



The New Homes Policy Playbook

Driving sustainability in
new homes –
a resource for local
authorities

VERSION 2.1

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This resource has been updated as part of UKGBC’s Advancing Net Zero Programme.

With thanks to partners:

Lead Partner



Programme Partners



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Introduction



Purpose

The component parts of the resource pack that follows are designed to help enable cities and local authorities drive up the sustainability of new homes. We start from a position that national policy is not currently delivering what is required from all new homes across the board, from either an environmental or social perspective.

Some local authorities want to or are already demonstrating leadership through ambitious policy. We recognise and applaud this and propose what we believe is a pragmatic way to enable this to happen more widely, whilst avoiding a patchwork of different approaches.

A consistent approach enables local authorities to benefit from shared learning, common resources and mutual confidence; and provides stability for industry around the requirements expected from it across different parts of the country.

How we intend this resource to be used

This is intended as a hands-on resource, designed to be used and adapted to support the 'day job' of officers with responsibility for sustainability, planning, regeneration, housing etc. within local authorities. It may be used in the following ways (and more):

- To inform planning policy in relation to the sustainability of new homes
- To inform local authority sustainability requirements as a procurer of new homes
- To enable positive engagement with developers who want to support a local authority's aspirations
- To signpost local authorities to policy precedents, industry-agreed standards and other helpful resources

Definition of 'sustainability'

In this resource we focus on energy and carbon, mitigating overheating risk, the cross-cutting issue of assuring performance and the role of acoustics at the scale of the individual property. We would like to add to these chapters to cover a wider range of issues across a broader range of scales, such as the integration of nature, low carbon transport, infrastructure, location, biodiversity and climate resilience. We espouse a holistic approach to sustainability, in which new homes should support the regeneration of the natural environment and aid local decarbonisation efforts through sustainable site

location, low carbon infrastructure and transport, while at the same time delivering a high quality of life for residents.

Using and contributing to this resource

This is a journey. The intention is for this resource to be a live document. We intend this to feel co-owned by users and are actively seeking ongoing feedback and engagement:

Requested actions for local authorities

- Consider how and when the recommendations can be incorporated into policy and associated guidance & give us your feedback
- Add to this resource pack and to our [interactive map](#) by providing links to policies, documents, case studies and evidence
- Open up or maintain dialogue with UKGBC on the status of your current policy and future plans

Requested actions for built environment professionals

- Consider the implications of the policy recommendations for your projects and business model
- Positively engage with UKGBC through membership, to develop further iterations of policy proposals

Please email john.alker@ukgbc.org

New Homes Policy Playbook



Background and UK policy context

Background

The 2015 Paris Agreement is a legally binding international treaty under the United Nations Framework Convention on Climate Change, which commits signatories to limit global warming to well below 2 °C, preferably to 1.5°C. The general consensus is that significant impacts on humans and the biosphere will be apparent even with 1.5 degrees of warming.

In response to the Paris Agreement and mounting public pressure, councils up and down the country have recognised that they have a duty to act. Nearly three-quarters of UK councils and combined authorities have declared climate emergencies and committed to delivering net zero carbon by 2050. In addition, a number of authorities are setting strong ambitions on a range of other sustainability goals.

In March 2018, UKGBC published the first version of this Playbook, with the aim of helping councils to use their planning and procurement policies to drive the sustainability of new homes. Since then we have received a wealth of positive feedback from local authorities, but we also recognise that much has changed in the intervening two and a half years, not least the UK policy context, which we will go on to describe in the next section. We therefore decided that it was time to publish a new, fully updated version of the Playbook – including a much-expanded section on how to set about delivering net zero carbon.

UK policy context

In June 2019, the Government announced that the UK will ‘eradicate its net contribution to climate change by 2050’ by legislating for net zero emissions – the first G7 country to do so. In order to reach this target, all buildings will need to be net zero carbon by 2050.

The UK is on track to deliver on its third carbon budget (2018 to 2022), but is set to miss the fourth (2023 to 2027) by 5.6% and fifth (2028 to 2032) by 9.6%¹. Crucially, these budgets were set against the previous target of an 80% reduction in emissions by 2050.

¹ Business, Energy & Industrial Strategy Select Committee, [Energy efficiency: building towards net zero](#), Twenty-First Report of Session 2017-19

The new net zero target – requiring a near 100% reduction by 2050 – means that progress will need to accelerate. Government has recently committed to a 68% reduction by 2030 based on 1990 levels as part of its commitment to the Paris Agreement.

According to the Climate Change Committee, in order to reach net zero the UK must reduce its emissions from 430 MtCO₂e to around 29 MtCO₂e in 2050². This will require a reduction in the direct emissions from buildings from around 85 MtCO₂e in 2017 to around 4 MtCO₂e in 2050³. To achieve this, the Committee has made clear that this will require ‘a new approach that will lead to the full decarbonisation of buildings by 2050’, using a mixture of energy efficiency and low carbon heating measures⁴.

² CCC, [Net Zero – the UK’s contribution to stopping global warming](#)

³ CCC, [Net Zero Technical Report](#)

⁴ CCC, [Net Zero – the UK’s contribution to stopping global warming](#); CCC, [Net Zero Technical Report](#)

Playbook Principles

Balancing ambition, consistency and local context

In the following sections, we have made recommendations about the requirements we believe local authorities should introduce to drive sustainable new homes in their area. These recommendations are divided into two types:

- **Our proposed minimum requirements** – which all LAs can and should introduce now; and
- **Our proposed stretching requirements** – which LAs wishing to go further should consider implementing at the next available opportunity. Like the minimum requirements, our recommended stretching requirements are both realistic and achievable, but represent a greater level of ambition.

All the recommended requirements go beyond what is required by national policy. Where necessary, specific issues around legality will be explored more fully in the relevant sections.

We recognise that a patchwork of different standards in different locations is challenging for developers. The approach we have followed attempts to balance the need for consistency with the need to enable local government to set suitably ambitious policy. This is also aligned with the position UKGBC has taken with central Government. We are on the record as advocating strong national policy, which sets out very clearly a future trajectory of escalating minimum standards – which local authorities can move in advance of, whilst maintaining consistency in terms of metrics and approach.

Playbook by topic

The topics covered by this playbook are:

[Part 1](#) - Advancing Net Zero – reducing energy demand and carbon emissions

[Part 2](#) - Mitigating overheating risk

[Part 3](#) - Acoustics

A broadly consistent structure is followed in each section:

1. Introduction to the topic
 - General context and policy drivers
2. Policy recommendations
 - Recommended policy interventions, divided between:
 - i. Minimum requirements
 - ii. Stretching requirements
 - Rationale
3. Policy examples
 - Examples already set by local authorities

The New Homes Policy Playbook

Part 1: Advancing Net Zero – Reducing energy demand and carbon emissions

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Introduction

The building and construction sector is crucial in the race to keep carbon emissions below dangerous levels for our planet. Globally, buildings consume 36% of energy produced, and are responsible for 39% of global carbon emissions, making them the largest contributing sector to climate change.

The World Green Building Council (WorldGBC) is catalysing the construction and property industry to lead the transition to a net zero carbon built environment through its Advancing Net Zero campaign. The campaign is calling for all buildings to be net zero carbon by 2050 and for all new buildings to be net zero in operation and to reduce embodied carbon by 40% by 2030⁵. In the UK, homes – both new and existing – account for 20% of our greenhouse gas emissions⁶. For new buildings, the embodied emissions from construction can account for up to half of the carbon impacts associated with the building over its lifecycle⁷.

UKGBC has adopted the Advancing Net Zero programme for the UK, which is helping to drive the transition to net zero carbon buildings, including through its publication of the Net Zero Carbon Buildings Framework in 2019⁸ and a number of subsequent pieces of guidance. In addition, a growing body of resources is helping the buildings sector better understand the key requirements for new net zero buildings, such as performance targets developed by LETI⁹ and RIBA¹⁰.

However, as the Climate Change Committee have repeatedly made clear, Government policies for new homes are not driving change at the pace required.¹¹ The Committee point to the weakening or withdrawal of policies to support low carbon measures, such as the scrapping of the original Zero Carbon Homes target and the Code for Sustainable Homes in 2015. They also state that ‘there is not enough use of local and urban planning to make progress on climate change mitigation’, while fully acknowledging that a lack of resources is often to blame. Finally, the Committee take the Government to task for

⁵ WorldGBC, [Whole-life Carbon Vision](#), 2019

⁶ Climate Change Committee, [UK housing: fit for the future?](#), 2019

⁷ RICS, [Whole life carbon assessment for the built environment](#), 2017

⁸ UKGBC, [Advancing Net Zero Programme](#), 2019 et seq

⁹ LETI, [Climate Emergency Design Guide](#), 2019

¹⁰ RIBA, [2030 Climate Challenge](#), 2019

¹¹ Climate Change Committee, [UK housing: fit for the future?](#), 2019

failing to clarify how far local and regional authorities are permitted to go in setting their own tighter standards for new-build homes. We will examine this latter issue in detail in our introduction to the *Reducing Energy Demand* section below, setting out our own best interpretation of the fast-changing national legal context.

Despite these constraints, we believe that there is much that local authorities can legally do to help speed up the journey towards net zero carbon new homes.

The component elements of achieving a net zero carbon new home

- Reducing energy demand – optimising the efficiency of the building fabric
- Reducing embodied carbon – driving down the carbon impacts related to product and construction stages
- Measuring in-use performance – closing the gap between modelled and actual energy performance
- Low carbon energy supply – encouraging onsite generation of low carbon heat and hot water
- Zero carbon balance – addressing the shortfall in achieving net zero carbon emissions



Figure 1: The component elements of achieving a net zero carbon new home (Credit: LETI)

Reducing energy demand

Introduction

As already noted, in order to achieve a net zero carbon economy by 2050, the UK must reduce its total energy consumption and source the remaining energy demand primarily from renewable sources. In addition to this, increased demand will be placed on the electricity grid as fuel sources are switched to electricity (e.g. through the electrification of heat in buildings and electric vehicle charging).

Improving the energy efficiency of new homes and thereby minimising their energy demand is the most cost-effective way to minimise the new infrastructure that will be required to achieve a zero carbon energy system. New homes should therefore target reductions in energy demand to reduce the amount of total energy supplied, both from the electricity grid and from renewable energy sources.

Put simply, optimising the efficiency of the building fabric is the starting-point for the whole net zero journey. We should not be designing and building homes that will need retrofitting in the future.

UK legal context

There is no doubt that the national policy context over recent years has led local authorities to be confused and uncertain about whether they can or cannot specify higher energy performance standards than those mandated by Building Regulations.

The recent policy history and current situation are summarised below.

Written Ministerial Statement of 2015

The current confusion can be traced back to a [Written Ministerial Statement](#) (WMS) of March 2015. This stated that *'local planning authorities...should not...set...any additional local technical standards or requirements relating to the construction, internal layout or performance of new dwellings.'* The exception was energy performance, where the WMS said that LAs would continue to be able to require energy performance standards higher than Building Regulations up to the equivalent of the now defunct Code for Sustainable

Homes Level 4 ‘until commencement of the amendment to the Planning and Energy Act 2008’.

