Supplementary Planning Document on

Climate Change Mitigation and Adaptation in New Development

London Borough of Hounslow

Contents

CHAPTER 1

INTRODUCTION

The United Nations has identified Climate Change as being the defining issue of our time and that we are now at a defining moment.

Failure to take sufficient action is expected to result in significant negative consequences for society – with, ultimately *"the collapse of our civilisations and the extinction of much of the natural world... on the horizon".*

(Sir David Attenborough – UN Climate Change Conference 2018)

In response, the **UK government** have declared a climate emergency highlighting the importance attached to tackling this issue.

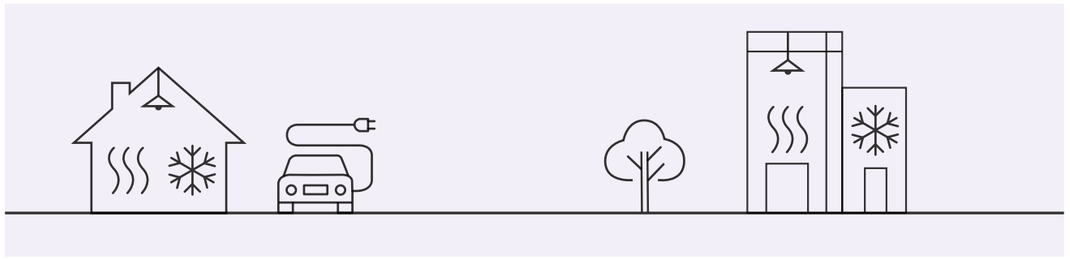
On the 18th June 2019, **Hounslow Council** also declared a 'climate emergency' and shortly thereafter announced a motion recognising the Government's legally binding national target to be zero carbon by 2050. To this end, it has called for *"all possible ways to bring this target forward".*

In line with this, we committed to identifying measures to reduce the Council's carbon footprint, making the Council's activities carbon neutral and ultimately carbon zero in the shortest possible timeframe.

Subsequently, The Council adopted a **Climate Emergency Action Plan** on 14 July 2020. This sets out the Council's intention to reduce its own direct emissions to net zero by 2030, and to use its influence and community leadership responsibilities to reduce wider borough emissions – which in 2019, **government statistics** show, amounted to 983 $ktCO_2$ – to net zero as quickly as is practicable after that.

The built environment is responsible for a significant proportion of carbon emissions. The **Committee on Climate Change** has estimated that 34% of UK emissions can be attributed to buildings, with approximately half of that from heating.

Within Hounslow, we know that around one third of the wider borough's emissions relate to domestic electricity, gas and other fuels, mostly for heating, lighting and other uses which are regulated (i.e. subject to limits under Building Regulations). A further third of emissions relate to industrial and commercial uses, a significant amount of which will also be associated with heating, lighting and cooling buildings. The final third relates to transport, which is heavily influenced by the design of the built environment. The Planning System, as a tool to shape the built environment, therefore has a vital role to play in meeting national, regional and local carbon reduction targets, including those contained with the Council's Climate Emergency Action Plan.



1.1 Purpose of this Document

One of the Council's most direct means to influence wider borough emissions relates, through planning policy, to those associated with new residential and commercial development. The vast majority of new buildings constructed now will still exist in 2050, the date when the government aims to be zero carbon nationally. There is therefore a critical need to ensure that every new building constructed today is built to a standard consistent with achieving net zero carbon emissions, to avoid the need for wasteful and costly retrofit in the future.

This was a key driver for the inclusion of an immediate-term goal (2021–2025) in the Council's Climate Emergency Action Plan, to prepare this Climate Change Supplementary Planning Document (SPD) to support new development to be built to Zero Carbon standards as quickly as practicable.

This document is intended to support developers to address climate change in their development proposals, with a specific focus on the **fabric and services of new developments** to minimise operational carbon emissions and adapt to the changing climate. It does not contain any new policies – rather, it provides guidance on how existing climate change mitigation and adaptation policies in the adopted development plan should be implemented for new development, in order to deliver on the Climate Emergency Action Plan and support the borough's journey to net zero.

This guidance seeks to:

1. Clarify existing local development plan policy requirements relating to climate mitigation and adaptation in new development projects, with a specific focus on building fabric and services.
2. Provide detailed guidance on the implementation of these policies in development design and construction – Chapter 3 sets out how development proposals can achieve these requirements and encourages them to go further where possible.
3. Combat silo thinking – identified as a key obstacle to delivering an effective response to the climate emergency – by setting out a practical approach, in Section 2.2, to placing these requirements within the context of the wider sustainable design process, to ensure delivery of sustainable buildings and places.
4. Provide a basis for clear and consistent decision-making by the council on planning applications.

1.2 Scope and Applicability

This guidance applies to all proposals for new residential or commercial schemes, whether major or minor. Where a particular policy only applies to major or referable schemes, this will be stated. The guidance is also relevant for significant redevelopments or refurbishments which are subject to planning permission.

1.2.1 Application of this guidance

This document takes as read the unequivocal scientific evidence for the human origins of climate change, and for the dire consequences to both the natural environment and human civilization that are likely to result from it. A planning application is not a forum for debating the seriousness of climate change and any suggestion that officers should disregard its importance when considering a planning application will carry no weight.

While there is a wide spectrum of views on how the challenge of climate change should be approached, it is important to note that, when defining how this SPD will be applied to new development, the Development Management system is plan-led. Unless material considerations indicate otherwise, decisions on planning applications must therefore be determined in accordance with the Development Plan (i.e. the London Plan and the Local Plan, as described in Sections 1.3.3 and 1.3.4 below). This SPD is a material consideration, but cannot be used to expand or extend requirements beyond those already set out in the Development Plan. Where the SPD makes suggestions which go beyond these requirements, these are clearly identified as aspirations.

The guidance in this document is based on policies and regulations at the time of preparation (2024), and on the best available knowledge of sources of good practice on responding to the climate emergency. However, regulations will be updated and what is considered to be good practice will also continuously evolve. This may happen rapidly in some areas of emerging knowledge, such as on embodied carbon. While the Council will endeavour to update this document over time, it is acknowledged that the source material may be superseded as and when new regulations are adopted, and guidance published – for example, upon completion of the Local Plan Review described in Section 1.3.4. You are advised to contact the Local Planning Authority for further information.

This document should be read in conjunction with the latest guidance and technical toolkits available, including (but not limited to) those from the UKGBC, RICS, CIBSE, and the RIBA, as referenced throughout this document. Further advice on building design may be sought through the Council's pre-application advice service.

1.2.2 Exclusions and restrictions to applicability

This guidance does not apply to certain types of decision or development. These exclusions, and other restrictions on its applicability, are set out below:

Site selection and types of development

Decisions on selection of sites for development, or what sort or scale of development is appropriate in a particular location, are not in scope of this SPD. The principles governing such decisions, including those relating to sustainability, are already set out elsewhere in the Development Plan (as set out in Section 3.1 below) and are not duplicated here. Rather, where development is considered to be appropriate on the basis of those principles, this SPD sets out the requirements which the resulting building's fabric and services must meet in response to the climate emergency.

Existing buildings

It is estimated by the UKGBC that approximately 80% of building stock that will exist in the UK in 2050 has already been constructed – so achieving Net Zero will not happen without tackling emissions from these buildings. Demolition and rebuild in most cases will, itself, result in significant carbon emissions, and so must be a last resort. Retention and low-carbon retrofit of existing buildings must therefore be a priority, if we are to meet our 2050 Net Zero target. Guidance to support re-use of existing buildings is already included in the Hounslow Character, Sustainability and Design Codes SPD (see Part A2 – Common Considerations; Resources & Lifespan section) and is not duplicated in this document.

Where retrofit requires planning permission – for example major office refurbishments, or conversions of buildings to residential use – applicants are expected to apply the principles set out in this SPD to mitigate and adapt to climate change, as far as is practicable without resorting to demolition and rebuild, and taking particular care with traditionally constructed buildings (i.e. solid wall structures typically of pre-1919 date) requires a different approach, materials and expertise, to ensure that they continue to be able to absorb and release moisture. More detailed guidance on this is set out in Section 3.7.

However, this document does not cover alterations to existing dwellings by householders. A separate Guide to Improving Sustainability of Existing Homes has instead been prepared, tailored to the specific issues faced by these buildings and the regulatory framework which applies. For example:

- Most of the changes which householders can make to mitigate and adapt to climate change do not require planning permission; we cannot, therefore, set out minimum standards or requirements for such measures. Rather, the Householder Guide seeks to set out available options and encourage householders to make energy performance and other improvements.
- Where householders choose to extend or refurbish their homes, minimum standards for energy performance of new building elements (windows, roofs, extensions, etc.) are already set out in Part L (2021) of the Building Regulations and will be applied to extensions or new elements of existing buildings, subject to any practical constraints (including those due to historic fabric, conservations status, etc). In these circumstances, local authorities have limited powers to require additional consequential energy efficiency improvements. Instead, the Guide to Improving Sustainability of Existing Homes seeks to encourage householders to take the opportunity to maximise energy performance improvements to the existing fabric at the same time.
- For homes which are listed or in conservation areas, there may be restrictions on some energy performance measures – this is also covered in the Guide to Improving Sustainability of Existing Homes.

Previously approved proposals

This guidance cannot be applied retrospectively to proposals which have already received planning permission.

In addition, certain types of planning application, such as Prior Approvals (needed for some types of permitted development) or variations to extant permissions, cannot be required to meet any new requirements. In these circumstances, officers will use discussions with developers as part of the planning process to encourage compliance – for example, by pointing out that it could be cheaper and less disruptive to comply now with expected future requirements, such as tighter minimum energy efficiency standards for rental properties, which may be introduced in the future).

