The use of more determinative language will help applicants understand what is required by the policy. As noted in some of the regulation 18 comments, existing decentralised systems may run from fossil fuel and such connection to these may not be desirable. The trust of the policy should secure energy or heat from low or zero carbon sources. There would be benefits of incorporating the use of decentralised energy systems with the % of energy demand to be provided by renewables. There should also be reference to how or where applicants would demonstrate assessment of decentralised system (criteria a-k). Suggest clarifying this by including reference to an Energy Statement.	The thrust of the policy, i.e. overarching aim could be to eliminate fossil fuel-based sources of power and heat, and such focus on the on-site generation of low carbon energy or heat or employ decentralised networks from existing sources of heat or power (providing these are low carbon and didn't result in greater emissions). This drives applicants to considering low carbon alternatives that would deliver a carbon reduction, over connecting a system that uses fossil fuels, or has an unclear pathway to decarbonising. Ensure thresholds for policy are clear. Suggest requirement for on-site renewables is at a major scale, with a super major scale (100 + homes, or 10,00sqm non-resi) needing to seek prior advice on energy infrastructure required. Clarify incorporating low or zero carbon sources of decentralised energy

Policy Ref	Policy wording	Comments	The scope to amend
	5. Developers should engage with relevant energy companies and bodies at an early stage in the development process to establish the likely future energy and infrastructure requirements arising from large-scale development proposals including 100 homes or more, or non-residential floorspace of 10,000m2 or more. Proposals for addressing energy provision on such sites should be developed and agreed between the local planning authority and developer(s) to establish the lowest lifetime carbon energy provision. 6. Information to support the preferred solution(s) should identify and address: a) current and future major sources of demand for heat (e.g., sites such as industrial / manufacturing sites, universities, large-scale sporting or leisure development, hospitals and social housing); b) demands for heat from existing buildings that can be connected to future phases of a heat network; c) major heat supply plant; d) possible opportunities to utilise energy from waste or waste heat from industrial processes; e) opportunities for heat networks; f) opportunities for private wire electricity supply; g) possible land for energy centres and / or energy storage; h) possible heating and cooling network routes; i) infrastructure and land requirements for electricity and gas supplies; j) feasibility of built-in renewable energy generation (Policy SCC5); and k) implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector. Heating / hot water systems 7. Heat sources for a district heating system should be chosen to minimise likely emissions and to make best use of any local decentralised networks, in preference to other solutions. 8. Where a district heating system is provided, development proposals must provide evidence to show that NOx emissions related to energy generation will be equivalent to or lower than those of an ultra-low NOx104 gas boiler.	There is also thought to the development types under criteria a to include hotels as well. Make it clear in what cases the Council would consider a decentralised energy system to be unviable or unfeasible. There may be a need to define the term “decentralised energy provision”.	Clarify where the applicant should typically find information about existing or planned decentralised energy networks in their area. (This could be in supporting text rather than the policy itself).
SCC2 Managing Heat Risk	1. Development proposals should aim to *minimise both internal heat gain* and the impacts of urban heat islands by using appropriate design, layout, orientation and materials to achieve a healthy and sustainable environment for new occupiers. 2. Opportunities to benefit from the proximity of existing heat sinks such as canals and other bodies of water should be explored and incorporated into proposals where available. 3. Development proposals will be expected to demonstrate how their potential for overheating and reliance on artificial cooling systems will be reduced, in accordance with the following cooling hierarchy: a) minimise internal heat generation through energy-efficient design; b) reduce the amount of heat entering a building through orientation, shading, albedo110, fenestration, insulation and the provision of green roofs and walls (Policies SDS5 and SDM1); c) manage heat within a building through exposed internal thermal mass111 and high ceilings; d) provide passive ventilation; e) provide mechanical ventilation; f) provide active cooling systems112.	The policy would be more successful if it focused on the minimisation of heat demand through energy efficiency measures, and then go on to introduce overheating and the cooling hierarchy. Overheating in homes can also be covered by the use of CIBSE TM59 as part of Building Regs Part O assessment. For non-residential development there is no Building Regulations requirement on overheating at present, but the equivalent methodology is CIBSE TM52 which could also be required in planning policy.	Recommend this policy focuses on the 1st step of the energy hierarchy and reducing the demand for energy by: - fabric first approach – increase energy efficiency through building fabric - employing sustainable design principles including orientation, optimising solar gain and with reference to the cooling hierarchy for overheating - green and blue infrastructure to mitigate for urban heat islands (inc canals) Regarding internal heat gains and external heat gains entering the building from outside, recommend using the word “optimise” rather than “minimise/reduce”, because these internal and external gains are also part of the solution to minimise space heating