The amendment in question would have removed local authorities’ power to require energy performance standards for new homes that are higher than those set in Building Regulations. The expectation that this power would be scrapped understandably sowed the seeds of much confusion. Subsequently, the whole zero carbon homes policy was scrapped, and to date the amendment has not been enacted.

Planning Policy Guidance on Climate Change (2019)

Some clarification was issued in the revised [Planning Policy Guidance on Climate Change](#), published in March 2019. The relevant extract said:

“Can a local planning authority set higher energy performance standards than the building Regulations in their local plan?”

“Different rules apply to residential and non-residential premises. In their development plan policies, local planning authorities:

- *Can set energy performance standards for new housing or adaptation of buildings to provide dwellings, that are higher than the Building Regulations, but only up to the equivalent of Level 4 of the Code for Sustainable Homes.*
- *Are not restricted or limited in setting energy performance standards above the Building Regulations for non-housing developments.”*

MHCLG Consultation on Part L 2020 and the Future Homes Standard (October 2019)

Further commentary on this situation was provided in this [consultation \(October 2019\)](#).

The consultation stated:

“In 2015, the then government set out in a Written Ministerial Statement its expectation that local planning authorities should not set energy efficiency standards for new homes higher than the energy requirements of Level 4 of the Code for Sustainable Homes (equivalent to a 19% improvement on the Part L 2013 standard). Section 43 of the Deregulation Act 2015 would introduce an amendment to the Planning and Energy Act that restricts local authorities from setting energy standards

above Building Regulations levels for new homes, but this amendment has not yet been commenced.

“We realise that this may have led to confusion and uncertainty for both local planning authorities and home builders. Many local planning authorities are unclear about what powers they have to set their own energy efficiency standards, although a number of local authorities continue to set their own energy performance standards which go beyond the Building Regulations minimum. While most of these adhere to the 19% level set in the 2015 Written Ministerial Statement, some go further.”

The last sentence is particularly pertinent, acknowledging as it does that, although many local authorities have indeed gone no further than the old Code 4 requirements, some have gone beyond this. We will return to this point below.

The central proposition in the same consultation was the Government’s intention to:

“introduce in 2020 a meaningful but achievable uplift to energy efficiency standards as a stepping stone to the [2025] Future Homes Standard. The intention is to make new homes more energy efficient and to future-proof them in readiness for low carbon heating systems”.

The Government consulted on two possible uplifts for 2020:

- Option 1: 20% reduction in carbon emissions compared to the current standard for an average home.
- Option 2: 31% reduction in carbon emissions compared to the current standard.

Of these, Option 2 – the 31% reduction – was the Government’s preferred option, on the basis that it would deliver more carbon savings, and would help prepare supply chains for heat pumps and increase the number of trained installers.

For 2025, the Government proposed that an average home built to the Future Homes Standard would have 75-80% fewer carbon emissions than one built to current Building Regulations. This followed on from a commitment made in the 2019 Spring Statement that by 2025 the new Future Homes Standard for new build homes would require new homes to be future-proofed with low carbon heating and world-leading levels of energy

efficiency¹². After the consultation closed, the Government recommitted itself to the Future Homes Standard on a number of occasions – in the August [Planning White Paper](#) and in the Prime Minister’s November [Ten Point Plan for a Green Industrial Revolution](#) (though bizarrely the commitment in the latter to bring the Standard forward to 2023 disappeared from the online document within hours of publication).

Finally, on 19 January 2021 the Government published its long-awaited [response to the Future Homes Standard consultation](#). In it the Future Homes Standard was once again reconfirmed – though it is now clear that it will not come into force until 2025. In addition, the 31% reduction was confirmed as the Government’s intended interim uplift to Building Regulations – it will be regulated for in late 2021 and will come into effect in 2022.

As regards local authorities’ ability to set higher energy performance standards, para. 2.27 of the 2019 Future Homes Standard consultation stated:

‘As we move to the higher energy standards required by Part L 2020 and the Future Homes Standard, there may be no need for local authorities to seek higher standards...’ and the power in the Planning and Energy Act 2008 may become redundant’.

They therefore requested feedback on when and if the amendments to the Planning & Energy Act 2008 should be enacted (i.e. the amendments that would have removed local authorities’ power to require energy performance standards for new homes that are higher than those set in Building Regulations).

UKGBC argued strongly in our [consultation response](#) that the Government should *not* commence the amendments to the Planning & Energy Act – and that local authorities should retain the power to set higher energy performance standards, in order to encourage innovation and enable them to meet their climate emergency targets. Many other stakeholders joined with us in opposing this restriction of local authorities’ powers. This included a cross-party group of Council leaders and Mayors who signed an [open letter](#) to MHCLG Secretary Robert Jenrick, calling on him to abandon the proposed restrictions.

¹² HM Treasury, [Spring Statement: Written Ministerial Statement](#), 2019

In order to avoid a patchwork of differing standards across the country, UKGBC also urged the Government to act swiftly to publish a forward trajectory for future Part L uplifts, which would allow local authorities to set higher energy performance standards in line with future national requirements. This could fulfil a similar function to the old Code for Sustainable Homes, which clearly set out the future direction of national policy. It would also mean that investment and skills would be directly related to future uplifts in national regulations.

The January 2021 Government response noted that an overwhelming majority – 86% – of consultation respondents had opposed the commencement of the amendment to the Planning & Energy Act and were in favour of retaining local planning authorities' flexibility to set standards, on the basis that they are best placed to assess local need and viability. Stakeholders argued that the role of the Building Regulations was to set minimum standards and that local authorities should not be prevented from going beyond these, in order to meet their climate change objectives.

In a very welcome move, the Government have therefore confirmed that:

'To provide some certainty in the immediate term, the Government will not amend the Planning & Energy Act 2008, which means that local planning authorities will retain powers to set local energy efficiency standards for new homes.'

Looking beyond the 'immediate term', the Government have stopped short of ruling out the curtailment of local authorities' powers in the future – and they point to the expected new planning reforms as the means whereby the longer-term role of local planning authorities in determining local energy efficiency standards will be clarified.

Recommendations

Minimum requirements

It is recommended that local planning authorities set a requirement for new homes as follows:

A 31% reduction on the Dwelling Emission Rate (DER) against the Target Emission Rate (TER) based on the 2013 Edition of the 2010 Building Regulations (Part L). A fabric first approach shall be prioritised, ensuring that at a minimum the thermal performance of the whole envelope exceeds that of the notional specification by 5%.

The energy use intensity for new homes should be reported on a kWh/m²/year gross internal area (GIA) basis.

Rationale

As already noted, the [Future Homes Standard consultation](#) concluded that a 31% reduction in carbon emissions compared to the current Part L is viable now on a national scale. Indeed the Government confirmed on 19 January 2021 that this 31% uplift will now come into effect in 2022. It is critical to reduce carbon emissions from new homes if the Government's net zero emission target is to be met. Given this urgency, there is no credible reason to delay the implementation of the 31% reduction target in the wait for the Part L performance uplift.

A thermal performance target exceeding current national standards has also been recommended. It is important to set a higher fabric energy efficiency standard to ensure that buildings do not need to be retrofitted at expense at a later date when more demanding regulations are introduced, for example if the Government proceeds with the Climate Change Committee's recent proposal that from 2028 no home should be able to be sold unless it reaches EPC Band C. This will also help safeguard against future heat decarbonisation pathways, by ensuring that new buildings can more easily transition to lower carbon heating sources in the near future. This is particularly pertinent for decarbonisation trajectories involving heat pumps, as effective use of the technology will require highly insulated and draught-proofed buildings to operate efficiently.

The [Impact Assessment](#) that accompanied the Future Homes Standard consultation concluded that the average additional capital cost associated with a 31% uplift is £4,620 per dwelling. The Impact Assessment foresaw that: 'The initial capital costs will be borne by developers, but these costs may ultimately be passed to landowners' – and that: 'The costs would fall with moderate efficiency gain through learning over time.'

We recognise that the legal situation has historically been very murky – though the recent Government response has made it much less so. In summary, we firmly believe that local authorities are legally able to set the minimum requirement as written above, as this mirrors the Government's intended 2022 Building Regulations uplift. It is worth recalling that the relevant section of the Planning & Energy Act¹³ clearly states that the energy efficiency standards that local authorities may set include those 'set out or endorsed in

¹³ Section 1(2)(b), [Planning & Energy Act 2008](#)

national policies or guidance'. Our view is that the Government's recently reconfirmed commitment to legislate for a 31% uplift later this year clearly constitutes 'national policies or guidance' as specified in the Act.

Stretching requirements

Local planning authorities seeking to go further should consider introducing the following stretching requirements. Note that these requirements shall be considered as a set, rather than as individual components for additional inclusion:

An energy use intensity (EUI) target of <70 kWh/m²/year operational energy use in GIA excluding renewable energy contribution shall be met. This target includes both regulated and unregulated energy consumption.

New build homes shall deliver ultra-high levels of energy efficiency consistent with a space heat demand of 15-20kWh/m²/year.

Designers shall evaluate the operational energy use using realistic information on the intended use, occupancy, and operation of the building to minimise any performance gap. They shall demonstrate this through compliance with the above targets using a design for performance methodology such as Passivhaus PHPP or CIBSE TM54 Operational Energy.

Rationale

An energy use intensity metric based on kWh/m²/year provides a more accurate reflection of actual energy consumption of a building than through EPC ratings. As a result, it is recommended that a transition towards using an EUI metric based on metered energy, for both regulated and unregulated energy, is increasingly adopted within planning policy. The <70 kWh/m²/year target is aligned with the [RIBA Sustainable Outcomes Guide's](#) 2025 target for domestic buildings¹⁴. This target should then be tightened over time as technologies and materials available to designers improve, to achieve an EUI of 35 kWh/m²/year excluding renewable energy contribution by 2030. This aligns with the 2030 targets for domestic buildings in the RIBA Sustainable Outcomes Guide and the LETI Climate Emergency Design Guide¹⁵.

¹⁴ RIBA, [Sustainable Outcomes Guide](#), 2019

¹⁵ LETI, [Climate Emergency Design Guide](#), 2019

Alongside this, thermal energy demand should have specific targets to ensure that a fabric-first approach is prioritised; the space heating demand of 15-20 kWh/m²/year is in line with the recommendations of the Climate Change Committee for new homes. Designing in this performance from the start is approximately one-fifth of the cost of retrofitting to the same quality and standard¹⁶ – and in the process will deliver household energy bills savings, provide additional health and comfort benefits for its occupants and help reduce both annual and peak energy demands.

In line with the above, it has been recommended that operational energy consumption be calculated using realistic estimates of operating hours, intended use and likely occupancy of the building. This will enable the designer to both estimate energy use more accurately, beyond just the regulated consumption as required by Part L, and highlight specific areas for improvements during the design process. By utilising design for performance methodologies such as those listed, the performance gap can be minimised.

The legal situation in relation to this proposed stretching requirement is also murky, for exactly the same reasons as set out above. It is arguably even murkier, given that this proposed requirement uses different metrics – and direct comparisons with the old Code 4 (for example) are difficult. Of course it represents a greater level of ambition and therefore all the comments made in the previous section also apply here. In other words, again this effectively becomes a choice for individual authorities and may come down to local market and local political contexts.