1.3 Planning policy and legislative framework

This section sets out the relevant national planning policy context, before outlining the key regional and local development plan documents and the relevant policies with which this SPD is primarily concerned.

1.3.1 International and national legislation

The international and national policy context and legislation on climate change, which may be relevant to planning decisions in London Borough of Hounslow, are set out in Annex A. The guidance contained within this document draws on this context and interprets it for development within the Borough. These policies will, where relevant and appropriate, be taken into account when considering planning applications.

1.3.2 National Planning Policy Framework

At the national level, the National Planning Policy Framework (NPPF) specifies the Government's planning policies for England and how these are expected to be implemented. The framework is underpinned by a presumption in favour of 'sustainable development', using the definition adopted by the UN: "meeting the needs of the present without compromising the ability of future generations to meet their own needs". The NPPF is a material consideration in all plan-making processes and development management decisions.

Paragraph 8 of the NPPF sets out the three overarching objectives for the planning system vis a vis achieving sustainable development: an economic objective, a social objective and an environmental objective. The environmental objective explicitly identifies the mitigation of and adaptation to climate change, including moving to a low carbon economy, as being central to meeting the Government's sustainable development ambitions. Annex 2 of the NPPF defines these goals as follows:

> ***Climate change mitigation***: *"Action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions".*
>
> ***Climate change adaptation***: *"Adjustments made to natural or human systems in response to the actual or anticipated impacts of climate change, to mitigate harm or exploit beneficial opportunities".*

The environmental objective also states that development should protect and enhance the natural, built and historic environment, including making effective use of land, as well as improving biodiversity, using natural resources prudently, and minimising waste and pollution.

Paragraph 9 of the NPPF states that these objectives should be delivered through the preparation and implementation of plans, and the application of the policies in the NPPF. Paragraph 10 establishes the presumption in favour of sustainable development, whilst paragraph 11 describes how the presumption should be applied to plan-making (including an explicit instruction that plans should promote a sustainable pattern of development which seeks to, inter alia, mitigate climate change and adapt to its effects) and decision taking.

The NPPF emphasises the invaluable role the planning system can play in cutting carbon emissions, minimising vulnerability, boosting resilience and supporting the delivery of a diversified energy system, where low carbon and renewable sources play an increasing role. To this end, Chapter 14 sets out policy to enable plan makers and decision takers to meet the challenge of climate change, flooding and coastal change. By way of introduction, paragraph 152 states:

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; encourage the reuse of existing resources, including conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure".

Further detailed and frequently updated national policy guidance is provided online through Planning Practice Guidance.

1.3.3 The London Plan

The London Plan is the spatial development strategy for Greater London, and as such forms part of the development plan for all London Boroughs. The current London Plan was published in March 2021.

The main London Plan policy relevant to this SPD is **Policy SI2 – Minimising greenhouse gas emissions,** within Chapter 9 – Sustainable Infrastructure. A range of other policies in this chapter will also be relevant, such as:

Policy SI1	Improving air quality
Policy SI3	Energy infrastructure
Policy SI4	Managing heat risk
Policy SI5	Water Infrastructure
Policy SI7	Reducing waste and supporting the circular economy
Policy SI12	Flood risk management
Policy SI13	Sustainable drainage

Other policies which have a bearing on this SPD include:

Chapter 1:	
Policy GG6	Increasing efficiency and resilience
Chapter 3:	
Policy D3	Optimising site capacity through the design-led approach
Policy D4	Delivering good design
Policy D6	Housing quality and standards

For all new buildings, commercial or residential, the current policy requirement in the London Plan is for them to have net-zero carbon emissions in operation. In planning terms, net-zero carbon relates only to regulated energy uses – heating, cooling and lighting a property – but not to unregulated emissions – that is, those from white goods and other plug-in items.

Energy and resources relating to construction

For all applications referable to the Mayor of London, the lifetime carbon costs of a building – including those involved in its construction, i.e., its embodied carbon – are also to be assessed.

An important change from the previous London Plan is the call for a 'circular economy' (Policy SI7): *"one that produces no waste and pollution, by design or intention…[which] keeps products, parts and materials at their highest use and value at all times [and] offers a sustainable alternative to our current linear economy…A circular economy also uses fewer new resources and energy [which] means less cost to the environment".* Central to meeting this policy ambition will be consideration, at the building design stage, of the efficient use of materials in its construction, as well as the accommodation of its future uses, refurbishment and eventual deconstruction and re-use of those materials.

1.3.4 Borough-level planning context

The Hounslow Local Plan (2015) Volume 1 is the key local development plan document (DPD) setting out the Council's strategic policies and proposals which are used to guide the development of the borough over a 15-year period to 2030. Local Plan policies must be consistent with national planning policy and conform with the Mayor of London's spatial development strategy, including policies related to sustainable development and climate change mitigation & adaptation.

This SPD provides additional practical and detailed guidance for Local Plan policies relating to climate change, to enable developers to enhance the sustainability of development in the Borough. The main Local Plan policies of relevance are in Volume 1, Chapter 9 – Environmental Quality, but policies in other chapters are also relevant. The key ones are set out below; however please note that this list is not intended to be exhaustive.

Chapter 6 – Context and Character:	
Policy CC2	Urban design and architecture
Policy CC4	Heritage
Chapter 9 – Environmental Quality:	
Policy EQ1	**Energy and carbon reduction**
Policy EQ2	**Sustainable design and construction**
Chapter 11 – Implementing the Strategy:	
Policy IMP1	Sustainable development

Policies EQ1 and EQ2 are the most relevant to this document. They currently require all developments to meet the carbon emission reduction requirements set out in the London Plan, and to implement high standards of sustainable design and construction.

However, they also go further: in Hounslow, major developments are expected to connect to existing decentralized heating, cooling or power networks or be adaptable for future decentralized energy; they are also expected to evaluate the feasibility and viability of Combined Heat and Power systems (either onsite or beyond the boundary) and to make a financial contribution to a certified borough-wide carbon reductions programme where reductions cannot be reached onsite (see Chapter 3 for further details).

Local Plan Review

The Climate Change Emergency Action Plan commits the Council to review all its policies, including those in the Local Plan, to raise levels of ambition on climate action. The Council is in the process of reviewing the Local Plan adopted in 2015 to create a new consolidated, single Local Plan, with the timetable for this work set out in the Council's adopted Local Development Scheme.
As part of this work, officers will be reviewing the Local Plan's policies on climate mitigation and adaptation to ensure better alignment with the London Plan 2021 and recent national policy changes, and to reflect the latest evidence base findings and Council priorities in relation to climate change and the move towards net zero carbon.
This SPD will be updated in future to align with the new single Local Plan once this has been adopted (currently scheduled for Winter 2025).

CHAPTER 2

SUSTAINABLE DESIGN EXPECTATIONS

The Council wishes to work together with landowners, developers, designers and builders, to achieve development which is not only zero carbon and adapted to the changing climate, but also protects biodiversity and supports sustainable lifestyles. In order to deliver this, sustainability needs to be an integral part of the design process. This chapter sets out our expectations regarding the sustainable design of proposed new developments, and provides guidance to help applicants to deliver buildings which meet these expectations.

2.1 Designing for climate mitigation and adaptation

Delivering zero carbon and climate-resilient design requires that the whole design team understands their individual contributions to reducing operational energy and embodied carbon in a cost-effective way. A 'golden thread' of responsibility should run through all RIBA stages, that is from pre-design, through construction and into operation, to ensure decisions are implemented and their operation verified.

To ensure this, developers should:

- Appoint key suitably qualified design team members to improve operational energy performance and other sustainability outcomes early in the design process. Investment in design will be very likely outweighed by reduced planning risk.
- Commit to benchmarking exercises and set established performance targets early in the design process - ideally prior to commencement of concept design (RIBA Stage 2).
- Ensure their Design Team designs in accordance with the sustainable design process set out below, and the recommended key performance targets set out in the Council's Sustainability Checklist (which will be made available by the Planning Department).
- Ensure that life cycle cost analysis and whole life carbon analysis are carried out for all projects, giving both appropriate weighting in value engineering decision making.

The Public Practice Note PN014 – Road Map to Achieving Net Zero Carbon for New Homes Projects sets out in more detail the activities which should be undertaken at each RIBA development stage, in order to deliver Net Zero development.

2.2 Integrating sustainability into design

While the main focus of this document is on the **design and construction of fabric and services in new developments** – covered in Chapter 3 below – other aspects of the design of new developments also have an important contribution to make, both in responding to climate change and tackling wider, interrelated, sustainability issues addressed in the Development Plan. The guidance in this document cannot therefore be considered in isolation – a holistic approach to sustainable design is needed.

To accomplish this holistic approach (and to meet the requirements of London Plan Policy D3 – *optimising site capacity through the design-led approach*), developers and their design teams are expected to adopt key sustainability principles **from the earliest stages of the design of a new proposal.** This requires that this document is considered alongside related guidance covering other aspects of sustainable design, in particular the Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations).

Such an approach will ensure that designers consider responses to the climate emergency and related sustainability objectives at the appropriate design stages. It is not acceptable to design a scheme without considering these matters, with a view to attempt to retrospectively *'green'* it, as this is unlikely to achieve good design outcomes.

Developers will themselves benefit from this approach – **actions to address climate impacts and related environmental objectives are likely to be both cheaper to deliver, and more successful, if they are taken into account from the outset and considered at each stage of the design process.** Developers who can demonstrate that they have done so, for example within their supporting sustainability statement, will also benefit from reduced planning risk.