Policy Ref	Policy wording	Comments	The scope to amend
			demand (improve energy efficiency) which is vital for the creation of a net zero carbon building. Scope to include specific metric of energy efficiency performance (e.g % reduction on Building regs or set SHD/EUI) TBC based on discussions on viability. Recommend that this policy also incorporates BREEAM standards, and CIBSE TM52 overheating mitigation method, for non-resi buildings.
SCC3 Flood Risk	1. Sandwell Council will seek to minimise the probability and consequences of flooding from all sources by adopting a strong risk-based approach to site allocations and the granting of planning permission, in line with the National Planning Policy Framework. 2. A Sequential Test will: a) be applied to all developments to ensure that development takes place in areas with the lowest flood risk, in line with NPPF requirements; b) take account of the most up-to-date information available on river flooding and all other sources of flooding, making use of the information provided in the 2020 Strategic Flood Risk Assessment (SFRA) updated in 2021 and any future updates; and c) consider the impact of climate change over the lifetime of that development. 3. Developers should apply the Sequential Test to all development sites, unless the proposal is for: a) a strategic allocation, and the test has already been carried out by the LPA; or b) a change of use (except to a more vulnerable use); or c) a minor development (householder development, small non-residential extensions with a footprint of less than 250m2); or d) a development in Flood Zone 1, unless there are other flooding issues in the vicinity of the development (i.e., surface water, ground water, sewer flooding). The SFRA can be used to identify where there are flooding issues from sources others than rivers. 4. Developers should provide evidence to the Council that they have considered all reasonably available alternative sites that are at a lower risk of flooding prior to determining the suitability of the chosen site for the proposed development type, in relation to all sources of flood risk on it. 5. For all developments the vulnerability of the development type to flooding should be assessed using the most up-to-date flood zone information in accordance with the NPPF, as set out below: a) Flood Zone 3 i. Where the site is in Flood Zone 3b (Functional Floodplain), all development other than essential infrastructure (subject to the Exception Test) will be refused (including extensions and intensification of use and changes of use) and opportunities to relocate development out of the floodplain should be sought; ii. Where the site is in Flood Zone 3a (High Probability), new homes can only be permitted subject to the Exception Test. b) Flood Zone 2 i. Where the site is in Flood Zone 2 (Medium Probability), most development can be permitted, subject to a site-specific flood risk assessment;	Reference to 2020 Strategic Flood Risk is useful – retain at start pf the policy as overarching requirement of the policy. E.g. Applications will be required to demonstrate the location of the site in respect of 2020 Strategic Flood Risk updated in 2021. Rather than outlining where an FRA isn't required, we would recommend setting the threshold clearly at the start to when an FRA is required (follow NPPF guidelines) It may also be prudent to refer to NPPF provisions, rather than repeating them in the event these changes, and the policy then becomes outdated.	Considering condensing policy and not duplicating national policy. Move to end of climate change chapter.

Policy Ref	Policy wording	Comments	The scope to amend
	ii. Highly vulnerable developments, such as caravans, mobile homes and park homes with permanent residential use can be permitted, subject to the Exception Test; c) Flood Zone 1 i. Where the site is in Flood Zone 1 (Low Probability), the information in the 2020 SFRA should be used to assess if a development is at risk from other sources of flooding and / or if there is an increased risk of flooding in the future due to climate change. If this site is shown to be at risk, a site-specific flood risk assessment should accompany a planning application. 6. To pass the Exception Test, developments will need to: a) demonstrate that wider sustainability benefits to the community outweigh flood risk. Matters such as biodiversity, green infrastructure, historic environment, climate change adaptation, flood risk, green energy, pollution, health and transport should be considered; b) prove that the development will be safe from flooding for its lifetime, taking account of the vulnerability of its users; and c) prove that the development can be achieved without increasing flood risk elsewhere, and, where possible, will result in a reduced flood risk overall. 7. All new developments in the following locations should be accompanied by a flood risk assessment and surface water drainage strategy that sets out how the development will provide a betterment in flood risk terms i.e., help to reduce flood risk both on and off site: a) where any part of the site is within Flood Zone 2 or Flood Zone 3; b) where the site is greater than one hectare and is within Flood Zone 1; c) where the site is a minerals or waste development; d) where the site is within five metres of an ordinary watercourse; e) where the site is within 20m of a known flooding hotspot; or f) where the site is within the 1 in 100-year flood extent based on the Risk of Flooding from Surface Water Map. 8. Surface water drainage strategies are also required for all major developments. These should consider all sources of flooding to ensure that future development is resilient to flood risk and does not increase flood risk elsewhere. Groundwater Source Protection Zones 9. No development will be permitted within a groundwater Source Protection Zone that would physically disturb an aquifer. A risk assessment demonstrating there would be no adverse effect on water resources will be required prior to the grant of planning permission. Watercourses and flood mitigation 10. Developments should, where possible naturalise urban watercourses (by reinstating a natural, sinuous river channel and restoring the functional floodplain) and open up underground culverts, to provide biodiversity net gain as well as amenity improvements; reference should be made to the latest River Basin Management Plans119. 11. Developers should set out how their mitigation designs will ensure that there is no net increase to fluvial flood risk downstream and where practicable how the development could help mitigate against downstream fluvial flood risk.		