Local authority examples:

Relevant local authority policies that address *Reducing Energy Demand* can be found – colour-coded in blue – via this [link](#). Relevant local authorities include:

- [Bristol City Council - Bristol Local Plan Review 2019](#)
- [Greater London Authority – The London Plan: Intend to Publish 2019](#)
- [Greater Manchester Combined Authority – GM Plan for Homes, Jobs and the Environment 2019](#)
- [Milton Keynes Council – Plan: MK 2016 – 2031](#)
- [Oxford City Council – Local Plan 2036 ADOPTED](#)

¹⁶ Climate Change Committee, *UK housing: Fit for the future?*, February 2019

- [Reading Borough Council - Sustainable Design and Construction Supplementary Planning Document 2019](#)
- [Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020](#)
- [Sutton Council – Sutton Local Plan 2016-2031](#)

Reducing embodied carbon

Introduction

Embodied carbon is the carbon associated with both building materials and the construction and maintenance of a building throughout its whole lifecycle.

As Building Regulations start to reduce operational emissions from buildings towards zero, embodied carbon emissions can be as much as 50% of total emissions over a building's lifetime. Despite this, there is nothing in national policy that currently requires embodied carbon emissions to be measured, let alone reduced.

Most embodied carbon emissions occur near the start of a building project, so local authorities have an important role to play in filling the gap left by national policy by setting their own requirements.

Recommendations

Minimum requirements

It is recommended that local authorities set a requirement for *all* new homes as follows:

All developments shall demonstrate actions taken to reduce embodied carbon and maximise opportunities for reuse through the provision of a Circular Economy Statement.

And the following is recommended for major developments:

Major developments (defined as those with 10 or more dwellings or 1000 square metres of floor space)¹⁷ shall calculate whole lifecycle carbon emissions (including embodied carbon emissions) through a nationally recognised Whole Lifecycle Carbon

¹⁷ This definition of 'major developments' is in line with that contained in Article 2(1) of *The Town and Country Planning (Development Management Procedure) (England) Order 2015*.

Assessment¹⁸ methodology and demonstrate actions taken to reduce lifecycle carbon emissions.

The above should be accompanied by a commitment that all public buildings and infrastructure should lead by example by disclosing such data.

Rationale

There are currently low levels of understanding about the embodied carbon impacts of new buildings. As a first step, it is therefore important to encourage the measurement of embodied carbon emissions, based on consistent scopes and datasets. This will help create greater visibility of these impacts and encourage voluntary reductions in embodied carbon.

However, it is expected that by 2025 there will be a consistent level of understanding on how to measure whole life carbon, and as such after this date it would be recommended to require all developments to measure this and set targets for embodied carbon in line with the stretching requirements below.

Stretching requirements

In addition to the disclosure requirement for public buildings and infrastructure, we recommend the following policy for *all* developments:

All developments shall calculate whole lifecycle carbon emissions (including embodied carbon emissions) through a nationally recognised Whole Lifecycle Carbon Assessment methodology and demonstrate actions taken to reduce lifecycle carbon emissions. Data gathered will serve as the basis for the introduction of carbon reduction targets in due course.

And for major developments:

Major developments should target <500 kgCO₂e/m² upfront embodied carbon emissions (equating to the emissions covered by Modules A1-A5 of the RICS methodology).

¹⁸ Currently the RICS Whole Life Carbon Assessment for the Built Environment Professional Statement 2017. Please note, however, that other methodologies will develop and improve over time.

Rationale

As previously noted, WorldGBC have set a target to reduce embodied carbon from all construction projects globally by 40% by 2030. These levels of reductions will only be possible if we start not only to measure embodied carbon but also to set targets for its reduction.

Consistent data is not yet widely available for all life stages of a whole lifecycle carbon assessment. However, data for upfront embodied carbon emissions (the product and construction stages) is already reasonably good, which is why we are recommending setting a target for them. The recommended target of <math><500 \text{ kgCO}_2\text{e/m}^2</math> is aligned with the [LETI best practice 2020 recommended target](#) for upfront embodied carbon and is also referred to by the [GLA as a current aspirational benchmark](#) for apartment buildings.

As data for the later lifecycle stages starts to become more widely available, it will be right to move over time towards setting targets for these and for whole lifecycle carbon emissions as a whole. By 2025, it is expected that data for whole lifecycle emissions will be more widely available, and so it is recommended that by this date upfront embodied carbon emission targets are tightened, and new targets for whole lifecycle carbon emissions are also introduced in line with industry understanding at the time.

Local authority examples:

Relevant local authority policies that address *Reducing Embodied Carbon* can be found – colour-coded in red – via this [link](#). Relevant local authorities include:

- [Greater London Authority – The London Plan: Intend to Publish 2019](#)
- [Greater Manchester Combined Authority – GM Plan for Homes, Jobs and the Environment 2019](#)
- [Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020](#)

Measuring in-use performance

Introduction

Over recent years the housebuilding industry and Government have grown increasingly concerned over the gap that sometimes exists between 'design' and 'as-built' energy performance. The difference between anticipated and actual performance is known as the 'performance gap' - and various studies have found that in-use energy consumption can be 2 to 5 times higher than compliance calculations carried out at design stage would suggest.

A variety of factors can be responsible for this, including incorrect design assumptions, product substitution on site, poor installation, inadequate verification, monitoring and compliance and, most significantly, the fact that developers are not required to test properties' performance post-occupancy.

According to the Climate Change Committee's report *UK housing – fit for the future?*, 'Closing the 'performance gap' between how homes are designed and how they actually perform when built or retrofitted is a vital first step to ensure improvements to Building Regulations are effective. [...] An immediate improvement would be to enforce current standards, and to revise monitoring metrics and certification to focus on 'as-built' performance.'

As the Climate Change Committee makes clear, the best way to tackle the performance gap systematically and at scale will be through changes to Building Regulations, and UKGBC is actively lobbying Government to move to a system of regulating 'in-use' or 'as built' - as opposed to modelled - performance.

However, until such time as Building Regulations are modified in this way, local authorities have an important role to play in requiring developers to demonstrate the actions they have taken to close the performance gap.

N.B. Although our recommendations for measuring in-use performance are contained in this *Advancing Net Zero* chapter, the problem of the performance gap applies equally to other sustainability issues, not least those relating to occupant health and wellbeing, such as overheating and indoor air quality. That is why our recommendations cover these issues too.

Recommendations

Minimum requirements

It is recommended that local authorities require developers to demonstrate that they will act to close the performance gap. This may be done through:

Demonstration that the principles of Soft Landings will be followed and a recognised performance gap / assured performance tool¹⁹ 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.

Rationale

Greater transparency regarding in-use performance is the first step on the way to closing the performance gap. It is an important way of engaging homebuyers and increasing their confidence that the homes they buy will perform as promised. The minimum requirement we have recommended is a light-touch approach that carries little or no burden for developers who take the performance gap seriously.

It has been recommended that the overarching principles of Soft Landings be applied to projects, to help inform the development of the client brief, and to set clear expectations for the operational outcome to match the design intention.

Stretching requirements

In addition to the above, local authorities should consider introducing the following requirements:

All major developments shall implement a soft landings approach from 'Phase 1: Inception and Briefing' as per [BSRIA BG 54/2018 Soft Landings Framework 2018](#), to ensure any building requirements set at the beginning are maintained throughout the project from inception to completion and beyond.

All developments shall put in place a recognised monitoring regime to allow the assessment of energy use, indoor air quality and overheating risk for 20% of the

¹⁹ such as [BEPIT Better Building Tool Kit](#) or [Assured Performance Process](#)

dwellings and at least 90% of the common parts for the first five years of their occupancy, and ensure that the information recovered is provided to the applicable owners and the planning authority.

Rationale

Soft Landings is designed to help the project team focus on the client's needs and the building's success criteria throughout the project, ensure a smooth transition into use and address issues that post-occupancy evaluations (POE) have shown to be widespread. By implementing this mindset and strategy from Phase 1, it helps commit those joining the design and construction team to follow through after handover. This then increases the likelihood that the building delivers an outcome in alignment with net zero standards, i.e. it minimises the risk of a performance gap.

The second requirement would give 'teeth' to the regime by requiring the undertaking of post-occupancy evaluations. Many leading developers already undertake these, with no adverse impact on delivery. The recommended target of monitoring 20% of dwellings and at least 90% of common spaces was taken from the evidence base used to support the development of Old Oak and Park Royal Development Corporation's Local Plan.

Local authority examples:

Relevant local authority examples addressing *Measuring in-use performance* can be found – colour-coded in yellow – via this [link](#). Relevant local authorities include:

[Cambridge City Council - The Cambridge Sustainable Housing Design Guide 2017](#)

[Greater London Authority – The London Plan: Intend to Publish 2019](#)

[Milton Keynes Council – Plan: MK 2016 – 2031](#)

[Old Oak and Park Royal Development Corporation - Post Occupancy Evaluation Study 2018](#)

[Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020](#)

[Sutton Council – Sutton Local Plan 2016-2031](#)

Low carbon energy supply

Introduction

The Climate Change Committee clearly outlined in their 2019 report '[UK housing: Fit for the future?](#)' that the UK's legally binding climate change targets will not be met without the near complete elimination of greenhouse gas emissions from UK buildings. New buildings have been highlighted as the most straightforward building stock to decarbonise; as a result it is important to encourage low carbon generation of heat to support the transition away from natural gas heating.

The CCC has also highlighted the importance of grid decarbonisation in the trajectory towards net zero – and onsite renewable generation supports this in two ways. First, it drives investment in additional renewable electricity, and second, it simultaneously reduces peak and annual demand on the grid.

Recommendations

Minimum requirements

It is recommended that local planning authorities set a requirement for new homes as follows:

All new developments should not have onsite combustion of fossil fuel. Where it can be demonstrated that there is no other viable alternative, the rationale must be clearly provided with supporting information as to how the design had considered low-carbon heating sources.

All developments shall assess the viability for onsite renewable generation. For developments with SE/SW facing roof(s), a minimum 40% solar technologies installation as a percentage of building footprint area shall be met unless it can be clearly demonstrated that this is not practically viable, e.g. on a heavily overshadowed site or where there are conflicting spatial limitations due to the use of heat pumps.

For large-scale major developments²⁰, proposals will be expected to consider the integration of new energy networks in the development. This consideration shall form part of the development proposals and take into account the site's characteristics and the existing cooling, heat and power demands on adjacent sites where readily available. Similarly, any new energy networks should prioritise non-combustible, non-fossil fuel energy as the primary heat source.

Rationale

The term 'should' has been used within the first requirement to indicate a strong recommendation, acknowledging that there will be specific circumstances in which zero or low carbon heating is not yet viable. This may be due to constraints in the local market, such as limited supply chain skill for the installation of relevant technologies. Nonetheless, planning policy must seek to drive the enhanced uptake of low carbon heating solutions where currently possible. Indeed, it is expected that this will soon form part of national regulations, such as the pending Future Homes Standard. Where this is the case, and low- or zero-carbon heating is not currently viable, existing energy networks that use carbon-based fuel shall provide a decarbonisation plan to show a roadmap to implementing low or zero carbon heating by 2030.

The value of onsite generation has long been recognised in local planning policy, e.g. through the use of the Merton Rule. However, it has also been recognised that the prescriptive nature of the Merton Rule is not necessarily appropriate or applicable for all types of new developments and can occasionally lead to the installation of inefficient onsite renewables. Consequently, a site-based approach based has been recommended to mitigate the risks of unintended consequences resulting from the Merton Rule, whilst still encouraging appropriate types of onsite installation. The 40% figure for PV installation has been proposed as part of the new Part L consultation, and is therefore considered to be viable on a national scale.