2.2.1 The sustainable design process

The Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations) sets out a sustainable design journey – an integrated approach to sustainable design with four key stages (see Figure 2.1).

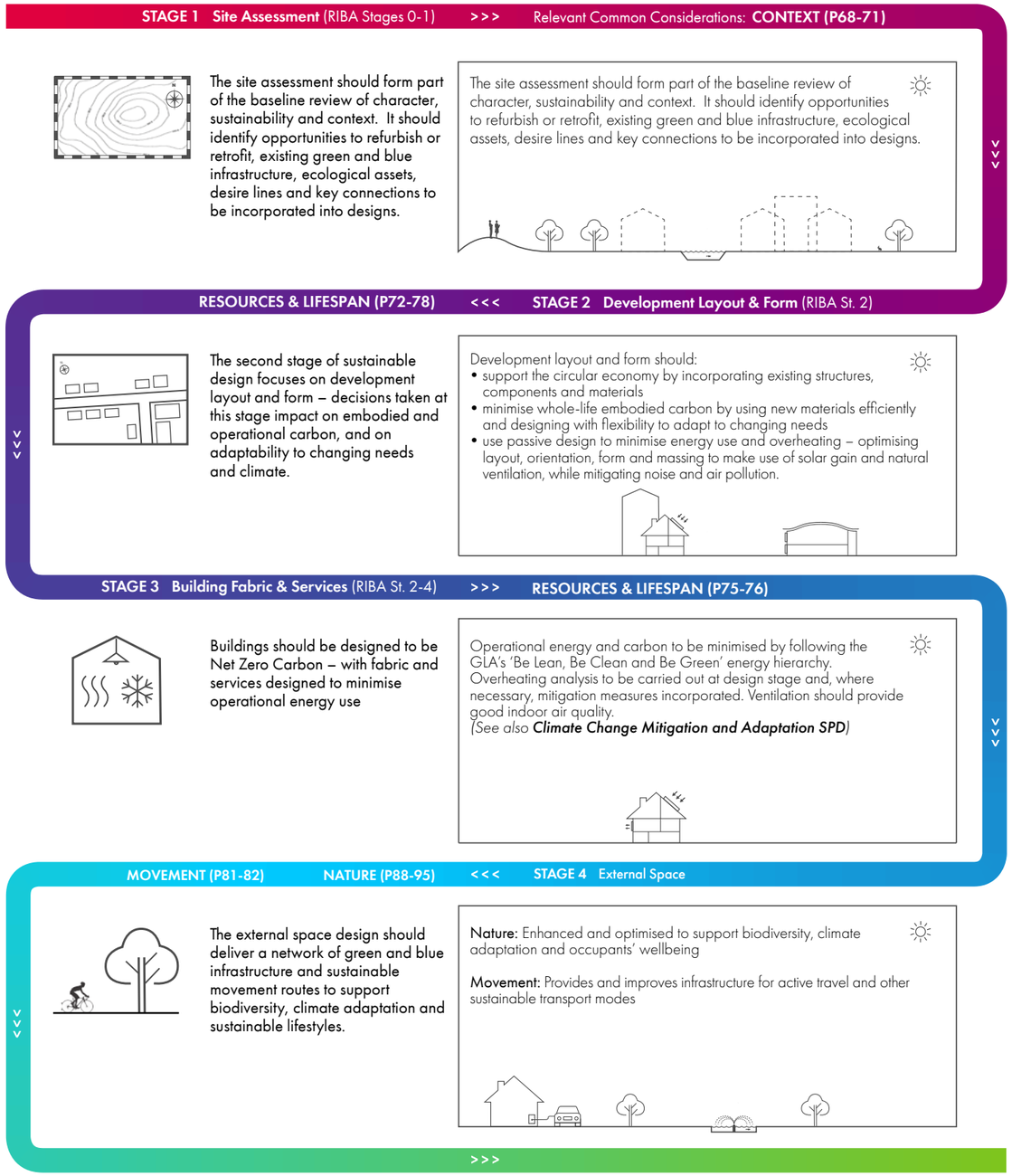


Figure 2.1
The four key design stages illustrated as a Sustainable Design Journey, with the relevant Common Considerations from the Hounslow Character, Sustainability and Design Codes SPD identified for each stage.

The issues to be addressed at each design stage, along with relevant sources of guidance, are set out below.

Stage 1: Site Assessment

The sustainable design journey begins with an assessment of site landscape, characteristics, assets and local character – this must inform all subsequent design stages.

Issues for Consideration	Desired Outcomes	Guidance
Opportunities for **retention and refurbishment** of existing buildings	Lower embodied carbon through reduced need for new construction	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Context – Identity Historic England's Energy Efficiency and Retrofit in Historic Buildings webpages
Identify and assess **existing green and blue infrastructure** (G&BI) and ecological assets Assess potential to incorporate new trees and other planting to provide 'ecosystem services' such as summer shading and flood mitigation	Current and potential role of existing G&BI within the wider green infrastructure and sustainable drainage network is identified Existing G&BI is preserved, enhanced and contributes to the new development's landscape design.	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Context – Nature – Public Spaces See also: Woodland Trust guidance on trees in residential developments (January 2019)
Identify **existing movement patterns** and desire lines across and around the site; connections to surrounding areas, especially public transport links	Existing opportunities for, and levels of, walking, cycling and other modes of sustainable movement are not lost as a result of the new development, but rather are retained and enhanced.	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Context – Movement – Public Spaces

Stage 2: Development Layout & form

This stage focuses on how the proposed layout, massing and form of buildings on a site can be designed to optimise the characteristics of the final development. Decisions taken at this stage can impact on both embodied carbon emissions and operational energy use, and on the development's adaptability to changing climate and other needs. Wider sustainability needs, such as impacts of proposed designs on green and blue infrastructure on the site, should also be considered.

Issues for Consideration	Desired Outcomes	Guidance
Circular Economy – Development design which realises opportunities to incorporate existing buildings, structures, components and materials into new buildings on-site	Demolition minimised and reuse of existing buildings maximised Components of previous buildings and projects reused at the highest value possible	Hounslow Character, Sustainability and Design Codes SPD (Part A2 –Common Considerations): – Resources & Lifespan; – Built Form; – Homes and Buildings See also: London Plan Guidance: Circular Economy Statements
Embodied Carbon – minimise by using new materials efficiently and designing with flexibility to adapt to changing needs	Carbon emitted as a result of construction and materials are kept to a minimum, in line with RIBA targets	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Resources & Lifespan See also: London Plan Guidance: Whole Life-Cycle Carbon Assessments
Use **Passive Design principles** to minimise energy use and overheating risk – optimising building layout, orientation, form and massing to optimise solar gain, summer shading and natural ventilation, while mitigating against sources of noise and air pollution – within the constraints imposed by the need to preserve existing green and blue infrastructure and movement networks	Contribution of development layout and design to achieving sustainable outcomes is maximised	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Resources & Lifespan; – Built Form; – Homes and Buildings
Site layout to **minimise current and future flood risk** – e.g. by allowing space for water and sustainable drainage, and locating more vulnerable parts of development in the lowest risk parts of the site	Flood risk is kept to an acceptable level and minimised for the most at risk uses New developments also to consider how future flood management infrastructure could be incorporated	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Nature

Stage 3: Building Fabric & Services

This stage involves addressing climate change issues in the detailed design of building fabric and services. These should be designed to ensure that buildings are net-zero carbon, minimising operational energy use; and to adapt the building to the changing climate, including rising temperatures and water scarcity.

The focus of this SPD is to provide detailed advice for this stage of the sustainable design process. However, the issues identified below have complex solutions, requiring action at more than one stage. Design decisions at this stage will therefore influence, and be influenced by, decisions made at other stages of the design process. **It is therefore essential that the guidance in Chapter 3 of this SPD is used in conjunction with the other related guidance identified below, and as part of a design process encompassing all four stages.**

Issues for Consideration	Desired Outcomes	Guidance
Minimise operational energy use and eliminate on-site carbon emissions, by following the GLA's 'Be Lean, Be Clean, Be Green and Be Seen' hierarchy.	No onsite carbon emissions Energy used by buildings is consistent with achieving decarbonisation of the energy grid by 2030 Homes are affordable to heat and run by residents	Chapter 3 of this SPD See also: Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Resources & Lifespan
Mitigate overheating risk – overheating analysis to be carried out at design stage and, where necessary, mitigations incorporated, using the Cooling Hierarchy	Residents are not exposed to avoidable overheating which may impact on their wellbeing	Chapter 3 of this SPD See also: Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Resources & Lifespan – Nature – Homes & Buildings – Built Form
Sufficient ventilation to provide good indoor air quality, including management of moisture and condensation	Residents are able to enjoy good levels of indoor air quality which does not compromise their health or wellbeing	Chapter 3 of this SPD See also: Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Resources & Lifespan – Built Form – Homes & Buildings
Minimising mains water requirement through efficient use, re-use and harvesting	Mains water use is kept to a level which is consistent with continued sufficient sustainable water supply as the city grows	Chapter 3 of this SPD

Stage 4: External Space

The design of external space should build on the findings of the site assessment to deliver a network of green and blue infrastructure and sustainable movement routes, to support biodiversity, climate adaptation and resilience, active travel and health and wellbeing.