Policy Ref	Policy wording	Comments	The scope to amend
	12. Development should not take place over culverted watercourses and a suitable easement should be provided from the outside edge of the culvert. 13. There should be no built development within five metres of an ordinary watercourse and within ten metres of the top of the bank of a main river unless a different appropriate width is agreed by either the Environment Agency or Lead Local Flood Authority. This is to enable the preservation of the watercourse corridor, wildlife habitat, flood flow conveyance and future watercourse maintenance or improvement. 14. Where there is a known or suspected culverted watercourse either on or immediately downstream of a site, where the SFRA highlights there may be a risk of flooding, developers should: a) confirm the location and presence of a watercourse (or otherwise) through ground-truthing strategic datasets and undertaking an assessment of the culvert extent and condition; b) confirm by survey, modelling and mapping, the flood extents of the watercourse(s), as many of the flood outlines associated with such watercourses have been carried out at a broad scale and may not take into account specific local features, such as culverts, bridges and detailed topographical survey; and c) design the development to accommodate the floodplain of the watercourse and mitigate against flooding to properties on the site. This should include a consideration of residual flood risk e.g., if a culvert were to block downstream. 15. All developments should seek to provide wider betterment by demonstrating in site-specific flood risk assessments and surface water drainage strategies (where required) what measures can be put in place to contribute to a reduction in overall flood risk downstream. This may be by: a) provision of additional storage on site e.g., through oversized SuDS, natural flood management techniques, green infrastructure and green-blue corridors; and / or b) by providing a partnership funding contribution towards wider community schemes (both within and beyond the Black Country, in shared catchments with Southern Staffordshire and Birmingham). 16. Consultation on site-specific requirements should be undertaken with the Council, the Environment Agency and Severn Trent Water (where this is a sewer flooding issue) at the earliest opportunity. Where necessary, discussions should also be held with other stakeholders such as the Canal and River Trust.		
SCC4 Sustainable Drainage and surface water	1. Major developments in Sandwell will be expected to incorporate Sustainable Drainage Systems (SuDS) unless clear and robust evidence can be provided to demonstrate why this would be inappropriate. 2. Other development schemes will be strongly encouraged to incorporate sustainable drainage / natural flood management techniques wherever possible and deliverable, and the provision of SuDS on such sites will be viewed positively when a decision is made on the application.		Considering condensing policy and not creating duplication with SCC2. Move to end of climate change chapter.