Note that the inclusion of onsite solar technologies should not be accepted as an adequate reason for precluding low-carbon heat; equivalent lifetime savings in emissions from onsite generation do not compensate for the lifetime emissions from a gas boiler. The net carbon savings associated with generation will also decline as the grid decarbonises, while emissions associated with natural gas heating are not projected to

²⁰ For example, [Haringey Council](#), [Central Bedfordshire Council](#) and a number of other LPAs define large-scale major developments as one 'where the number of residential units to be constructed is 200 or more, or where the floor space to be built is 10,000 square meters or more, or where the site area is 2 hectares or more.'

change materially. Even with a rapidly decarbonising grid, onsite solar technologies will continue to reduce demand from the electricity grid, particularly if combined with energy storage capacity.

Stretching requirements

Local planning authorities seeking to go further than the minimum should consider introducing the following stretching requirement. This requirement has been designed to complement the stretching targets as outlined in '[1. Reducing Energy Demand](#)' and therefore should not be included into local planning policy independently of such.

Major developments shall match their total annual energy demand through a combination of renewable generation capacity, energy storage and smart controls.

Rationale

The current Part L and SAP assessments do not account for the availability of renewable energy generation and demand when assessing the net carbon emissions of a building. As a result, they do not reflect the true grid system impacts as the carbon intensity and cost of supplying power at different times of the day and year vary significantly.

Through combining renewables generation capacity with additional energy storage and smart controls, this allows for demand side response, encouraging the storage of energy during off-peak hours and discharge during peak times. Developments can then model their total annual energy demand against that which they will produce, taking into account any benefit from these additional technologies.

This requirement has been recommended for major developments, which often have more flexibility with building orientation, spatial requirements and roof pitch than minor development projects.

Local authority examples:

Relevant local authority policies that address *Low carbon energy supply* can be found – colour-coded in green – via this [link](#). Relevant local authorities include:

[Bristol City Council - Bristol Local Plan Review 2019](#)

[Greater London Authority – The London Plan: Intend to Publish 2019](#)

[Greater Manchester Combined Authority – GM Plan for Homes, Jobs and the Environment 2019](#)

[Milton Keynes Council – Plan:MK 2016 – 2031](#)

[Oxford City Council – Local Plan 2036 ADOPTED](#)

[Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020](#)

[Sutton Council – Sutton Local Plan 2016-2031](#)

Zero carbon balance – addressing residual emissions

Introduction

As already noted, 308 councils have declared a climate emergency to date; many of these have correspondingly set or are looking to set ambitions for their local area to be net zero by 2050 at the latest. This often includes an aspiration for new developments to be built to a net zero carbon standard, which in turn often leads LPAs to explore setting up a ‘carbon offset fund’.

Local Planning Authorities that have established a ‘carbon offset fund’ typically require developers to make a cash-in-lieu contribution to account for the shortfall in achieving net zero carbon developments. As is explained within the recommendations rationale below, it is not strictly accurate and appropriate to call such funds ‘offset funds’, and it is suggested that any LPAs seeking to establish a similar scheme should position and communicate it as a ‘carbon tax fund’ instead.

Recommendations

Minimum requirements

It is recommended that local planning authorities set a requirement for new homes as follows:

Where it is clearly demonstrated that net zero carbon cannot be fully achieved through on-site measures, all developments shall be required to make a financial contribution to the LPA’s carbon tax fund equal to the residual regulated emissions at a rate of £X/tCO₂ over 30 years.

Alternatively, developments can make up the shortfall off-site by funding a carbon reduction or removal project directly, provided the LPA has approved this approach.

Rationale

It is recommended that for any project to be termed a ‘carbon offset’, it should align with the widely recognised offset principles such as those outlined by the [UK Environmental](#)

[Reporting Guidelines](#) or [ICROA](#). These require carbon offsets to demonstrate real, measured and independently verified carbon savings in order to compensate for the equivalent residual emissions. The compensated emissions should also be within a timeframe consistent with time of pollution and any net zero claims.

However, it is acknowledged that it may currently be too difficult for LPAs to implement a comprehensive ‘ex-post’ monitoring of the carbon emissions saved from funded projects. LPAs may also wish to fund initiatives that have less tangible carbon impacts, such as behaviour change projects. These cannot reasonably be called an offset but still contribute towards an area’s net zero trajectory and raise awareness of the climate emergency.

It is recommended that each LPA clearly outlines its criteria and rationale for assessing and selecting which carbon reduction or removal projects to fund. This will aid overall transparency as to how and when the carbon tax funds are spent, and support developers in understanding what their contributions have been invested in. LPAs should also encourage developers to suggest alternative projects off-site. In the longer term, this will promote closer ties between developers and the local area, support greater innovation and ensure that developers take greater ownership of addressing their residual carbon emissions.

Similarly, it should be recognised that developers may have net zero commitments beyond planning requirements – this would likely necessitate the offsetting of their balance through formal standards that meet the offsetting principles at a lower £/tCO₂. A full list of approved standards is provided within the resources listed above and includes government-backed schemes such as the Woodland Carbon Code²¹. As a result, LPAs may wish to consider allowing developers to invest a proportion of their carbon tax fund contributions in these verified mechanisms until a local comprehensive ‘ex-post’ monitoring scheme can be implemented.

No carbon price £/tCO₂ figure has been specifically recommended for the minimum requirement as this should be set according to the LPA’s drivers and priorities. This can either be informed through commissioning an evidence base for the local area, assuming the HMT Green Book non-traded carbon price, or through reviewing the rationale and premise behind the Local Authority examples provided within this Playbook. 30 years is

²¹ Note that UK emission reduction projects are sometimes termed ‘carbon units’ and not ‘carbon offsets’ because they may not meet all aspects of the ‘additionality’ offset principle, e.g., if savings are counted by both the reporting entity and towards policy or mandatory targets for reducing GHG emissions.

the common timescale to which existing LPA schemes operate; this requires the developer to multiply their residual emissions by 30 years to establish the anticipated shortfall over this period. The resulting amount is then collected upfront.

It is acknowledged that over the next 30 years the level of residual emissions may not remain constant, particularly as it is based on modelled rather than in-use data. The carbon factors used to calculate the balance will also change over time, and electric schemes will benefit from wider decarbonisation of the grid. However, until building policies evolve to utilise in-use data, it is recommended that LPAs levy carbon tax payments for the 30 years upfront using the carbon factors as provided through planning policies. This is to ensure broader consistency with Part L Regulations and the minimum requirements as listed within this document. It is also strongly recommended that LPAs prioritise the development and capacity required to effectively implement a basic carbon tax scheme before seeking to further enhance the underlying methodology or requirements.

Stretching requirements

Local planning authorities seeking to go further than the minimum should consider introducing the following stretching requirements, which are listed in increasing levels of leadership.

*Where it is clearly demonstrated that net zero carbon cannot be fully achieved through on-site measures, all developments shall be required to make a financial contribution to the LPA's carbon tax fund equal to the residual regulated **and unregulated** emissions remaining at a rate of £X/tCO₂ over 30 years.*

For clarity, the residual regulated and unregulated emissions should be calculated using a design for performance methodology such as Passivhaus PHPP or CIBSE TM54 Operational Energy.

The above requirement has been designed to complement the stretching targets as outlined in ['1. Reducing Energy Demand'](#) and ['3. Measuring In-use Performance'](#), and therefore should not be included in local planning policy independently of such.

Major developments shall be required to make a financial contribution to the LPA's carbon tax fund equal to the residual upfront embodied carbon (equating to the emissions covered by Modules A1-A5 of the RICS methodology) of the development at a rate of £X/tCO₂ at the point of completion.

For clarity, the upfront embodied carbon should be calculated using a nationally recognised Whole Life Carbon Assessment methodology.

The above requirement has been designed to complement the stretching target as outlined in [‘2. Reducing Embodied Carbon’](#), and therefore should not be included in local planning policy independently of such.

Rationale

The current Building Regulations only require developers to assess and account for the consumption of regulated energy. However, in the context of declaring climate emergencies and aspiring towards net zero buildings, it is increasingly clear that both unregulated energy use and the embodied carbon of buildings should be considered within the design and construction process.

The performance gap often evident between the as-designed SAP calculation and in-use emissions can be caused by inaccurate estimations of operational consumption, including the exclusion of unregulated energy use. Further to this, as the grid rapidly decarbonises towards the 2030s, the carbon emissions resulting from energy consumption will decrease. Consequently, the absolute amount of funds collected on regulated energy use will decrease significantly over the coming decade as the grid decarbonises. However, this will not necessarily indicate that energy reductions of new builds are in line with net zero requirements, hence it is important to ensure that these meet the energy performance targets as outlined within [‘1. Reducing Energy Demand’](#).

Embodied carbon will also account for an increasing share of carbon emissions produced and must be addressed by any LPA declaring a climate emergency and/or with a net zero target. These emissions are also released by the point of the building’s completion, and therefore steps should be taken to ensure that developers seek less carbon-intensive materials and manufacturing methods where viable.

As data for whole life cycle emissions become more widely available from 2025 onwards, it is recommended that the carbon tax mechanism be extended to include the remaining embodied carbon modules as per the RICS methodology.

Similar to the rationale provided for the minimum requirements, LPAs should set their carbon price for unregulated energy and embodied carbon emissions based on their own drivers and priorities. These can be assessed through bespoke methods, such as commissioning a local evidence base, or they can be derived from available references,

such as other LPAs' carbon prices or a nationally recognised pricing mechanism e.g. the HMT Green Book.

Looking forward

Looking further forward, it will be essential that LPAs develop criteria for assessing suitable projects to fund and a comprehensive 'ex-post' monitoring scheme that delivers real, measured, and independently verified savings. Whilst it is recognised that this may be too stretching to achieve now, carbon reductions and removals cannot credibly be counted towards a local, regional or national net zero target if they cannot be proven to do so.

However, given that most LPAs do not currently operate a carbon tax scheme, it is considered a priority now to first integrate an appropriate administration process within the authority for effective delivery and monitoring of such a scheme. LPAs can then build on this experience to further tighten their criteria going forward for assessing eligible projects and evaluating the associated impacts from the funded projects.

Local authority examples:

Relevant local authority policies that address *Zero carbon balance – addressing residual emissions* can be found – colour-coded in orange – via this [link](#). Relevant local authorities include:

- [Bristol City Council - Bristol Local Plan Review 2019](#)
- [Greater London Authority – The London Plan: Intend to Publish 2019](#)
- [Milton Keynes Council – Plan: MK 2016 - 2031](#)
- [Oxford City Council – Local Plan 2036 ADOPTED](#)
- [Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020](#)
- [Sutton Council – Sutton Local Plan 2016-2031](#)

Local Authority Examples

All local authority policies relevant to 'Part 1: Advancing Net Zero – Reducing energy demand and carbon emissions' are listed below. In order to indicate the topics to which they relate, the policies are colour-coded and tagged as follows:

Reducing Energy Demand

Reducing Embodied Carbon

Measuring in-use performance

Low carbon energy supply

Zero carbon balance – addressing residual emissions

Bristol City Council - Bristol Local Plan Review 2019

Reducing Energy Demand / Low carbon energy supply / Zero carbon balance – addressing residual emissions

Draft Policy CCS2: Towards zero carbon development

Energy use in new development:

Development will be expected to:

- Minimise the demand for heating, cooling, hot water, lighting and power through energy efficiency measures; then
- Meet its remaining heat/cooling demand sustainably, as set out below; then
- Maximise on-site renewable energy generation; and then
- Meet any outstanding reduction in residual emissions through carbon offsetting.