Issues for Consideration	Desired Outcomes	Guidance
Green space design which supports biodiversity, helps to address overheating and flood risks, and enhances occupant health and wellbeing. Trees have a particularly important role to play in delivering these aims	Development provides sufficient green space – and in particular trees – to meet UGF and BNG requirements Existing green and blue infrastructure is preserved and enhanced Support for biodiversity, climate adaptation, and occupant health and wellbeing is maximised	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Nature – Public Spaces See also: Hounslow's Green and Blue Infrastructure Strategy Hounslow's Nature Recovery Action Plan Woodland Trust guidance on trees in residential developments – provides advice on integrating trees into the design process.
Provide **infrastructure for sustainable movement –** active travel, public transport and the transition of vehicular trips to electric mobility; incorporating and enhancing movement routes and desire lines identified at Stage 1	Opportunities for residents to use walk, cycle and use public transport are maximised Sufficient infrastructure is provided to support residents to transition to electric mobility	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations): – Movement – Nature – Public Spaces

Issues covered in this document

Building envelope
High levels of fabric efficiency. Optimise window sizes to limit heat loss to the north and take advantage of useful solar gains to the south.

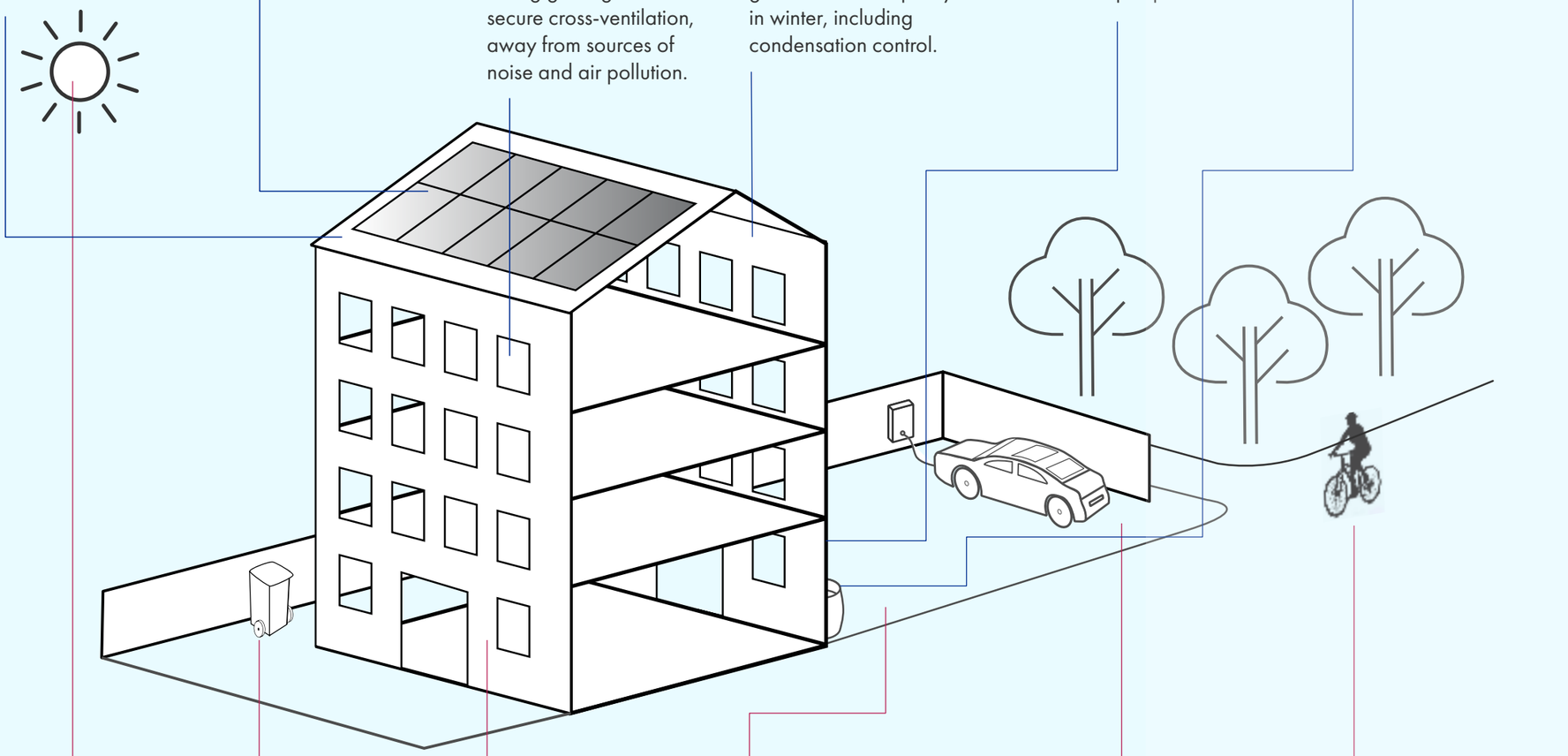
Renewable energy
Energy generation should seek to match,wherever possible, annual energy use.

Overheating mitigation
Provide shading to windows to limit summertime solar gain, and avoid large expanses of east/west facing glazing. Provide secure cross-ventilation, away from sources of noise and air pollution.

Ventilation and indoor air quality
Mechanical Ventilation with Heat Recovery (MVHR) should be used to provide energy efficient ventilation for good indoor air quality in winter, including condensation control.

Low-carbon heat
New homes should not be connected to the gas grid. Low-carbon alternatives such as district heating connection or heat pumps should be used.

Water use
Specify water-efficient fittings. Incorporate rainwater collection for re-use.



Passive design
Use orientation, compact building form, layout, massing and organisation to optimise solar gain and passive ventilation, and minimise annual energy requirement for heating and cooling.

Issues covered in the character and design codes SPD

Waste & Recycling
Kitchen areas to include convenient, adequately sized recycling and food waste storage, with easy access to external waste collection points and, where possible, dedicated space for home-composting of food waste.

Circular economy & Whole-life carbon
Re-use existing structures where possible. Minimise new materials and embodied carbon in new developments. Flexible design for adaptation and reuse.

Flooding
Use permeable surfaces wherever possible, and incorporate living roofs and sustainable drainage systems (SuDS) to limit run-off to green-field levels.

Green & Blue infrastructure
incorporate a network of green and blue spaces which builds on existing features. Select diverse native species of planting and provide habitat for birds, bats, insects and bees, including on living roofs. Provide space for food-growing.

Sustainable movement
provide active travel and other sustainable travel infrastructure, including secure, easy-to-access cycle parking. Install electric vehicle charging points/hubs sufficient for every household.

2.2.2 Where to find guidance on specific sustainable design issues

The full range of sustainability issues which need to be considered in new developments are identified in Figure 2.2. The items in blue along the top are those covered in detail in this document, relating to Design Stage 3 (Building Fabric & Services). Along the bottom, in red, are the wider aspects of sustainable design, relating to Design Stages 1, 2, and 4. These are explored in detail in the Hounslow Character, Sustainability and Design Codes SPD and other relevant council guidance (such as the Council's Refuse and Recycling Guidance, Green and Blue Infrastructure Strategy and Nature Recovery Action Plan).

2.3 Evidence Base

Applicants are expected to provide sufficient evidence to demonstrate the extent to which their proposals have taken on board the full range of sustainable design principles set out above.

2.3.1 Supporting Documents

Many aspects of sustainability are assessed in supporting documents required to accompany planning applications. Some of these are listed in the council's validation requirements; others are set out in the London Plan as requirements for major or referable schemes. A list of the most important of these is set out in Table 1 below for ease of reference.

A completed **Sustainability Statement** is also expected for all major planning applications. This should clearly evidence that the proposed development has taken every possible step to minimise carbon emissions and explain how it will meet each of the other applicable sustainability standards, cross-referencing relevant supporting documents listed in Table 1. The level of detail required depends on the size and complexity of the proposal. The applicant is also expected to use their statement to identify unique sustainability aspects of their development.

Figure 2.2
Sustainability issues to be addressed through development design

Table 1: Key Development Plan sustainability policy requirements for new developments

Sustainability assessments and documents required for all applications for new development (including Minor Applications):	Further information
Environmental Impact Assessment (EIA) and Environmental Statement – (qualifying applications) – where an EIA is required, Schedule 4 to the regulations sets out the information that should be included in an Environmental Statement. It may be helpful for a developer to request a 'screening opinion' (to determine whether EIA is required) from the local planning authority before submitting a planning application.	Further information is available on the Government website: Environmental Impact Assessments
Biodiversity Net Gain Minimum Information Requirements – All developments (with some limited exceptions) are required to achieve a minimum 10% biodiversity net gain on site. (Applies to major applications submitted from 12 February 2024; and to minor applications submitted from 2 April 2024)	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations, p31) National Planning Practice Guidance: Biodiversity Net Gain
Travel Plan – Required for any development where there will be a significant transport or highways impact	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations, p21-22)
Additional requirements for all Major Applications:	**Further information**
Energy Assessment – should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.	Section 3.2 of this document See also GLA Energy Assessment Guidance
Urban Greening Factor Calculation – All major developments are required to incorporate urban greening, achieving at least an Urban Greening Factor (UGF) of 0.3 (for predominantly commercial development) or 0.4 (for predominantly residential development) as per London Plan Policy G5. UGF calculations should be submitted as a separate stand-alone drawing.	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations, p33-34)
Additional requirements for all Major Applications:	**Further information**
Drainage Assessment – All major developments are required to demonstrate that they would achieve a greenfield run-off rate and manage water as close to its source as possible, through the use of Sustainable Drainage Systems (SuDS)	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations, p30)
Transport Assessment and Travel Plan – required for all applications that generate significant additional traffic and/or parking requirements, or seek to reduce existing parking provisions (with the exception of individual dwellings). The assessment should consider sustainable modes of transport in accordance with the London Plan and NPPF. It must adhere to TfL's Healthy Streets approach and include an Active Travel Zone survey.	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations, p21-22)
Air Quality Assessment – Air Quality Assessment – required for *all* major applications, and encouraged for all applications. Should confirm whether air quality is an issue and demonstrate what mitigation measures will be implemented to ensure the inhabitants of the proposed development are not negatively affected by the existing poor air quality. The London Plan requires new developments to be Air Quality Neutral. Developments are encouraged to be Air Quality Positive where possible.	Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations, p43)
Health Impact Assessment (HIA) – to be submitted alongside major planning applications for residential and commercial uses. Sections on Climate Change and Air Quality are included in the London Healthy Urban Development Unit (HUDU)'s 'Rapid HIA Tool, which most consultancy firms use as their template.	The Rapid HIA tool can be found on the HUDU website
'Be Seen' energy monitoring – all major developments are required to monitor and report actual operational energy performance for at least five years post-occupancy in line with policy SI 2 in the London Plan 2021 and the GLA's 'Be Seen' Energy Monitoring Guidance 2020, or equivalent.	Section 3.2 of this document