Policy Ref	Policy wording	Comments	The scope to amend
	3. Development proposals should provide details of adoption, ongoing maintenance and management of SuDS. 4. SuDS shall be designed in line with the local requirements for SUDS120. Preference will be given to systems that also contribute to the conservation and enhancement of biodiversity and green infrastructure in the wider area. 5. For all major developments, surface water flows must be reduced back to equivalent greenfield rates. If greenfield runoff rates are not considered to be feasible for viability or other reasons, the developer must submit evidence demonstrating what the constraints are and how the development will accommodate runoff rates that are as close as possible to greenfield rates. 6. For all minor developments, a minimum reduction of 30% over pre-development runoff rates will be required. Under no circumstances will post-development runoff rates that are greater than pre-development runoff rates be permitted. Surface water run-off should be managed as close to its source as possible. 7. Surface water drainage strategies are required for all major developments, regardless of their size and the flood zone and catchment they are in to meet the requirements of the Lead Local Flood Authority. These should consider all sources of flooding to ensure that future development is resilient to flood risk and does not increase flood risk elsewhere and should look to provide wider betterment. 8. A hydrogeological risk assessment is required where infiltration SuDS is proposed for anything other than clean roof drainage in a Source Protection Zone 1121.		
SCC5 Renewable and Low carbon energy and BREEAM standards	Renewable and Low Carbon Energy generation 1. Proposals involving the development of renewable or low carbon energy sources will be permitted where the proposal: a) accords with local and national guidance; b) would not significantly harm the natural or built environment; c) maintains and safeguards the historic environment and heritage assets, including their setting and in accordance with Policies SHE1 - SHE4; and / or d) will not have a significant adverse effect on the amenities of those living or working nearby. Low carbon and renewable requirements for development 2. Small developments creating between one and nine homes or non-residential floorspace of less than 1,000m2 gross (whether new build or conversion) must incorporate energy generated from renewable or low carbon sources sufficient to off-set at least 10% of the estimated residual energy demand124 of the development on completion. 3. Major developments creating ten or more homes or non-residential floorspace of 1,000m2 gross or more (whether new build or conversion) must incorporate the generation of energy from renewable or low carbon sources sufficient to off-set at least 20% of the estimated residual energy demand of the development on completion. 4. A variety of renewable and low-carbon energy sources and generation methods should be assessed and costed, including on-site and off-site sources where appropriate and the use of district heat and / or decentralised energy networks where available or proposed. An energy assessment must be submitted with the planning application to demonstrate that these requirements have been met.	The thresholds are clearer in this policy. Point (1) might benefit from being subject to a threshold – e.g. is this policy mainly aimed at large standalone renewable energy development, or is the intention that even a single home with some solar panels on the roof would be expected to provide detailed assessment against points a/b/c/d? 10% and 20% based on energy calculated as part of 2021 building regulations building which is considered to be viable based on The Viability and Delivery Study. The feasibility of achieving these %'s would increase with a more fabric efficient building, see recommendations on SCC2. "Residual energy demand" will need to be clarified as to whether it refers to *regulated* energy only (i.e. the energy uses that are regulated by Building Regs Part L) or *total* energy use. For climate effectiveness we would advise the latter, so long as this is what the feasibility & viability study mentioned above has shown. It has been shown feasible (dependant on Sandwell viability) for the total energy demand of a FHS to be	Recommend this policy focuses on the 2nd step of the energy hierarchy in incorporating low and zero carbon technologies and then generation of zero carbon energy on-site. We anticipate that the % to be provided on-site from renewables be dependent on discussions on viability. Amend policy wording to clarify the scope of the energy use that is covered by the requirement for 20% renewable provision in residential (point 3). Advise avoiding repetition/overlap between policies (e.g. points 4-5 currently overlap with SCC1 and SCC2) in order to provide conceptual clarity. Some of the detail could perhaps become supporting text rather than policy text (e.g. point 5 on the potential of canals as a heating/cooling source; this could be supporting text to either a decentralised energy policy, a combined renewable/low-carbon and decentralised energy policy, or an overheating policy – or even an SPD/SPG if one is expected to be developed).

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5. The potential for inland waterways to promote low carbon technologies is recognised; in appropriate locations adjacent to Sandwell's canal network, proposals to heat and cool new properties using water source heat pumps will be welcomed and supported.

6. The renewable energy target will only be reduced if it can be demonstrated that achievement of the target would:

a) make the proposal unviable through submission of an independently assessed financial viability appraisal; or
b) would not be feasible due to practical constraints.

BREEAM Standards

7. All new build non-residential developments, student housing and care homes of 1,000 sqm gross or more should achieve the following standards of BREEAM New Construction certification, including full credits for category Wat 01 (water efficiency):

<table>
<tr><th>Size</th><th>Standard</th><th>Year</th></tr>
<tr><td rowspan="2">1,000 - 5,000m^2 gross</td><td>BREEAM Very Good</td><td>up to 2029*</td></tr>
<tr><td>BREEAM Excellent</td><td>2029 - 2039*</td></tr>
<tr><td>>5,000m^2 gross</td><td>BREEAM Excellent</td><td></td></tr>
</table>
8. BREEAM requirements may be varied if it can be demonstrated that achievement of the standard would make the proposal unviable, through submission of an independently assessed financial viability appraisal.
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provided on-site through solar PV – therefore can the policy be more ambitious within the limits of feasibility and viability.