Development will be expected to achieve:

- A minimum 10% reduction in regulated CO2 emissions through energy efficiency measures; and
- A minimum 35% reduction in regulated CO2 emissions through a combination of energy efficiency measures and on-site renewable energy generation.

After applying on site measures, development is expected to achieve a 100% reduction in its remaining regulated and unregulated emissions through the use of carbon offsetting as set out below.

Carbon offsetting: financial contributions and other allowable solutions

Once on-site CO2 reduction requirements for energy efficiency and renewable energy measures have been met, the remaining emission reductions will be met by carbon offsetting measures such as:

- Providing the residual emission reduction through a financial contribution to renewable energy, low carbon energy and energy efficiency schemes elsewhere in the Bristol area; or
- Agreeing acceptable directly linked or near-site provision.

The financial contribution required will be equivalent to the cost of mitigating the residual CO2 emissions off-site, at a rate of £95 per tonne of CO2 that would be emitted over a period of 30 years.

Relevant links:

- [Bristol City Council - Bristol Local Plan Review 2019](#)

Cambridge City Council

Measuring in-use performance

Post Construction Monitoring And Maintenance

PCMM01 – Support for Estates Teams And Residents

New development schemes should:

- Provide leadership for residents to help foster good sustainable behaviour/lifestyles. This could include input from a developer, housing association, managing agent or a community group;
- Provide aftercare and support for residents of all tenures, including those who rent properties from private landlords.
- Engage communities as a whole; information based on websites, handbooks and community noticeboards do not tend to be successful and so more constructive methods should be considered.

A post occupancy support statement will be required to demonstrate how residents and estates teams on a scheme will be supported. This will need to include detail relating to the green elements of buildings in particular and how people will be supported in using this technology, as ‘fit and forget’ technology still requires education.

For all major developments, the BSRIA Soft Landings Framework should be utilised to provide support from the design stage through to the post occupancy stage. This will require the development and implementation of a Soft Landings Plan and subsequent reporting through the provision of Soft Landings Reports.

PCMM02 – Minimising the Performance Gap

All major developments and any scheme that proposes to use new and/or innovative construction methods or technologies:

- **Standard/Requirement:** Assess all risks that could contribute to a potential energy performance gap between design aspiration and the completed development.
- **Evidence of Compliance:** Evidence should be provided to demonstrate that a ‘tested’ performance gap/assured performance tool has been used to minimise the potential performance gap from design stage through to construction through to completion.

PCMM03 – Post Construction Monitoring and Evaluation

All major developments and any scheme that proposes to use new and/or innovative construction methods or technologies:

- **Standard/Requirement:** Provision of post occupancy data on key performance indicators for a sample of units across a development. These indicators may include: Energy use; Temperature and humidity; Performance of renewable and/or low carbon technologies; etc. Post-occupancy evaluation should provide comparisons between a full year’s operational resource consumption. If the evaluation highlights a significant discrepancy between design and operational performance, then recommendations should be made for further diagnosis and/or remedial work to resolve the issues and close the performance gap.
- **Evidence of Compliance:** Submission and implementation of a Post Construction Monitoring and Evaluation Framework setting out which key performance indicators will be monitored and the mechanics of how this monitoring will be undertaken. Monitoring reports to be submitted for discussion and review following a year’s post occupation monitoring.

Relevant links:

- [Cambridge City Council - The Cambridge Sustainable Housing Design Guide 2017](#)

Greater London Authority – The London Plan: Intend to Publish 2019

Reducing Energy Demand / Low carbon energy supply / Zero carbon balance – addressing residual emissions / Reducing Embodied Carbon / Measuring in-use performance

Policy SI 2 Minimising greenhouse gas emissions

- A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:
 1. be lean: use less energy and manage demand during operation
 2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
 3. be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
 4. be seen: monitor, verify and report on energy performance.
- B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.
- C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations¹⁵⁶ is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:
 1. through a cash in lieu contribution to the borough's carbon offset fund, or
 2. off-site provided that an alternative proposal is identified and delivery is certain.
- D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.
- E. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.
- F. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Relevant links:

- [Greater London Authority – The London Plan: Intend to Publish 2019](#)

Greater Manchester Combined Authority – GM Plan for Homes, Jobs and the Environment 2019

Reducing Energy Demand / Low carbon energy supply / Reducing Embodied Carbon

Policy GM-S 2 Carbon and Energy

The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:

1. An expectation that new development will:
 - a. Be zero net carbon from 2028 by following the energy hierarchy (with any residual carbon emissions offset), which in order of importance seeks to:
 - i. Minimise energy demand;
 - ii. Maximise energy efficiency;
 - iii. Utilise renewable energy;
 - iv. Utilise low carbon energy; and
 - v. Utilise other energy sources.

With an interim requirement that all new dwellings should seek a 19% carbon reduction against Part L of the 2013 Building Regulations

- b. Incorporate adequate electric vehicle charging points to meet likely long-term demand;
- c. Where practicable, connect to a renewable/low carbon heat and energy network;
- d. Achieve a minimum 20% reduction in carbon emissions (based on the dwelling emission or building emissions rates) through the use of on site or nearby renewable and / or low carbon technologies; and
- e. Include a carbon assessment to demonstrate how the design and layout of the development sought to maximize reductions in whole life CO2 equivalent carbon emissions. District Local Plans may set out specific carbon emission reduction targets or promote other measures through which energy efficiency of buildings can be achieved.

Relevant links:

- [Greater Manchester Combined Authority - Greater Manchester Spatial Framework Publication Plan 2020](#)

Milton Keynes Council – Plan:MK 2016 - 2031

Reducing Energy Demand / Measuring in-use performance / Low carbon energy supply / Zero carbon balance – addressing residual emissions

Policy SC1: Energy and Climate

- H. Implement the Energy Hierarchy within the design of new buildings by prioritising fabric first, passive design and landscaping measures to minimise energy demand for heating, lighting and cooling.
- K. Development proposals for 11 or more dwellings and non-residential development with a floor space of 1000 sq.m or more will be required to submit an Energy and Climate Statement that demonstrates how the proposal will achieve the applicable requirements below:
1. Achieve a 19% carbon reduction improvement upon the requirements within Building Regulations Approved Document Part L 2013, or achieve any higher standard than this that is required under new national planning policy or Building Regulations.
 2. Provide on-site renewable energy generation, or connection to a renewable or low carbon community energy scheme, that contributes to a further 20% reduction in the residual carbon emissions subsequent to 1) above.
 3. Make financial contributions to the Council's carbon offset fund to enable the residual carbon emissions subsequent to the 1) and 2) above to be offset by other local initiatives.
 4. Calculate Indoor Air Quality and Overheating Risk performance for proposed new dwellings.
 5. 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 in 4) above.
 6. 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.
- N.B. Alongside production of a Sustainable Construction Supplementary Planning Document (SPD), Milton Keynes Council is developing a bespoke quality and monitoring regime to help developers close the performance gap and generate post-construction and post-occupancy data about how new homes perform in terms of energy use, carbon emissions, indoor air quality and overheating risk. Both the SPD and quality/monitoring regime are due to be adopted in March/April 2021.

Relevant links:

- [Milton Keynes Council – Plan: MK 2016 - 2031](#)

Old Oak and Park Royal Development Corporation (OPDC)

Measuring in-use performance

Residential development proposals should:

v) Formally report on the annual energy and water consumption for a target of 20% of dwellings and at least 90% of common parts through an online OPDC data collection tool, or other preferred means.

Relevant links:

- [Old Oak and Park Royal Development Corporation - Post Occupancy Evaluation Study 2018](#)

Oxford City Council – Local Plan 2036 ADOPTED

Reducing Energy Demand | Low carbon energy supply

Policy RE1: Sustainable design and construction

Planning permission will only be granted where it can be demonstrated that the following sustainable design and construction principles have been incorporated, where relevant:

- a) Maximising energy efficiency and the use of low carbon energy.

Energy Statements:

- An Energy Statement will be submitted to demonstrate compliance with this policy for new-build residential developments (other than householder applications) and new-build non-residential schemes over 1,000 m². The Energy Statement will include details as to how the policy will be complied with and monitored.

Carbon reduction in new-build residential developments (other than householder applications):

- Planning permission will only be granted for development proposals for new build residential dwelling houses or 1,000 m² or more of C2 (including student accommodation), C4 HMO or Sui Generis HMO floorspace which achieve at least

a 40% reduction in carbon emissions from a 2013 Building Regulations (or future equivalent legislation) compliant base case. **This reduction is to be secured through on-site renewable energy and other low carbon technologies (this would broadly be equivalent to 25% of all energy used) and/ or energy efficiency measures.**

- The requirement will increase from 31 March 2026 to at least a 50% reduction in carbon emissions. After 31 March 2030 planning permission will only be granted for development proposals for new build residential dwelling houses or 1,000 m² or more of C2 (including student accommodation), C4 HMO or Sui Generis HMO floorspace that are Zero Carbon.

Carbon reduction in new-build non-residential developments of 1000m² or more:

- Planning permission will only be granted for development proposals of 1,000m² or more which achieve at least a 40% reduction in the carbon emissions compared with a 2013 Building Regulations (or future equivalent legislation) compliant base case. **This reduction is to be secured through on-site renewables and other low carbon technologies and/ or energy efficiency measures.** The requirement will increase from 31 March 2026 to at least a 50% reduction in carbon emissions.

Relevant links:

- [Oxford City Council – Local Plan 2036 ADOPTED](#)

Reading Borough Council - Sustainable Design and Construction Supplementary Planning Document 2019

Reducing Energy Demand | Zero carbon balance – addressing residual emissions

3. Submission Requirements

3.10 New build housing on sites less than 10 dwellings will achieve at a minimum a 19% improvement in regulated emissions over the target emission rate, as defined in the 2013 Building Regulations unless it can be clearly demonstrated that this would render a development unviable.

3.11 In achieving Zero Carbon Homes for major residential developments, the preference is that new build residential of ten or more dwellings will achieve true carbon neutral development on-site. If this is not achievable, **it must achieve a minimum of 35% improvement in regulated emissions over the Target Emissions Rate in the 2013 Building Regulations, plus a Section 106 contribution of £1,800 per remaining tonne**

towards carbon offsetting within the Borough (calculated as £60/ tonne over a 30 year period). £60 per tonne of carbon is a nationally-recognised price of carbon and reflects the amount established by the Zero Carbon Hub. Based on a review of other Local Planning Authorities (LPA) carbon pricing, £60 is the amount used by a majority of LPAs and is lower than the £95/tonne proposed in the new draft London Plan.