Additional requirements for applications referable to GLA:	Further information
Whole Life Cycle Carbon Assessment – targeting / demonstrating carbon-neutrality for the lifetime of the development (i.e., including the embodied carbon resulting from the sourcing of materials and the construction process).	Hounslow Character, Sustainability and Design Codes SPD (Part A2– Common Considerations, p13, 17-18) London Plan Guidance: Whole Life-Cycle Carbon Assessments
Circular Economy Statement – Required by London Plan Policy SI7 to demonstrate how a development, including any public realm and supporting infrastructure, will incorporate Circular Economy measures into all aspects of the design, construction and operation.	Hounslow Character, Sustainability and Design Codes SPD (Part A2– Common Considerations, p17-18) London Plan Guidance: Circular Economy Statements

2.3.2 Sustainability Checklist

To support developers to meet the council's sustainability requirements and aspirations, we have prepared a sustainability checklist (which will be made available by the Council's Planning Department), bringing together in one place all sustainability metrics which may apply to new development, organised by theme. This includes those set out in this SPD, the Hounslow Character, Sustainability and Design Codes SPD, the Council's Recycling and Refuse Guidance and other relevant documents. For each metric, up to three levels of aspiration are defined, as shown in Table 2.

Table 2: Sustainability checklist – levels of ambition

HIGH STANDARD or ASPIRATION	An exemplary standard, which – where relevant – is in alignment with our Climate Declaration target for Net Zero-Carbon (or Net Zero Waste) by 2030
MEDIUM STANDARD or ASPIRATION	A higher standard or aspiration, compatible with Net Zero-Carbon (or Waste) by 2050
MINIMUM REQUIREMENT / LOW ASPIRATION	Meets minimum requirements (e.g., Building Regulations); or, where no such requirements are defined, represents a minimum level of aspiration (i.e., typical for recent development); BUT not consistent with climate targets

Submission of a completed sustainability checklist will be required for all planning applications for new development, at both full and outline application stages. Confirmation that applicants have done so will be included in the Council's list of Validation Requirements for relevant planning application types. Applicants should note that:

They will be expected to complete, as fully as they can, the sustainability questions under each of the themes relevant to their project, indicating the proposal's expected performance against each metric

They are strongly encouraged to consider these metrics early in the design process, as set out in the Sustainable Design Journey above; and should be prepared to discuss them at the pre-application stage. **Attention to these metrics will facilitate smoother progress through the development management process**

Checklists will be assessed in the round to ensure a holistic and balanced approach to sustainability is being considered. Each theme will be assessed in the context of factors that may be unique to a development, providing flexibility in how each development is assessed. Checklists will also be used by the council to ensure that design-stage sustainability ambitions are recorded and progressed during construction and post-completion

CHAPTER 3

TOWARDS ZERO CARBON AND CLIMATE ADAPTATION

This chapter provides detailed guidance on how proposals for new development can meet requirements to be zero carbon in operation and adapted to the changing climate, through the design and construction of their building fabric and services.

3.1 The scale of the Net Zero challenge

In their Climate Emergency Design Guide (2020), the London Energy Transformation Initiative (LETI) concluded that, in order to achieve a zero-carbon built environment in the UK by 2050, all new buildings completed from 2030 will need to operate at net-zero carbon and so, by 2025 all new building designs must be capable of delivering net zero carbon.

This will need everyone involved in delivering the built environment to start learning how to deliver net zero carbon buildings now – a view shared by other organisations, including the World Green Building Council and Architecture 2030. Such buildings do not burn any fossil fuels, and their energy consumption must be below that which can be fully supplied by local and national renewable energy, to ensure it does not result in carbon emissions. The embodied carbon of their construction and maintenance must also be accounted for.

Buildings being designed now will almost certainly still be in existence in 2050. Each one which does not achieve a zero-carbon balance now – or is not adapted to the expected future climate – will ultimately add to the number of existing buildings requiring retrofit to meet our climate change targets. Not only will this incur further embodied carbon, it will also make it more expensive to meet the Borough's carbon reduction targets, as the costs of achieving higher standards via retrofit are three to five times higher than for new buildings and. Furthermore, the carbon impact of delayed action on building standards is significant [Currie & Brown, "A Report for the Committee on Climate Change – The costs and benefits of tighter standards for new buildings," 2019].

3.1.1 Requirements and Aspirations

This guidance primarily relates to the delivery of relevant policies from the Development Plan (i.e. the London Plan and Local Plan, as described in sections 1.3.3 and 1.3.4 above, and related documents). While seeking not to duplicate the Development Plan documents, relevant policies are replicated here for ease of reference:

Development Plan policies and guidance

Relevant Development Plan policies are listed in blue boxes, along with links to related documents and statutory guidance. Other relevant guidance documents are also identified, where these may be helpful.

From these policies, this document sets out specific requirements relating to climate mitigation and adaptation, which must be applied to the fabric and services of new developments. Alongside these, it also sets out aspirations for higher standards which the council encourages developers to implement in their proposals, to support delivery of our net zero ambitions.

Requirements and aspirations, and their associated guidance, are colour-coded to enable them to be easily distinguished in the text, as set out below:

Requirements – what you MUST do

Text in RED boxes sets out the key requirements from the Development Plan. These are considered the minimum necessary for a development to achieve the basic level of climate resilience and must be incorporated into new development.

These requirements are a material consideration in the determination of planning permission, which applicants must demonstrate have been met for any new development – attention to this will help applicants to provide the right information so that planning decision makers can assess whether development proposals comply with Development Plan policies.

Aspirations – what you CAN do

In addition, this document also shows, in GREEN boxes, what can be done beyond the requirements of the Development Plan. These are examples of good practice and further steps that can be taken to minimise the impact of climate change on the built and natural environment. These are intended to support developers who are looking to go above and beyond the minimum requirements to ensure that their developments are as environmentally friendly as possible.

When considering the planning balance, Council Officers will give significant positive weight to proposals that exceed existing policy requirements and targets.

3.2 Development Plan requirements

Applicants should have regard to existing requirements set out in the following Development Plan policies, which are referred to in this chapter:

London Plan: Chapter 9 – Sustainable Infrastructure:

- Policy SI 2 Minimising greenhouse gas emissions
- Policy SI 3 Energy infrastructure
- Policy SI 4 Managing heat risk
- Policy SI 5 Water infrastructure
- Policy SI 12 Flood risk management

Related GLA Energy Planning Guidance – including:

- **Energy Assessment Guidance** which applicants must follow to prepare their energy statements and report carbon emissions
- **Be Seen' Energy Monitoring Guidance** for major applications on compliance with Policy SI 2 (A) (4);
- **Whole Life-Cycle Carbon Assessments Guidance** for referable applications on compliance with Policy SI 2 (F)

Hounslow Local Plan: Chapter 9 – Environmental Quality:

- Policy EQ1 (Energy and carbon reduction)
- Policy EQ2 (Sustainable design and construction)

Applicants should also have regard to Government regulations and guidance:

- Energy efficiency in buildings policy
- Building Regulations – Approved documents L1A, L1B, L2A, L2B (via the planning portal)
- The National Design Guide Resources Section, paragraph 135:

"well-designed places and buildings conserve natural resources including land, water, energy and materials. Their design responds to the impacts of climate change by being energy efficient and minimising carbon emissions to meet net zero by 2050. It identifies measures to achieve:
· mitigation, primarily by reducing greenhouse gas emissions and minimising embodied energy; and
· adaptation to anticipated events, such as rising temperatures and the increasing risk of flooding"

London Plan Policy SI2 requires all major development to be operationally 'net zero carbon' for regulated energy uses (which include heating, hot water, cooling, ventilation and lighting). That is, energy consumption for these uses should be kept as low as practicable; onsite energy generation maximised to cover as much as possible of residual needs; and where onsite energy balance is not achieved, a carbon offset payment is needed to cover the carbon emissions associated with remaining consumption from the energy grid. This is to be achieved by following the London Plan energy hierarchy set out in Section 3.4 below.

The policy includes a minimum requirement for major schemes to achieve a 35% reduction in on-site carbon emissions below Building Regulations Part L 2021 standards (this equates to approximately 55% improvement over Part L 2013).

Major development proposals are also required to calculate and minimise carbon emissions from any other part of the development, including plant or equipment, which are not covered by Building Regulations.