Consider where BREEAM requirements sit – may be best to be relocated to SCC2.

Points (4) and (5) overlap significantly with separate policy SCC1 (Energy Infrastructure). Point (4) also overlaps with policy SCC2 (Managing Heat Risk).
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Reductions on the building regulations baseline carbon emissions

Using powers granted by the Planning and Energy Act, most 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 the previous version of Part L of Building Regulations (Part L 2013) as Part L 2021 is recent and not used as the baseline in most existing local plans.

This percentage reduction in on-site carbon emissions usually ranges from 19% to 40%. Some local plans 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 example plans have sought a 19% reduction, because this reflected the national Code for Sustainable Homes which was previously seen as best practice – and because of a 2015 Written Ministerial Statement previously mentioned, 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[lvii]. Several other adopted local plans have similarly adopted similar requirements (see examples box).

As of 2022, the building regulations Part L has been updated, resulting in a ~31% reduction in the carbon emissions rate compared to Part L 2013. And from 2025, it will be updated again to a 75% reduction. It is important to note that these reduction values exceed the 19% reduction limit referred to in the 2015 WMS, which clarifies the invalidity of the statement.

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**, generally accepted best practice across the 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 is 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 applied the hierarchy before 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 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.

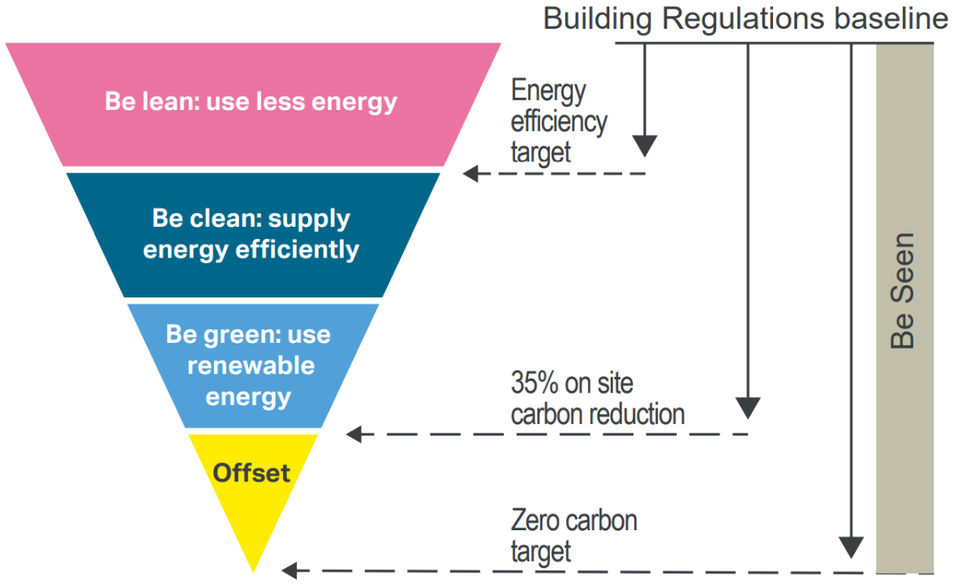

Figure 14: New London Plan (2021) Diagram of the energy hierarchy to reach 35% on-site reduction compared to baseline carbon emissions rate set by Building Regulations Part L 2013.

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.

Reducing energy demand

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[lviii]. 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 *energy efficiency* 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, 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 percentages were set according to best practices already being achieved in local proposals at the time, which may now be considered 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 certain minimum standard of insulation, glazing and airtightness. The TFEE therefore 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 demonstrate effort at this stage of energy hierarchy. The requirement could be a % improvement on the Part L 2021 TFEE, or could be set as an absolute kWh/m2/year figure that the proposed home must achieve. The target may need to be updated when Part L 2025 (Future Homes Standard) enters force.