Relevant links:

- [Reading Borough Council - Sustainable Design and Construction Supplementary Planning Document 2019](#)
- [Reading Borough Council – Local Plan 2019](#)

Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020

Reducing Energy Demand | Reducing Embodied Carbon | Measuring in-use performance | Low carbon energy supply | Zero carbon balance – addressing residual emissions

Policy P9 Mitigating and Adapting to Climate Change

- 3) 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:
 - a. 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.
 - b. From April 2025 for all new dwellings to be net zero carbon.
 - c. Minor non-residential development will conform to at least BREEAM Very Good and major non-residential development will conform to at least BREEAM Excellent.
 - d. 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.
 - e. Supply energy efficiently and give priority to decentralised and/or district energy supply.
 - f. For all major developments, 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.

- g. Source low carbon and sustainably sourced building materials wherever possible, e.g. secondary aggregates, recycled products and FSC certified timber.
- h. For residential development of new dwellings: provide at least one charging point for electric vehicles per dwelling. For non-residential development, 1 charging point will be provided per 10 parking spaces. On development sites without allocated parking, a contribution will be made to the Council's Charging Infrastructure Fund and/or provision to be made through a commercial rapid charging point.

Renewable and low carbon energy and carbon offsetting schemes

5) Planning permission will be granted for renewable or low carbon energy developments, and carbon offsetting schemes, provided that they:

- i. Do not cause demonstrable harm to residential amenity or established commercial operations;
- ii. Avoid or minimise impacts on the historic environment;
- iii. Can demonstrate no adverse effect on the natural environment including designated sites;
- iv. Do not have an unacceptable visual impact which would be harmful to its setting;
- v. Will not have a detrimental impact on highway safety.

Relevant links:

- [Solihull Metropolitan Borough Council – Solihull Local Plan: Draft Submission Plan 2020](#)

Sutton Council – Sutton Local Plan 2016-2031

Reducing Energy Demand | Measuring in-use performance | Low carbon energy supply | Zero carbon balance – addressing residual emissions

Policy 31: Carbon and Energy

- A) Proposed developments should meet the following targets for reducing CO2 emissions expressed as a percentage improvement over Part L of the 2013 Building Regulations:
- all residential buildings forming part of major developments should achieve 'zero carbon' standards, by:
 - i. achieving at least a 35% reduction in regulated CO2 emissions on site.
 - ii. offsetting the remaining regulated emissions (to 100%) through the delivery of CO2 reduction measures elsewhere through a Section 106

contribution to the council's carbon offset fund priced at £60 per tonne over 30 years.

- all major non-residential developments should achieve at least a 35% reduction in regulated CO2 emissions on site.
- all minor residential developments should achieve at least a 35% reduction in regulated CO2 emissions on site.

B) In seeking to minimise CO2 emissions in line with the above targets, all proposed developments will apply the Mayor's energy hierarchy by:

- achieving the highest standards of energy efficient design and layout.
- supplying energy efficiently in line with the following order of priority:
 - i. being designed to connect to existing or planned district heating and/or cooling networks supplied by low or zero-carbon energy, unless it can be demonstrated through whole life cycle evidence that connection is not reasonably possible. All major developments located within identified Decentralised Energy Opportunity Areas (Maps 10.1 and 10.2) should apply the council's 'Decentralised Energy Protocol' (Schedule 10.A).
 - ii. site wide heating and/or cooling network supplied by low or zero-carbon energy.
 - iii. communal heating and cooling.
- using renewable energy generated on-site. Major developments will be expected to achieve at least a 20% reduction in total CO2 emissions (regulated and unregulated) through renewables with minor developments achieving a reduction of at least 10%.

C) All planning applications for new dwellings or major non-residential developments should be supported by an Energy Statement incorporating 'as-designed' Building Regulations Part L outputs to demonstrate how the relevant targets for reducing CO2 emissions will be met. The Energy Statement should include calculations of energy demand and emissions at each stage of the Mayor's energy hierarchy for both regulated and non-regulated elements in line with GLA 'Guidance on Preparing Energy Assessments' as amended.

Relevant links:

- [Sutton Council - Sutton Local Plan 2016-2031](#)

The New Homes Policy Playbook

Part 2: Mitigating Overheating Risk



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Introduction

There is strong evidence that excessive or prolonged high temperatures in homes can have severe consequences for occupants.

Indoor temperature is not just a question of comfort. There are approximately 2,000 heat-related deaths each year in the UK whilst the 2003 summer heatwave saw more than 35,000 fatalities Europe-wide. Summer temperatures in urban areas are predicted to rise between 2 and 4 degrees by 2050, increasing the existing risk posed to the elderly, the young and the sick (those who typically spend most of their time indoors during the day) of suffering from severe heat stress.

It is also fair to say that increasing levels of building airtightness and fabric efficiency require greater focus on the risk of overheating and strategies to mitigate this. However, we fundamentally believe that it need not be a choice between the two – it is perfectly reasonable to expect efficient, low carbon homes which also minimise risks posed by overheating. The Zero Carbon Hub published a comprehensive [report](#) on overheating in new homes in 2016.

In addition, there are market trends and drivers which warrant a progressive approach to mitigating overheating risk. Many expect the explosion of consumer interest in health and wellbeing to translate into demand for homes that actively enable positive health outcomes and for this to begin to be a stronger factor in housing choice. See UKGBC's 2016 [work](#) on this topic.

National policy

Even though current Building Regulations do not explicitly cover overheating, references and guidance exist in a number of Government documents. These notably highlight the use and importance of green infrastructure as to address overheating.

A key policy driver for mitigating overheating risk is the [revised NPPF](#) (July 2018). This states that:

“Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating from rising temperatures.”

Subsequently, it emphasises that:

“New development should be planned for in ways that ... avoid increased vulnerability to the range of impacts arising from climate change.”

And: *“When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure.”*

The [Housing Health and Safety Rating System Guidance](#) published by Government in 2006, described overheating as threats from excessively high indoor air temperatures. Excess indoor heat is characterised as a hazard in the document, with 25°C cited as a threshold temperature above which mortality rates will increase.

The [Heatwave Plan for England](#) provides a good practice guide for protecting the public from overheating hazards. Within the Heatwave Plan, it is advised that cool rooms maintaining temperatures below 26°C should be provided in the case of hot weather in hospitals, care/nursing homes and other residential environments occupied by vulnerable individuals. Local authorities, such as [London](#), have produced Resilience Plans that include extreme heat management.

The [National Adaptation Programme](#) (NAP) sets the actions that Government and others will take to adapt to the challenges of climate change in the UK over a five-yearly cycle, as per the requirements of the Climate Change Act 2008.

The [second National Adaptation Programme \(2018 to 2023\)](#) includes a specific plan to tackle overheating in buildings, which mentions that:

- Natural England will develop a set of green infrastructure standards that can be easily used by local GI planners;
- MHCLG commissioned a piece of [research](#) to investigate the impacts of overheating in homes on occupants. Phase 1 examined the type of properties most at risk of overheating, using dynamic thermal modelling to assess this risk for different dwelling types and locations throughout England. Phase 2 consists of a cost-benefit analysis of alternative risk mitigation strategies to reduce overheating risk to an acceptable level.

Future direction of travel

In 2018 the House of Commons Environmental Audit Committee (EAC) held an inquiry into heatwaves and recommended that the Government should create a new regulation to stop buildings being built which are prone to overheating.

The Government responded to this recommendation by committing in the Future Homes Standard consultation to consult on a method for reducing overheating risk in new homes. This consultation was originally scheduled for late 2019/early 2020, but is yet to appear.

The Government is also in the process of developing the policy of ‘Environmental net gain’, which looks to require broader environmental improvements and co-benefits from new development, beyond biodiversity enhancement.

Recommendations

Minimum requirements

It is recommended that local planning authorities develop an overheating risk framework with three core components:

1. *Include mitigation of overheating within the local plan, making clear that new development should follow the cooling hierarchy (see existing policy examples). Provide further guidance on best practice design, either using publications aimed at a national audience (see examples), or ideally providing locally tailored guidance to take account of climatic and geographical differences.*
2. *An early screening assessment/score card, used by developers and/or the Local Planning Authority to provide a simple, time-efficient assessment of risk of overheating. This could be locally developed, or could use nationally recognised screening tools such as BRE’s temperature reporting tool, currently used as part of the [Home Quality Mark](#) or the [Passivhaus Planning Package \(PHPP\)](#) – which includes summer comfort calculations. A pro forma could form an appendix to an SPD.*
3. *When early screening flags a potential issue, we recommend LAs require a detailed appraisal. This would use full dynamic analysis tools to manage and rectify designs that are at significant risk and would need to adopt the methodologies, metrics and KPIs outlined within [CIBSE TM59: 2017 Design methodology for the assessment of overheating](#).*

Rationale

As already noted, there is widespread recognition within the industry and Government that overheating is a major issue. We therefore do not anticipate any challenges to LAs taking a leadership position on this topic.

The recommendations are set out sequentially, but in reality are a closely related package that together form a risk framework for overheating. The three core components described above require some upfront investment of time and resource from local authorities, but are relatively light-touch to administer and do not pose undue burdens on developers. Early consideration of overheating can bring significant benefits not only to residents, but to public finances through avoiding the costs of ill-health, and ultimately costly retrofits. In addition, the recommendations are designed to frontload the discussion of overheating, so that developers can review and design out risk prior to planning submission. Early consideration keeps project team and build design costs down.

It is also worth noting that, to address the ‘heat island effect’, some local authorities have chosen to pioneer green infrastructure or nature-based solutions. These can deliver wider co-benefits in terms of fulfilling parallel commitments to tackle biodiversity decline, as well as enhancing local health and wellbeing.

Stretching requirements

In addition to the above, local authorities should consider introducing the following requirements:

All large developments shall implement a soft landings approach from ‘Phase 1: Inception and Briefing’ as per [BSRIA BG 54/2018 Soft Landings Framework 2018](#), to ensure any building requirements set at the beginning are maintained throughout the project from inception to completion and beyond.

All developments shall 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 owners and the planning authority.

Rationale

These requirements mirror those in the Measuring In-Use Performance section above. Please see the full rationale there. In essence, use of the Soft Landings Framework helps

to ensure that designed operational outcomes are achieved, which includes limiting overheating.

Local authority examples

Below is a non-exhaustive list of existing local authority policies which set requirements for mitigating overheating risk.