Hounslow Local Plan Policy EQ1 (d) sets out the expectation that all new-build developments should meet the carbon emissions reduction requirements set out in the London Plan. As such, minor residential development will also be expected to comply with London Plan Policy SI2, including the 35% reduction in on-site emissions, unless there are extenuating circumstances.

3.3 Beyond the Development Plan

Developers are encouraged to go further than the existing Development Plan requirements to aim for operational zero carbon on-site, in order to be consistent with the borough's climate change target and climate emergency declaration.

This will also help to tackle fuel poverty and to future-proof development. As such, it will be attributed significant positive weight in the planning balance.

Due to the decarbonisation of the electricity grid (as reflected in the updated carbon factors in Part L 2021), a greater improvement over Part L can now be achieved with no increase in specification. As residential developments are therefore expected to be able to exceed the 35% on-site reduction target, the GLA's Energy Planning guidance has introduced an additional benchmark improvement of 50% over Part L 2021 (equivalent to 65.5% improvement over Part L 2013) in which residential developments should be aiming to achieve.

The GLA will periodically update their benchmark and may also introduce more stretching benchmarks for other typologies, to reflect improvements in expected performance over time. Applicants are encouraged to go beyond these benchmarks where they can – **in keeping with the spirit of London Plan Policy SI2, which requires developments to approach as close as possible to Net Zero carbon for regulated operational energy uses.**

Unregulated emissions from white goods and other plug-in items are not covered by building regulations, and so are fall outside of the GLA and Local Plan policies. Nonetheless, consideration should also be given to minimising these where possible.

3.3.1 Alternative approaches to measuring Energy Performance

Set out below are two alternative approaches to defining and measuring operational net zero, and the resulting aspirational targets.

Statutory Part L measures – SAP & SBEM

For the purposes of assessing compliance with Part L 2021, the energy performance of new developments must be calculated using the SAP methodology (or SBEM for non-residential developments). SAP calculates a Dwelling Emissions Rate (DER) and a Dwelling Fabric Energy Efficiency rate (DFEE) for the proposed designs, which must be lower that the target rates calculated for a hypothetical building of the same dimensions. The DER – the main measure used in Building Regulations – calculates carbon emissions for the residual energy needed from the grid (i.e. subtracting any energy generated from onsite renewables), for regulated energy uses only (heating/cooling, lighting and ventilation). Thus, for a building to be classed as zero carbon, it must supply all its heating and hot water from onsite renewables and therefore totally independent from the grid. This may be possible for low-rise buildings, but will be difficult to achieve for higher density development in urban areas. Instead, any carbon emissions resulting from residual energy use from the grid may (as a last resort) be 'offset', through a carbon offset payment to the local authority. Unregulated uses – appliances, etc. – are not included in the calculation.

Alternative approach – Energy Use Intensity and Space Heating Demand

Energy Use Intensity (EUI) is an alternative measure which takes a different approach. It is an annual measure of total operational energy expected to be consumed per m2 of floorspace in a new development, from all sources (including onsite renewables). It includes both regulated energy uses (heating, hot water, cooling, ventilation and lighting) and an allowance for unregulated uses (plug loads and equipment). The related measure of Space Heating Demand (SHD) is the part of this energy requirement needed for space heating.

A significant advantage of using EUI is that it can be estimated at design stage and then, unlike the SAP or SBEM methodologies used for Part L compliance, it can be easily measured post-occupancy through energy bills. Because it calculates operational energy use before taking into account onsite renewables, it is a better measure of the energy efficiency of the building and its services.

However, unlike the SAP methodology's DER, EUI does not provide a direct measure of the carbon emissions associated with operational energy use. Instead, suggested EUI rates have been calculated for different types of development, which are considered to be achievable but at which the residual demands on the electricity grid are low enough such that, on average, they do not result in any additional carbon emissions. This is explained in more detail in Section 3.3.3 below.

While SAP and SBEM remain the principal measures of energy performance in the London Plan 2021, the Mayor of London's updated Energy Assessment Guidance now includes a requirement for applicants to report the Energy Use Intensity (EUI) and space heating demand of all new major developments, using the GLA's carbon emissions reporting spreadsheet. These metrics will help applicants to demonstrate that they have maximised energy efficiency measures will be used to improve our understanding of energy demand.

3.3.2 Aspirational Net Zero Targets – SAP and SBEM

The Future Homes and Future Buildings standards, expected to be introduced in 2025, will see further tightening of Part L emissions standards (expected to be at least 75% lower than those in Part L 2013; equivalent to at least 64% reduction from Part L 2021); and a requirement that new buildings will be 'zero carbon ready', i.e., not requiring retrofit work to benefit from electrification of heating.

In preparation for this, developers are recommended to begin to target the Future Homes and Buildings standards in the designs now.

Residential Developments:
Analysis prepared for London boroughs in the **Delivering Net Zero** report (2023) suggests that, in most cases, new domestic buildings should already be able to achieve at least a 60% improvement over Part L 2021.

Non-residential developments:
Some of these may initially find it more challenging to achieve significant on-site carbon reductions beyond Part L 2021. Analysis in the **Delivering Net Zero** report suggests that the following targets for non-residential typologies should be achievable:

- Offices: 25% improvement over Part L 2021
- Schools: 35% improvement over Part L 2021
- Hotels: 10% improvement over Part L 2021

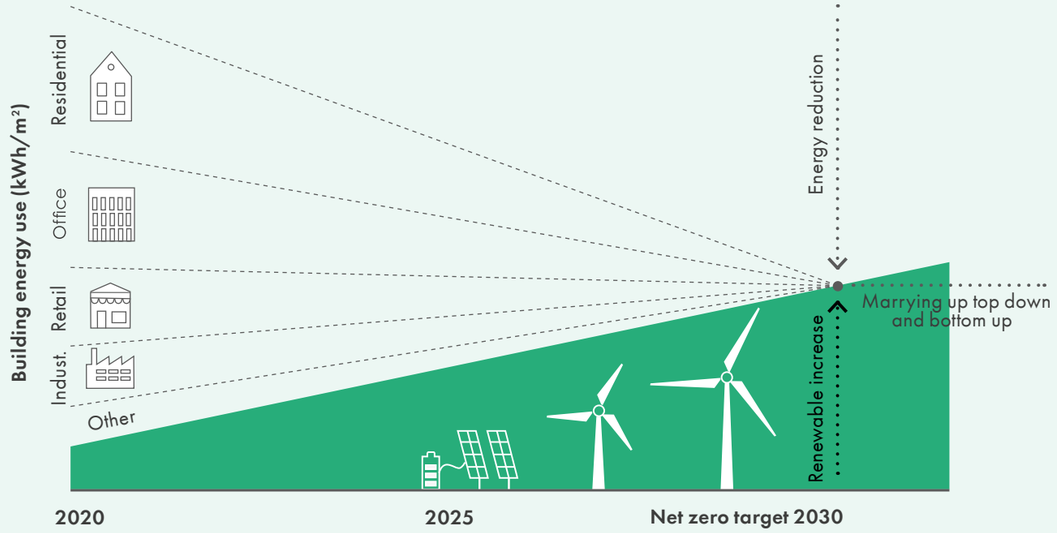
Industrial Buildings:
The **Delivering Net Zero** report also suggests that these could achieve 45% improvement over Part L 2021. However, it is acknowledged that this is heavily dependent on the industrial use and processes for which the building is intended, which may not even be known for speculative development. In such cases, it is recommended that the London Plan fabric efficiency targets are applied to any conditioned (i.e. cooled or heated) space, and the 'office' targets above are applied to the parts of the building used as an office or similar workspace.

Other non-domestic buildings:
These should aim to achieve 35% improvement over Part L 2021, subject to the specific circumstances of each development.

3.3.3 Alternative EUI definition of operationally Net Zero buildings

EUI as the preferred measure of energy performance used in both the UK Green Building Council's Net Zero Whole Life Carbon Roadmap (2021), and LETI's Climate Emergency Design Guide (2020). The UKGBC have worked with LETI on the development of a simple EUI-based definition for new buildings which are Net Zero Carbon in operation, published in 2019 and now supported by the BBP, the Good Homes Alliance, RIBA and CIBSE. This is based on the 'Paris-proof' principle that the built environment should use no more than the limited amount of carbon which can be apportioned to it, consistent with the UK economy as a whole reaching net zero emissions by 2050.

Net Zero at this national level requires the decarbonisation of energy drawn from the National Grid through the use of renewable energy sources. While grid decarbonisation itself is outside the scope of this document, developments nonetheless have an important role in ensuring that a 'zero carbon balance' is achievable at a national level. Because the amount of renewable energy that the UK can produce is finite, there is a limit to what is available for use by each building; developments therefore must not exceed an 'energy budget' for its operational needs – including for unregulated uses – otherwise a zero-carbon grid will not happen.



Source: LETI Climate Emergency Design Guide

Figure 3.1 – Aligning top-down and bottom-up approaches to achieving Net Zero in operation by 2030

The lower the energy demand of the building, the easier it is for it to achieve net zero in use, and also – by minimising its residual demand for energy from the grid – for the country to achieve net zero. A net zero carbon building is therefore first and foremost an energy efficient building.