Potential targets for fabric energy efficiency	Justification [CAVEAT: SEE POST-HOC PREFACE TO THIS REPORT]
Homes: 10% improvement on the Target Fabric Energy Efficiency Rate set by Part L 2021 using SAP10.2 Non-residential: Energy efficiency measures (fabric and supply) to deliver 19% reduction in carbon emissions compared to Part L 2013 or equivalent vs Part L 2021.	As of June 2022, the new national baseline is Part L 2021. In 2025 it will be replaced again by the Future Homes Standard, which has upgrades to the building fabric. This 10% figure represents the approximate difference in fabric (average of all building element U-Values and airtightness) between Part L 2021 and Future Homes Standard 2025. Unfortunately, the Future Buildings Standard specification 2025 for *non-residential* buildings has not yet been released so no equivalent percentage can be calculated at present. Meanwhile, a 19% improvement on Part L 2013 has been demonstrated feasible and viable in Milton Keynes (see case study).
Homes and schools: 15-20kWh/m^2/year Fabric Energy Efficiency using Part L SAP10.2. Additional energy reporting with PHPP or TM54.	Homes: kWh limit shown to be necessary for the UK to stick to its carbon budgets between now and 2050, and reach the net zero goal by 2050. Schools & homes: kWh limit shown to be feasible in emerging example evidence bases (Greater Cambridge & Central Lincolnshire). However, this evidence used different energy modelling methods (PHPP or TM54) because SAP/SBEM are inaccurate at predicting energy usage.

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)**[7]. 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.."

[7] 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.

Efficient energy supply

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

This step generally refers to measures to use heat networks[8] to distribute heat efficiently and cleanly and with minimal losses.

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 or data centres which generate 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
- 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. This is generally no longer seen as a sustainable option because they almost always run 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 that should 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 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.

[8] 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.

Example: New London Plan 2021

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

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.

Renewable and low carbon energy at new buildings

At present, emerging Sandwell's Reg 19 policy includes the provision of 10 % of energy demand in minor developments be provided through renewable energy, and 20% in major developments. This is documented as viable through the Black Country Delivery and Viability Report 2021, which shows that this level of renewable energy provision is already viable across the Black Country local plan area. As such, the principle of requiring renewable energy on-site is established and should be considered viable, depending on the % sought.

The third step of the energy hierarchy is to decarbonise energy supply (see *Figure 14*): 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.

Requirements for renewable or low-carbon energy supply 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'[9]; 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.

At present, emerging Sandwell's Reg 19 policy includes the provision of 10% of energy demand in minor developments be provided through renewable energy, and 20% in major developments – as such applying a 'Merton Rule'. This is documented as viable through the Black Country Delivery and Viability Report 2021, which shows that this level of renewable energy provision is already viable across the Black Country local plan area. As such, the principle of requiring renewable energy on-site is established and should be considered viable, depending on the % sought.

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[lix]. 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.

We would therefore recommend including enough flexibility to accommodate unique site constraints, whilst still seeking an ambitious amount of appropriate onsite LZC technologies in all proposals. There is a growing number of adopted example policies that set specific targets for onsite renewable generation towards net zero carbon target. 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.

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 clarification on where to account for these in an energy statement.

Heat pumps are not automatically zero carbon – they still use mains electricity to run. But they can be a low carbon heating system provided they run at high efficiency (they can deliver about three 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. This becomes feasible if the heat pump is used in combination with improved thermal efficiency and reduced air permeability[10].

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 don't need as many solar panels, resulting in savings in embodied carbon.

Carbon savings from heat pumps are usually treated in planning guidance under the same step of the energy hierarchy as renewables – that is Step 3/'Be Green'. For example, London Plan draft energy guidance[lx] 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.

Counting heat pumps as a Step 3 / 'be green' measure' gives more flexibility in options for buildings to achieve carbon reductions at this stage even if the building is not suitable for solar panels due to shadow or orientation.

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.

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

[10] 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: 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 2020

Policy P9, point 3, requires 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

Setting absolute targets for energy use intensity, space heating and on-site renewable energy generation

There is a growing number of local authorities pursuing the industry-recommended approach to achieving genuine net zero new build development. The approach does not use baselines and % reductions based on previous iterations of Part L, as previously explored, and instead sets threshold limits on energy use. A policy that follows this approach sets three key requirements:

1. Energy use intensity (EUI) – the predicted total amount of regulated and unregulated energy used.
2. Space heating demand – the amount of energy required to heat the building.
3. On-site renewable energy generation – must match total energy to be a net zero building.

Comparison of targets for residential development

Space heating demand (kWh/m²/year)	Energy use intensity (kWh/m²/year)	Target referenced
30	40	Cornwall Climate Emergency DPD
		Bath & North East Somerset Local Plan Partial Update
15-20	35	Central Lincolnshire Local Plan
		Greater Cambridgeshire Draft Local Plan
	n/a	Committee on Climate Change
15	35	London Energy Transformation Initiative
		CIBSE
		Good Homes Alliance

The EUI target includes all energy used by the building, importantly accounting for 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 energy used by the building is the primary aim of the EUI approach, which can then be supplemented to net zero by the renewable energy generation requirement that supplies the energy demand of the building.