Policy	Policy Summary	Status
Cornwall County Council	<p>The Green Infrastructure Strategy for Cornwall document provides a strategic framework to manage and enhance the wider natural environment for the benefit of people, biodiversity and places. It also sets out an approach to how Cornwall wants to guide and shape the planning and delivery of Green Infrastructure up to 2030. This is further strengthened by Policy 25 of the Cornwall Local Plan.</p> <p>Links:</p> <ul style="list-style-type: none"> • Cornwall Council - A Green Infrastructure Strategy for Cornwall 	Adopted
Brighton and Hove Council	<p>CP8 Sustainable Buildings, policy 2.G.: All development proposals including conversions, extensions and changes of use will be expected to demonstrate how the development... protects occupant health and the wider environment by making the best use of site orientation, building form, layout, landscaping and materials to maximise natural light and heat, whilst avoiding internal overheating by providing passive cooling and ventilation</p> <p>Links:</p> <ul style="list-style-type: none"> • Brighton & Hove City Council - Brighton & Hove City Plan Part One 	Adopted March 2016
GLA	London Plan, policy 5.9: Major development proposals should reduce potential overheating and reliance on air conditioning systems and	Adopted (New London Plan emerging)

	<p>demonstrate this in accordance with the cooling hierarchy.</p> <p>Urban greening is also supported through the use of urban greening factors. Further details and guidance regarding overheating and cooling, including prioritising green infrastructure solutions are outlined in Severe Weather and Natural Hazards Response Framework.</p> <p>Links:</p> <ul style="list-style-type: none"> • <u>London Resilience Partnership - Severe Weather and Natural Hazards Response Framework</u> • <u>Mayor of London - Policy 5.9 Overheating and cooling</u> 	
<p>Greater Manchester Combined Authority</p>	<p><u>Policy GM-Strat 13 Strategic & Green Infrastructure Policy GM-G 2 Strategic Green Infrastructure Network - Protecting and enhancing the green infrastructure network throughout Greater Manchester (including its accessibility) is central to the overall vision for the city region, and the Strategic Green Infrastructure Network aims to help cool overheating urban areas, manage flood risk and enable wildlife to adapt.</u></p> <p>Links:</p> <ul style="list-style-type: none"> • <u>Greater Manchester Combined Authority - Greater Manchester Spatial Framework Publication Plan 2020</u> 	<p>Draft, currently under consultation</p>
<p>Milton Keynes Council</p>	<p>Plan MK, policy SC1: Sustainable Construction: Development proposals for 11 or more dwellings are required to:</p> <ul style="list-style-type: none"> • calculate Indoor Air Quality and Overheating Risk performance; • implement a recognised quality regime that ensures the 'as built' performance (energy use, carbon emissions, indoor air quality, and overheating risk) matches the 	<p>Adopted March 2019</p>

	<p>calculated design performance of dwellings;</p> <ul style="list-style-type: none"> 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. <p>Links:</p> <ul style="list-style-type: none"> Milton Keynes Council - Plan: MK 	
Cambridge City Council	<p>Overheating requirements are included in the Greater Cambridge Housing Development Agency Housing Design Guide. Guidance on the cooling hierarchy will be incorporated into the update to the Council’s Sustainable Design and Construction SPD. Developments perceived to be at risk of overheating can be required to carry out detailed modelling.</p> <p>Links:</p> <ul style="list-style-type: none"> Greater Cambridge – The Cambridge Sustainable Housing Design Guide Greater Cambridge – Sustainable Design and Construction Supplementary Planning Document 	Published
London Borough of Islington	<p>A good example of design guidance and an explanation of the cooling hierarchy can be found in “Low Energy Cooling – Good Practice Guide 5”.</p> <p>Links:</p> <ul style="list-style-type: none"> Islington Council - Low energy cooling – Good Practice Guide 5 	Published

The New Homes Policy Playbook

Part 3: Acoustics

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We are most grateful to ROCKWOOL UK for providing content for this chapter

Introduction

Mitigating the impact of noise pollution

With more people living and working in cities than ever before, an increase in high density development and the move towards a 24-hour economy, noise pollution has become a growing issue in the built environment. There are well documented health risks associated with noise pollution, and our understanding of how it can impact health and wellbeing is growing all the time.

In 2018, the World Health Organisation (WHO) [Environmental Noise Guidelines](#) estimated that nearly 20% of Europe's population have their health impacted by noise pollution. The [Chief Medical Officer](#) in the UK puts noise second only to air quality in terms of the impact on public health of a single pollutant.

Studies have shown that exposure to unwanted noise can contribute to sleep disturbance, hypertension, and an increased risk of diabetes, dementia, stroke and heart disease.

The irritation caused by noise pollution can have significant detrimental effects on quality of life, and can contribute to cardiovascular and metabolic [disease](#). Noise pollution is also linked to poor cognitive performance in children, as they struggle against the cognitive load it causes. It is therefore important that new residential development is built to mitigate the adverse impacts of noise.

Of course, not all sound is bad for us. Good acoustic design can improve the quality of our environments and our health and wellbeing by, for example, improving our connection to the sound of nature.

Current policy

There is existing policy to mitigate the impact of noise pollution in new homes. Defra's [Noise Policy Statement for England](#) provides the basis for noise policy in the UK and sets Government's aim to:

"Promote good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development."

For planning, the revised NPPF includes provision on noise, stipulating that local planning policies should: *"Mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse*

impacts on health and the quality of life.” The NPPF also refers planners to the ‘Explanatory Note to the Noise Policy Statement for England ([DEFRA, 2010](#))’.

Approved Document E of the Building Regulations complements this with specific requirements for sound insulation between dwellings in new buildings, as well as conversions. However, these are designed to achieve a minimum standard for the protection of health and safety.

Adhering to these requirements alone will not design out all unwanted internal noise, especially in settings such as cities, where high density living often results in higher than average experiences of noise.

There are also no requirements in the Building Regulations to limit the noise entering buildings from the outside environment. Again, this is particularly significant in urban environments where residential buildings are often subject to significant noise from the surrounding area.

There is therefore a gap between what dwellings meeting the Building Regulations will achieve in terms of noise management, and the ability of those dwellings to meet the requirements of the NPPF and the Noise Policy Statement for England (NPSE) to avoid ‘adverse impacts on health and quality of life’. As such, LPAs need to consider how to use their local plans to ensure effective noise mitigation is achieved in residential developments.

Agent of Change Principle

The revised NPPF in 2018 embedded the ‘Agent of Change’ principle into planning legislation. Planning policies and decisions should ensure that:

“new development can be integrated effectively with existing businesses and community facilities ... Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established.”

In terms of noise mitigation, that means that the responsibility for mitigating impacts from existing noise-generating activities will lie with the developer of the new scheme. For example, if a residential unit is planned in proximity to a music venue, in order to obtain planning permission the developer of that residential scheme must ensure that the residential unit will have effective noise mitigation to avoid complaints about noise to the venue.

The legal mechanism to support this is still evolving, together with its relationship with the law of nuisance, in order to avoid people's rights, or the vibrancy of areas, being undermined.

Recommendations

Minimum requirements

It is recommended that local planning authorities:

Embed the concept of good acoustic design within the Local Plan, making clear that new development should have considered acoustics from the outset, and provide guidance on best practice design.

[The ProPG Planning & Noise Guidance](#) from the Institute of Acoustics, Association of Noise Consultants and Chartered Institute of Environmental Health sets out an acoustic design process to deliver the good acoustic design for a particular site. The ProPG defines good acoustic design as:

“not just compliance with recommended internal and external noise exposure standards. Good acoustic design should provide an integrated solution whereby the optimum acoustic outcome is achieved, without design compromises that will adversely affect living conditions and the quality of life of the inhabitants or other sustainable design objectives and requirements.”

It also goes on to say that:

“Using fixed unopenable glazing for sound insulation purposes is generally unsatisfactory and should be avoided; occupants generally prefer the ability to have control over the internal environment using openable windows, even if the acoustic conditions would be considered unsatisfactory when open. Solely relying on sound insulation of the building envelope to achieve acceptable acoustic conditions in new residential development, when other methods could reduce the need for this approach, is not regarded as good acoustic design. Any reliance upon building envelope insulation with closed windows should be justified”.

Further guidance

[Residential guidance](#) on Acoustics Ventilation & Overheating is also available from the Institute of Acoustics, Association of Noise Consultants (January 2020).

In 2014, the [ISO 12913-1 Acoustics-Soundscape standard](#) was published and it provided a new framework to measure and assess sound that more accurately reflects how it is perceived by the listener in context.

Stretching requirements

In authorities where noise is likely to be a significant issue, or where there are sites or building types that may give rise to high levels of noise, the Local Plan should include specific policies and standards for noise protection, and quiet areas that should be protected. This may include:

Setting requirements above the Building Regulations for certain building types – this has been used by LPAs for example for mixed use development where internal noise may result in high internal noise levels.

Identifying sites for development where noise will require extra mitigation. For example, some LPAs have used noise mapping to identify sites and areas that will be subject to significant environmental noise, often due to proximity to road, rail or air travel routes, and mandated further standards in the Local Plan. In the worst cases LPAs should also state that residential development will not be granted (see Hounslow policy example).

Setting minimum standards for developments in their local area. Many LPAs require developments to meet the internal noise levels in BS8233:2014.

BS8233:2014 – Guidance on Sound Insulation and Noise Reduction in

Buildings

BS8233:2014 provides guidance for the control of noise in and around a building, dealing with both internal and external noise sources. It contains advice on noise levels, acoustic design and noise control measures that are regularly used by Planning Authorities when imposing planning conditions.

For dwellings, it recommends the following noise levels based on earlier versions of World Health Organisation recommendations:

Activity	Location	07:00 – 23:00	23:00 – 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	-
Sleeping	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

Rationale

A requirement for good acoustic design appears in many local plans, for example both the current and new London Plan. There are also many examples of LPAs setting requirements for additional noise standards within their local plans and setting the BS8233 standard as a planning condition (please see policy examples below).

Good acoustic design is also consistent with the provision for good design in the NPPF, which states that:

“Good design is a key aspect of sustainable development, creates better places in which to live and work and helps make development acceptable to communities. Being clear about design expectations, and how these will be tested, is essential for achieving this.” Furthermore, [MHCLG guidance](#) states: *“Good acoustic design needs to be considered early in the planning process to ensure that the most appropriate and cost-effective solutions are identified from the outset..”* and that *“[...] Plans may include specific standards to apply to various forms of proposed development and locations in their area”*.

Considering the acoustic environment when designing a home can be more cost-effective for developers than mitigating the impact of noise after the planning application has been submitted. Through good design, developers can review and design out the risk of noise intrusion prior to planning submission.

Finally, it is clear that concerns around noise and the importance of acoustics are growing in the public consciousness. Defra’s 2012 [National Noise Attitude Survey](#) showed that between 2000 and 2012, noise increased from being the ninth environmental priority to the fourth. A recent Policy Exchange report, [Building More, Building Beautiful](#), found that thick, sound-resistant walls came top in what people felt would create ‘warm feelings’

associated with a home. Designing with noise in mind will engage consumers, increasing the desirability of homes; and designing areas with high quality sound environments will contribute to the creation of desirable places to live.

Local authority examples

Below is a non-exhaustive list of existing local authority policies which set requirements for mitigating noise pollution.