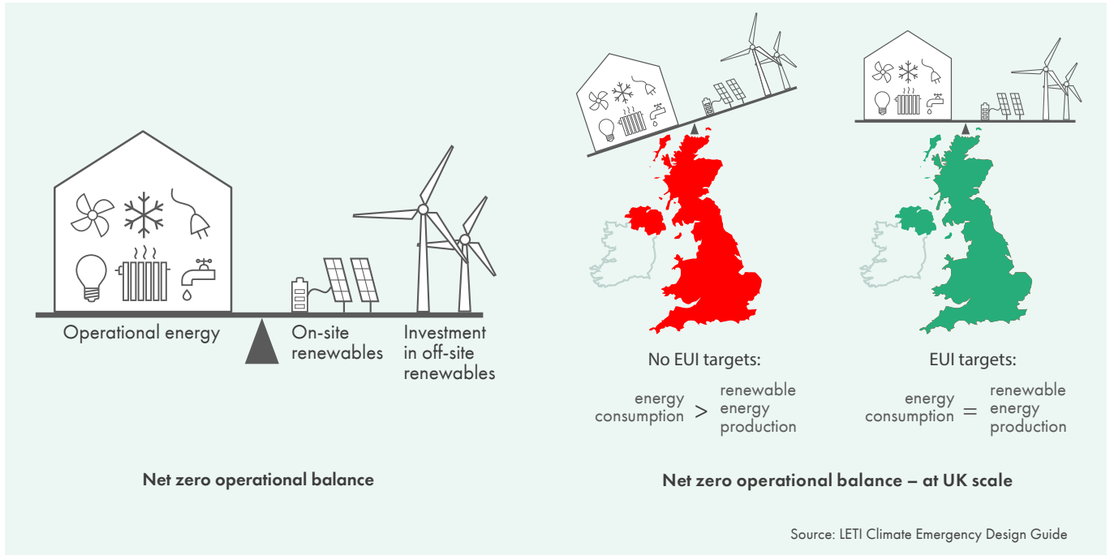


Figure 3.2 – Achieving a national Net Zero Balance

Developers are encouraged to ensure their proposals are also consistent with this alternative Operational Net Zero Carbon definition. The full set of criteria for meeting this definition can be found in the **WLCN-LETI 'Definitions' document** and are summarised in this **UKGBC Net Zero Carbon One-Pager**. The most important aspects are as follows:

- **No fossil fuels used on-site for space heating or hot water** – e.g., uses heat pumps or low-carbon district heating
- **Ultra-low level of operational energy use** – space heating demand and energy use intensity (EUI) minimised, and at or below the *target levels set out in Table 3 below*, which are consistent with achieving national net zero goals. In addition, peak demand reduction and demand management should increasingly be considered, to support the grid system and its decarbonisation.
- **Operational zero carbon balance** –100% of the energy used – including that needed for unregulated uses – is produced by renewable energy sources. This should be generated onsite where possible. Any energy use not met by on-site renewables should be met by investment into off-site renewable energy capacity which demonstrates additionality (i.e. which results in new installed renewable energy capacity that otherwise would not have occurred); OR a minimum 15-year renewable energy power purchase agreement (PPA). (Most green tariffs are not robust enough and do not provide 'additional' renewables)
- **Measurement and verification** – Annual energy use and renewable energy generation on-site must be reported and independently verified in-use each year for the first 5 years. This can be done on an aggregated and anonymised basis for residential buildings.

Based on these recommendations, Table 3 below sets out good practice EUI target values for a range of building archetypes. Design teams are encouraged to use design-stage predictive energy modelling calculations to indicate whether the relevant targets set out in Table 3 are likely to be met.

Aspirational EUI and SHD targets for buildings to be zero carbon in operation

The LETI Climate Emergency Design Guide (2020) has calculated target EUI values for UK buildings which are consistent with achieving a zero-carbon grid. More recently, the Delivering Net Zero report prepared for London boroughs in 2023 has set out exemplar targets which ought to be achievable by a range of typologies.

Table 3: Energy Use Intensity and Space Heating Demand targets for different typologies

Building Archetype	Energy Use Intensity (EUI) (kWh/m2/yr)	Space Heating (or where relevant, cooling) Demand (kWh/m2/yr)
Residential (detached, semi detached & end-of-terrace)	35	20
Residential (all other typologies)	35	15
Offices/Retail (Net Lettable Area)	70	15
Schools	65	15
Leisure (detached, semi detached & end-of-terrace)	100	15
Hotels (detached, semi detached & end-of-terrace)	160	15
Industrial (detached, semi detached & end-of-terrace)	No targets identified; minimum DEC B (40) rating suggested	15 (conditioned areas only)

Achieving these targets will require good practice fabric and ventilation standards, in combination with low carbon heating such as heat pump or connection to a low carbon communal system. This is consistent with the requirements of the energy hierarchy set out in Section 3.4 below.

As the EUI targets include unregulated energy uses, developers will find it easier to meet them if they specify and install low energy plant such as lifts, and efficient appliances which do not rely on fossil fuels, such as induction hobs. While consumer uses (TVs, computers, etc.) are not in developers' control, these can be expected to average out between high and low energy-use occupants in post-occupancy surveys of major developments.

LETI has produced a Net Zero FAQs document which provides further information on how to calculate EUIs, including for buildings connected to a district or communal heating system.

3.3.4 Embodied Carbon

The focus of most existing regulation to reduce carbon emissions from buildings is on operational energy use. As a result, there are currently no required standards or limits for embodied carbon in the development plan.

London Plan policy SI 2 F does, however, require all referable schemes to complete a Whole Life-Cycle Carbon (WLC) assessment, as set out in the **WLC London Plan Guidance**. This assessment should calculate whole life-cycle carbon emissions and demonstrate actions taken to reduce these.

Referable schemes are also required to complete a Circular Economy (CE) Statement, as set out in the **CE Statement London Plan Guidance.** Attention to CE principles, in particular reuse of existing buildings or their components, will also support a reduction in embodied carbon of new development.

In Hounslow, action to reduce embodied carbon is an important component of our journey to net zero. We will continue to gather evidence on how we can better incorporate the assessment of embodied carbon as part of a whole life cycle emissions approach into policy through future reviews of the Local Plan.

In the meantime, applicants are encouraged to:

- Complete a Whole Life-Cycle Carbon (WLC) assessment for all major applications, as supported and encouraged by the **WLC London Plan Guidance.**
- Complete a Circular Economy (CE) Statement for all major applications, as supported and encouraged by the **CE Statement London Plan Guidance.**
- Consider the lifetime emissions of their proposals. If the additional embodied carbon of a building element or component outweighs the potential operational energy saving associated with it over its expected lifetime, then an alternative approach should be considered
- Achieve the aspirational targets for embodied carbon from construction set out in the Sustainability Checklist
- Assess, reduce and verify embodied carbon post-construction.

All schemes that can demonstrate positive steps have been taken to reduce embodied carbon should do so, as this will weigh positively in the overall planning balance of the scheme. Applicants are encouraged to include in their approach, implementation of circular economy principles, use of the river and other waterways for transportation of construction and waste materials, and other sustainable construction and transportation practices. Further guidance on these, including aspirational targets, can be found in the Hounslow Character, Sustainability and Design Codes SPD (see Part A2 – Common Considerations; Resources & Lifespan section)

3.4 The London Plan Energy Hierarchy

The London Plan policy SI 2 sets out a requirement for all major development to be net zero carbon in operational energy use, and to achieve as much of this as possible on-site. As permitted by the London Plan, Hounslow Local Plan policy EQ1 has extended this requirement to all new-build residential and non-residential development proposals, not just major development.

To achieve this, all developments are expected to maximise emissions reductions by following the London Plan's energy hierarchy:

a) **Be Lean** – Construct the Development sustainably, to minimise the energy needed for heating, cooling and lighting

b) **Be Clean** – Connect to a heating network; or, if that is not possible or feasible, another source of clean heat

c) **Be Green** – Use on-site renewable energy to cover residual energy needs (including for plug-in loads)

d) **Be Seen** – Monitor, verify and report on energy performance

The Energy Hierarchy and Associated Targets

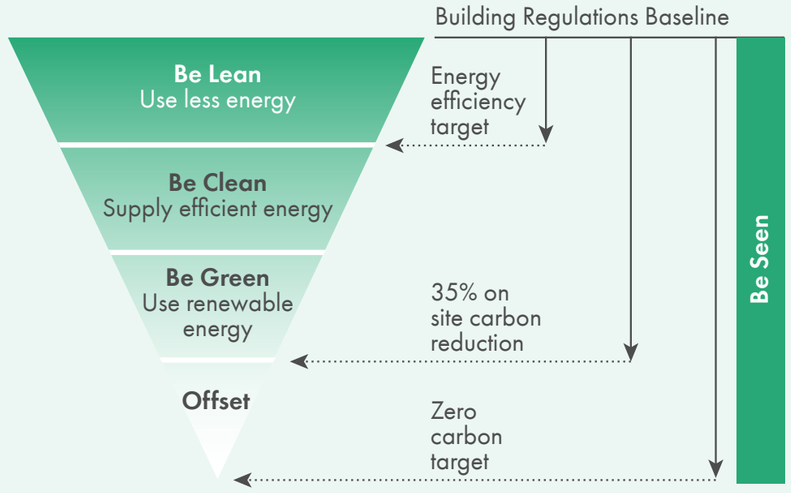


Figure 3.3 – The London Plan 2021 Energy Hierarchy

Energy Assessments

Applicants must prepare an Energy Assessment to demonstrate the carbon efficiency of their development and submit this as part of a planning application – it is a validation requirement. Energy assessments should be constructed in accordance with this energy hierarchy, as set out in the Mayor of London's Energy Assessment Guidance (as updated in 2022).