Following an energy metric approach ensures more control over the 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, the 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 Cambridgeshire, 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/m²/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.

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.

A difference between standards set between residential and non-residential development may be noted in these examples. 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: 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[1]. 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.

Emerging example: Merton New Local Plan (draft 2022)

In April 2023, the inspectors expressed concerns in the Post-Hearings Letter[lxi] around the viability of policies set out below, particularly for smaller development, that may negatively impact delivery. This relates to potential issues for small housebuilders in that required expertise in energy efficient construction may not be widespread.

The currently proposed draft with main modifications after the inspectors' first comments[lxii,lxiii] sets Policy CC2.3, which includes the following maximum **Energy Use Intensity** targets from Jan 2025 – this is likely to change now following the Post-Hearings Letter:

- Residential and multi-residential – 35 kWh/m^2/year
- Offices, retail, GP surgery, hotels and higher education – 55 kWh/m^2/yr
- Schools – 65 kWh/m^2/yr
- Leisure – 100 kWh/m^2/yr
- Light industrial uses – 110 kWh/m^2/yr

Supporting text paragraph 2.3.18 explains that major developments should calculate these with (CIBSE) TM54, (PHPP) methodology or equivalent. Minor residential schemes are permitted to instead calculate these with Part L SAP. 5-year post occupancy monitoring is also required for major development.

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 another emerging local plan. In contrast, paragraph 2.1.14 notes that typical current Part L EUI is 140/kWh/m^2/yr.

The policy 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[lxiv].

Proposed Policy CN3 (Energy efficiency standards to reduce carbon emissions) requires 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 the 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[lxv])

Policy CC/NZ *will 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 is still in its relatively early stages as of May 2022. It completed its First Proposals/Preferred Options consultation in December 2021, from which issues are being explored. A draft of the local plan itself is expected be released in 2023.

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

Policy EN1 Part B *requires 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)[lxvii]

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 above show that the equivalent Sandwell policies could include 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 overheating risk

In addition to the key energy metrics for these policies, the Sandwell Local Plan 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, it is recommended that this more detailed policy approach requiring CIBSE overheating methods should be utilised.

Overheating and operational energy/carbon should be treated 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.

Carbon offsetting

Carbon offset payments are sometimes set as a Section 106 requirement in order to make a development's unavoidable carbon emissions acceptable through 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 is calculated to emit over a certain number of years. Several key differences arise in how this kind of policy can be applied:

- 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 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 a non-SAP / non-SBEM method 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.

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.

The recommended London 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 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". The equivalent cost of offsetting based on the original £95/tCO_2 is now set at £378/tCO_2 (2023 price) to reflect a decrease in carbon intensity of the grid. 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 survey of 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 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 LPA should factor in a cost to administer the fund and set up a pipeline of projects to be funded.

Energy 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.

It should however be explicitly noted that offsetting in this context, as well as a carbon offset context, **should strictly be a last resort only acceptable in exceptional circumstances**. The risk of offsetting is that it may increase the burden on existing district-wide decarbonisation plans and use up low hanging fruit resources. **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 – can be 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 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* offset price as nationally-averaged costs can produce a price 25% lower than the local cost, as demonstrated above. 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[lxviii] of the actual energy use of a building. SAP and SBEM are compliance tools[lxix], 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[11] 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 be made in the building –for cost-cutting reasons, supply difficulties, or simply because the right person was not on site at the time[lxx].

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[lxxi] 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. Sandwell would need to decide 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

[11] 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.

terms of unconfirmed occupant fit-out, operational hours, occupancy, and other third-party factors. 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[12] are provided:

- Air tightness testing ~£1000 per property
- Thermographic testing[13] ~£400 per property
- U Value testing ~£400 for a dwelling (3 weeks per property)[14]
- Post-occupancy evaluation testing: ~£5000[15]. (if applied to scalable developments >c.50 dwellings, the economy of scale would reduce the cost burden through sample testing only).

[12] Communities and Local Government (2008), Performance Testing of Buildings BD 2535
[13] 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.

[14] 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.
[15] 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[lxxii]:

"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.

Emerging Example: Solihull Draft Local Plan (draft 2021)

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]”

Emerging Example: Merton New Local Plan (draft 2021)

Merton is currently awaiting a response from the Inspector following the submission of additional requested information and documents post-examination. Its proposed draft with main modifications after inspector’s first comments[lxxiii] Policy CC2.3 includes a range of space heat and energy use intensity targets whose compliance must be demonstrated 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.