Policy	Policy Summary	Status
Cambridge City Council	<p>4.46 The internal and external acoustic environment and good acoustic design in and around new noise sensitive and noise generating development should be considered as early as possible in the development control process. This shall include:</p> <ul style="list-style-type: none"> • consideration of the feasibility of relocating or reducing noise from • relevant sources; • adequate distance separation from noise sources; • site and building layout/orientation; • internal room configuration; • provision and retention of acoustic barriers or other screening; • acoustic insulation of buildings/noise sources; • building ventilation strategy; • noise limits at site boundaries. <p>4.48 ‘Important Areas’ for road and rail have been identified within Cambridge and an indicative plan of these areas can be viewed at http://extrium.co.uk/noiseviewer.html (England Noise Map Viewer).</p>	Adopted

	<p>4.49 These areas give a good indication of those places that are exposed to the highest levels of existing road and rail transport noise. Proposals for new residential development in these locations need to be carefully considered and opportunities to reduce noise levels in these areas should be secured to improve the acoustic quality of the environment.</p> <p>Links:</p> <ul style="list-style-type: none"> • Cambridge City Council - Cambridge Local Plan October 2018 	
Greater London Authority	<p>Policy D13 6) where it is not possible to achieve separation of noise-sensitive development and noise sources without undue impact on other sustainable development objectives, then any potential adverse effects should be controlled and mitigated through applying good acoustic design principles.</p> <p>3.13.3 The management of noise also includes promoting good acoustic design of the inside of buildings. Section 5 of BS 8223:2014 provides guidance on how best to achieve this.</p> <p>Links:</p> <ul style="list-style-type: none"> • Mayor of London - The London Plan 	Adopted
Liverpool City Council	<p>Policy CC24 All residential developments within the City Centre (as defined on the in the local plan), must meet the highest standard of acoustic sound insulation and specifically the internal noise levels for as set out in BS8233:2014.</p> <p>Links:</p> <ul style="list-style-type: none"> • Liverpool City Council - Liverpool Local Plan Submission Draft January 2018 	Emerging

<p>London Borough of Hackney</p>	<p>LP58 Improving the Environment – Pollution Noise and Vibration</p> <p>K. Noise-sensitive development should be located in areas where occupiers will not be exposed to significantly adverse noise levels. Where new noise-sensitive development is proposed in proximity to existing noise-generating uses, the applicant will be required to carry out a noise assessment and demonstrate how adverse effects will be effectively mitigated without harming the continued operation of existing uses.</p> <p>L. Development in any location will only be permitted where it can be demonstrated that the noise generated by the development is effectively mitigated to prevent adverse impacts on health and quality of life. The impact of noise generated by the demolition and constructions phases of development must also be minimized.</p> <p>M. All residential development proposals shall minimise the potential adverse noise impact on and between dwellings through housing layout, design and materials. New development will only be permitted where the locations of lift and circulation mitigate the impact.</p> <p>Links:</p> <ul style="list-style-type: none"> • Hackney Council - Hackney Local Plan 2033 	<p>Adopted</p>
<p>London Borough of Hammersmith and Fulham</p>	<p>10.24 + 10.27. Notes Approved Document E of Building Regulations is minimal acceptable levels only and requires sound insulation above the Building Regulations (with specific levels set in the appendix) when:</p>	<p>Adopted</p>

	<ul style="list-style-type: none"> • in all parts of adjoining dwellings is unsuitable, • where residential and commercial uses will share separating floors, ceilings or walls <p>22.1 Requires the internal ambient noise levels for habitable rooms ... in terms of the overall level LAeq as indicated in ... BS8233:2014 are met.</p> <p>Links:</p> <ul style="list-style-type: none"> • <u>London Borough of Hammersmith and Fulham - Planning Guidance Supplementary Planning Document 2017</u> 	
<p>London Borough of Hounslow</p>	<p>Policy EQ5 – Noise</p> <p>The LPA expects new residential development to be located outside the outside of the 69 dB LAeq 16hrs noise contour of Heathrow Airport. Between the 69dBA LAeq and 63dBA LAeq contours there will be a presumption against family housing, whilst other smaller one bed and studio housing will only be accepted where high levels of sound insulation and ventilation are provided.</p> <p>In addition, between 63 and 57dBA LAeq contours all new built development, including residential extensions, should have high levels of sound attenuation and acoustically treated ventilation.</p> <p>Links:</p> <ul style="list-style-type: none"> • <u>Hounslow Council – Local Plan 2015 - 2030</u> 	<p>Adopted</p>
<p>London Borough of Richmond (in conjunction with LB Hounslow and LB Hillingdon)</p>	<p>Detailed guidance for the control of noise in new development, including:</p>	<p>Adopted</p>

	<p>3.1 Outlines the general approach that encourages good acoustic design in the planning process.</p> <p>5.0 Details a noise assessment process for noise sensitive developments that includes a noise risk assessment, requirements for internal noise levels (to BS8223:2014 levels in noise sensitive rooms) and external amenity areas.</p> <p>8.0 Encourages applicants to adopt higher standards than the Building Regulations, particularly where certain types of commercial use adjoin residential use.</p> <p>Links:</p> <ul style="list-style-type: none">• <u>London Borough of Richmond - Development Control for Noise Sensitive Development</u>	
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Helpful Resources



Part 1 - Carbon & energy demand reductions

Bioregional, 2020, Buildings Energy Performance Improvements Toolkit (BEPIT):
<https://www.bioregional.com/projects-and-services/creating-sustainable-homes-communities/building-energy-performance-improvement-toolkit-bepit>

BSRIA, 2018, BG 54/2018 Soft Landings Framework:
https://www.bsria.com/uk/product/QnPd6n/soft_landings_framework_2018_bg_542018_a15d25e1/

Business, Energy & Industrial Strategy Select Committee, 2019, Energy efficiency: building towards net zero: <https://publications.parliament.uk/pa/cm201719/cmselect/cmbeis/1730/1730.pdf>

Centre for Sustainable Energy, 2018, West of England Carbon Reduction Requirement Study - Carbon Offsetting in the West of England:
<https://www.bristol.gov.uk/documents/20182/3368102/Carbon+Offsetting+in+the+West+of+England.pdf/894f7c11-33e4-a8b4-ec89-383828553184>

Climate Change Committee, 2019, UK housing: Fit for future? :
<https://www.theccc.org.uk/publication/uk-housing-fit-for-the-future/>

Climate Change Committee, 2019, UK housing: fit for the future?: <https://www.theccc.org.uk/wp-content/uploads/2019/02/UK-housing-Fit-for-the-future-CCC-2019.pdf>

Good Homes Alliance, 2020. Assured Performance Process (APP):
<https://kb.goodhomes.org.uk/tool/assured-performance-process/>

HM Government, 2019, Environmental Reporting Guidelines: Including streamlined energy and carbon reporting guidance:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/850130/Env-reporting-guidance_inc_SECR_31March.pdf

HM Government, 2020, The Ten Point Plan for a Green Industrial Revolution:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/936567/10_POINT_PLAN_BOOKLET.pdf

ICORA, 2020, Code of Best Practice for Carbon Management Services:
https://www.icroa.org/resources/Documents/ICROA_cobp_carbon_management_service_executive_summary_2020.pdf

LETI, 2019, *Climate Emergency Design Guide*: <https://www.leti.london/cedg>

LETI, 2019, Net Zero 1-pager: <https://www.leti.london/one-pager>

LETI, 2020, LETI Embodied Carbon Primer: https://b80d7a04-1c28-45e2-b904-e0715cface93.filesusr.com/ugd/252d09_8ceffcbaafdb43cf8a19ab9af5073b92.pdf

Mayor of London, 2018, Carbon Offset Funds:
https://www.london.gov.uk/sites/default/files/carbon_offset_funds_guidance_2018.pdf

Mayor of London, 2020, Whole Life Carbon Assessment – Pre-consultation Draft:
https://www.london.gov.uk/sites/default/files/wlc_guidance_april_2020.pdf

Ministry of Housing, Communities & Local Government, 2019, The Future Homes Standard: changes to Part L and Part F of the Building Regulations for new dwellings:
<https://www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings>

Ministry of Housing, Communities & Local Government, 2020, Planning for the Future – White Paper:
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/907647/MHCLG-Planning-Consultation.pdf

Passivhaus Trust, 2018, Passivhaus Powerhouses:
<https://passivhaustrust.org.uk/news/detail/?nid=741>

RIBA, 2019, 2030 Climate Challenge: <https://www.architecture.com/about/policy/climate-action/2030-climate-challenge>

RIBA, 2020, Sustainable Outcomes Guide: <https://www.architecture.com/-/media/GatherContent/Test-resources-page/Additional-Documents/RIBASustainableOutcomesGuide2019pdf.pdf>

RICS, 2017, Whole life carbon assessment for the built environment:
<https://www.rics.org/globalassets/rics-website/media/upholding-professional-standards/sector-standards/building-surveying/whole-life-carbon-assessment-for-the-built-environment-1st-edition-rics.pdf>

Scottish Government, 2020, Embodied Carbon: Status Quo and Suggested Roadmap:
https://zerowastescotland.org.uk/sites/default/files/Embodied_carbon_spreads%20final.pdf

UKGBC, 2019 et seq, Advancing Net Zero Programme: <https://www.ukgbc.org/ukgbc-work/advancing-net-zero/#net-zero-carbon-buildings-framework>

Useful projects, 2020, Meridian Water Environmental Sustainability Strategy:
<https://www.ukgbc.org/wp-content/uploads/2020/10/Meridian-Water-Environmental-Sustainability-Strategy-.pdf>

WorldGBC, 2019, Whole-life Carbon Vision: <https://www.worldgbc.org/advancing-net-zero/whole-life-carbon-vision>

Part 2 - Mitigating Overheating Risk

BRE, 2020, A Brief Guide to the HQM: <https://www.homequalitymark.com/>

CIBSE, 2017, CIBSE TM59: 2017 Design methodology for the assessment of overheating: <https://www.cibse.org/news-and-policy/june-2017/new-cibse-publication-tackles-overheating-in-homes>

Ministry for communities and local government, 2006, Housing health and safety rating system (HHSRS): guidance for landlords and property-related professionals: <https://www.gov.uk/government/publications/housing-health-and-safety-rating-system-guidance-for-landlords-and-property-related-professionals>

Department of Environment, Food and Rural Affairs, 2018, The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf

Design Support, 2020, Passivhaus Trust: https://passivhaustrust.org.uk/design_support.php

Good Homes Alliance, 2019, Overheating in New Homes: <https://goodhomes.org.uk/overheating-in-new-homes>

Public Health England, 2014, Heatwave Plan for England: <https://www.gov.uk/government/publications/heatwave-plan-for-england>

Mayor of London, 2020, London City Resilience Strategy 2020: https://www.london.gov.uk/sites/default/files/london_city_resilience_strategy_2020_digital.pdf

Ministry of Housing, Communities & Local Government, 2019, Research into Overheating in New Homes: <https://www.gov.uk/government/publications/research-into-overheating-in-new-homes>

Ministry of Housing, Communities & Local Government, 2019, National Planning Policy Framework: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/810197/NPPF_Feb_2019_revised.pdf

UKGBC, 2016, Health and Wellbeing in Homes: <https://www.ukgbc.org/wp-content/uploads/2017/12/Healthy-Homes-Full-Report.pdf>

Zero Carbon Hub, 2018, Next Steps for Overheating: <https://www.zerocarbonhub.org/sites/default/files/resources/reports/ZCH-Overheating-NextStepsDefinitions-Final.pdf>

Part 3 – Acoustics

ANC, 2020, Acoustics Ventilation and Overheating: <https://www.association-of-noise-consultants.co.uk/wp-content/uploads/2019/12/ANC-AVO-Residential-Design-Guide-January-2020-v-1.1.pdf>

DEFRA, 2010, Noise Policy Statement for England (NPSE):
<https://www.gov.uk/government/publications/noise-policy-statement-for-england>

ISO, 2014, ISO 12913-1 Acoustics-Soundscape Part 1: Definition and conceptual framework:
<https://www.iso.org/standard/52161.html>

WHO, 2018, Environmental Noise Guidelines for the European Region:
<https://www.euro.who.int/en/health-topics/environment-and-health/noise/publications/2018/environmental-noise-guidelines-for-the-european-region-2018>