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

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 sourced from existing buildings. The Committee on Climate Change has shown[lxxiv] (and Government has recognised[lxxv]) 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[lxxvi]. Heat pump rollout in particularly must be vastly accelerated[lxxvii]. 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 carbon and will deliver economic and wellbeing-related benefits in the long term if implemented correctly.

Take-up of solar panels to existing homes dropped steeply[lxxviii] since the closure of the Feed-In Tariff scheme in 2019, as new installations no longer generate income from energy sent to the grid. 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. 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[lxxix]), 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). Nonetheless, the Local Plan can look to encourage low-carbon measures to be integrated into the areas of the building where planning permission is needed, and require that the energy hierarchy is followed for 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 for actively welcoming energy improvements to existing buildings: Milton Keynes Local Plan (adopted 2019) [lxxx]

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 [such as 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 in the Borough, on an individual and area-wide basis. Where appropriate the Council may employ Local Development Orders to support area-wide schemes".

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.

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 do this. Yet they are important examples of how to signal a positive stance by the council towards retrofitting, offering confidence to potential applicants and steering officers to take very seriously the benefits of energy efficiency retrofitting when weighing up its impacts.

Emerging example: Wokingham Draft Local Plan Update 2020

Draft Climate Change Policy SS8 confirms the local 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."

Example: Cornwall Climate Emergency Development Plan Document (adopted)

This emerging plan has been through Regulation 19 consultation, underwent independent examination in Summer 2022[lxxxi], 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).

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

Policy GP/CC *is titled* 'Adapting heritage assets to climate change'.

The proposed policy direction includes

- "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 (e.g. removal of cement render and replacement with breathable options).
- Give consideration to measures that will reduce carbon emissions and assist with adaptation to our changing climate (for example external shading or property level flood protection).
- The plan will also direct residents to further guidance on how to approach works to older homes."

> The 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 therefore "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".
>
> The supporting text emphasises that this is particularly relevant because 20% of homes were built before 1919, and Listed Building Status applies to 1% of homes in Cambridge and 3% of homes in South Cambridgeshire. It also notes that such improvement to existing buildings reduces running costs and also increases the lifespan of the building.
>
> It explains 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 assets".

The Sandwell local plan should ensure that policy is in place to support energy and carbon improvements to existing buildings. Although it may not be possible to strictly set this as requirements, it is important for the local plan to take a stance that supports positive measures to existing buildings.

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 Sandwell because some of materials or products will have been produced here, and all will have been transported within the country or district, 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[lxxxiii], 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[lxxxiv] 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[lxxxv]: 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[lxxxvi]**:** 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, there would be challenges from the development sector consultees and potentially also the inspector. One likely objection is the argument that such a requirement may inhibit the delivery of housing targets.

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[lxxxvii] 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 Sandwell 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 look to setting embodied carbon targets, as 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[lxxxviii] 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.

Further evidence of feasibility of similar performance requirements is found in supporting documents of several pioneering recent and emerging plans. The evidence bases for local plan documents in Greater Cambridge (emerging)[lxxxix], Central Lincolnshire (adopted 2023)[xc] and Cornwall (adopted 2023)[xci] all have studies showing that the 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 will be a far smaller factor in housing delivery compared to the overarching construction labour shortage[xcii] which constrains the whole sector today. As national housing targets are thought to already be too large for the workforce to deliver[xciii], 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.

Note that Aspinall Verdi have currently already applied £6,000 per unit (residential typologies) to achieve FHS from 2025.

Nevertheless, it would be more robust to use more transparently evidenced cost uplift data, specific to Sandwell's policy proposals. The strongest way to assess viability impacts would be to commission a study of up-to-date cost uplifts specific to Sandwell 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[xciv,xcv] (adopted), Essex[xcvi], and a collection of London boroughs[xcvii]. It may be possible to adapt this data for the Sandwell context, if Sandwell 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 Sandwell. 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 new National Planning Policy Framework is leading the Planning Inspectorate to place a greater focus on design quality. A recent analysis[xcviii] of appeals since July 2021 found that inspectors are no longer dismissing poor design as a reason for refusal simply because of a shortfall in housing land supply, and that the likelihood is very low of the developer being awarded costs if their application is refused on design grounds.

The relevant parts of the NPPF 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[16] 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'.

[16] '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.

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