The purpose of the energy assessment is to plot the percentage emission reductions achieved relative to the Part L 2021 baseline, through each of the Be Lean, Be Clean, Be Green headings. Where this meets the London Plan minimum requirement but falls short of being carbon neutral (i.e., a 100% reduction for regulated energy use, including renewables), the applicant would need to demonstrate why further carbon savings could not be achieved. To evidence this, it must be clearly shown that a carbon-neutral aspiration was considered fully at the beginning of the design process for the building. Where there is a justifiable shortfall, a scheme will be required to make a contribution to the Council's Carbon Offset Fund (see Section 3.5 below).

Applicants may find the following guidance documents helpful in meeting the requirements of the London Plan Energy Hierarchy (some of these are also referenced at relevant points in the text below):

- **CIBSE Engineering Guidance** – in particular:
  - o CIBSE Guide A: Environmental Design
  - o Guide F: Energy Efficiency in Buildings
  - o 'Knowledge Series' documents relevant to your building project
- **CIBSE Net Zero Guidance**, including Net Zero FAQs
- **CIBSE Operational Net Zero Carbon Buildings Position Statement**
- Carbon Trust **Building Fabric Guide**
- **Passivhaus** (Widely used standard for low-energy heating and cooling)
- Levitt Bernstein **Easi Guide to Passivhaus Design** (2020)
- The RIBA **Sustainable Outcomes Guide** and **2030 Climate Challenge** for designers
- **LETI Climate Emergency Design Guide** and **Operational Energy Modelling Guide**
- BRE's **BREEAM Sustainability Standard**
- The **Net Zero Carbon Guide** – a free resource to help navigate the process of achieving net zero carbon for both old and new buildings
- **Towards Net Zero** Carbon report (prepared for 5 London Boroughs in 2020)
- **Delivering Net Zero** report (prepared for 19 London Boroughs, including Hounslow, in 2023)

Energy Hierarchy Stage 1:
Be Lean – Fabric Efficiency

The first stage of the energy hierarchy centres on ensuring that the development fabric itself is constructed in a manner which minimises or eliminates energy needed for heating, cooling, ventilation and lighting. Design teams should seek to limit building energy demand through passive measures and efficient fabric design prior to considering systems' optimisation to satisfy demand.

First and foremost, this means that all new developments must significantly reduce their energy demand through maximising their thermal performance by adopting a fabric first approach, promoting comfortable and healthy indoor conditions and protecting the building fabric from the environment. This 'fabric-first' approach must be incorporated from the start of the design process to ensure the appropriate measures are incorporated into the scheme.

London Plan policy SI 2, C requires an increase in fabric energy efficiency of at least 10% beyond Building Regulations standards for residential developments, and 15% for non-residential. This requirement remains in place for Part L 2021, though it is recognised that this may be challenging to achieve, given the introduction in Part L 2021 of the Target Fabric Energy Efficiency Standard (FEES), Target Primary Energy Rate, and of wastewater heat recovery (WWHR) in the 'notional specification' for the target emission rate (TER). Nonetheless, all schemes should aim for at least some improvement in fabric energy efficiency standards over Part L 2021.

Developments must optimise energy efficiency with fabric and other passive solutions prior to adopting and sizing any strategies and systems required to keep the building comfortable, such as ventilating, heating and cooling. This will not only reduce the size and capital cost of plant equipment, but will also reduce the cumulative demands made of national grid infrastructure. **This could also improve chances for securing sufficient grid connection where capacity issues are present.**

Developers can achieve this by adopting recognised and successful fabric first approaches such as Passivhaus (NB: other independent assessment methodologies also exist, such as the Home Quality Mark and BREEAM). They may find it helpful to refer to the Easi Guide to Passivhaus Design. This sets out the nine key considerations for minimising energy use through passive design, as summarised in the diagram below:

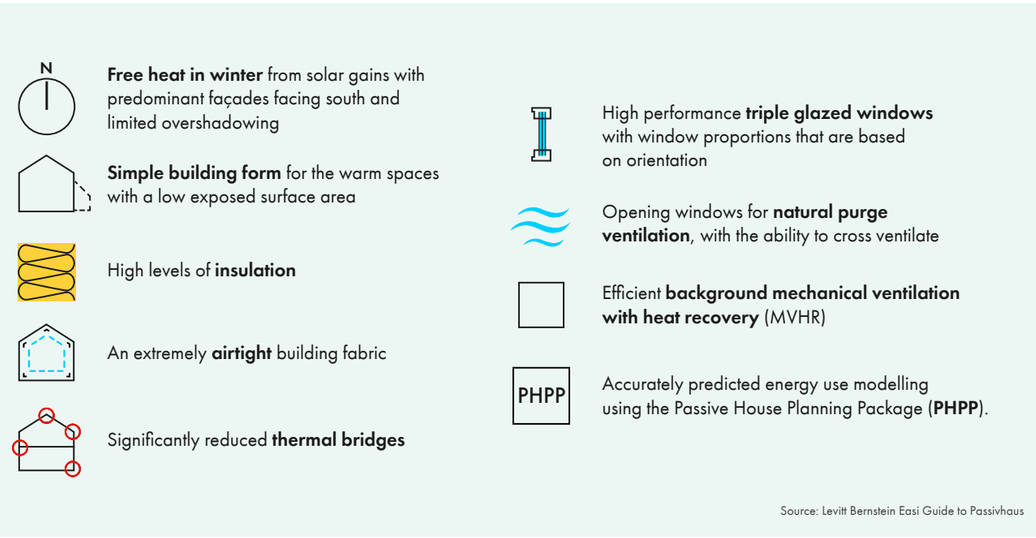


Figure 3.4 – Nine key considerations for minimising energy use through passive design

These considerations should, wherever possible, be incorporated into the design of all proposals. In addition, developers should consider the following good practice approaches in their building designs:

- Group together cold / unheated spaces, such as bin/bike stores and substations, where possible keeping them separate from buildings or towards their north ends. Where unheated spaces adjoin a warm part of the building, such as a dwelling or office space, the party wall and separating floor above need to be highly insulated.

- Draw the insulation and airtightness line around dwellings early and consider whether circulation space should be within or outside of the insulated volume.
- Expose thermal mass (such as brick or blockwork) inside the building to help to reduce internal temperature fluctuations.
- Specify and install low energy plant such as lifts, and efficient appliances which do not rely on fossil fuels, such as induction hobs (while this will not improve performance against Part L, it may improve EUI ratings).

NB: The relative improvement approach against a notional building, as used for Part L compliance, does not reward the significant energy and carbon savings which may be achieved through more efficient building forms, optimising orientation and other passive design techniques which work alongside fabric efficiency measures to reduce energy use. These techniques should be considered in Stage 2 of the design process set out in Section 2.2, and are described in more detail in the Hounslow Character, Sustainability and Design Codes SPD (see Part A2 – Common Considerations; Passive Design, Built Form and Homes and Buildings sections).

Reducing the performance gap

The performance gap is defined as the deficit between predictions of energy consumption from building compliance tools and actual measured energy use during operation of new developments. Studies undertaken by Innovate UK and the Zero Carbon Hub show that the majority of built projects do not meet their intended performance targets when tested, falling short even of compliance with Part L and Part F of the Building Regulations. Independent research carried out by the UK Passivhaus Trust determined an average performance gap of 40% between the overall energy use of a new build house when compared to its EPC modelling.

While some of the gap relates to variations in how buildings are used in practice, many of the contributory causes to the performance gap can be attributed to:

- a 'design for compliance' culture in which a short-term objective – compliance with regulations – is sought with little regard to how the building will actually perform in operation. The consequences of this approach are evident in much of our existing building stock, with operational performing much worse than anticipated at design
- Quality and execution of construction, resulting in design intent not being realised – e.g., product substitutions, gaps in insulation and insufficient care taken in relation to air-tightness and thermal bridging.

To address the performance gap, it is critical that developers and contractors take action on both design and construction quality. Contractors should understand how to construct buildings which:

- achieve high levels of airtightness in practice
- reduce / eliminate the effects of thermal bridging
- avoid other gaps in the insulation barrier during and following installation

The full implications of specification substitution must be clearly defined.

Applicants are advised to use an independent, verified design for performance methodology such as Passivhaus PHPP or CIBSE TM54 Operational Energy, to ensure that the development's operational energy performance reflects realistic design intentions on its use, occupancy and operation, and that it addresses the performance gap.

Energy Hierarchy Stage 2:
Be Clean – Heating Infrastructure

The second stage of the hierarchy requires developers to demonstrate how their developments will supply space heating and hot water efficiently and cleanly.

All new developments should prioritise the use of heating systems which do not use on-site combustion. This will generally mean either connecting to a heat network or using an on-site electric-powered system, such as a heat pump or direct electric heating. As well as becoming a lower carbon energy source with the decarbonisation of the national grid, electricity also provides air quality benefits which are particularly important in a London borough.

Any development that proposes to use gas or other fossil fuel systems as the primary source of heating should:

- provide robust justification to satisfy the Council that low or zero carbon systems cannot be used
- set out how the development has been future-proofed to achieve net-zero carbon by 2050
- demonstrate that the gas-powered system is credibly being used as a stepping-stone towards this objective.

It is expected that, in most cases, the use of gas boilers as the primary source of space heating and hot water will be incompatible with the requirement to achieve at least 35% reduction in carbon emissions beyond Part L 2021.

In achieving these aims, attention should also be paid to minimising the risk of fuel poverty – e.g., by ensuring that the cost to occupants of using the required levels of heating or cooling are lower than they would be under the base case scenario.

Applicants are encouraged to use the LETI Heat Decision Tree (p. 76 of the LETI Climate Emergency Design Guide) throughout the design stages of their project, to assist them in choosing the most appropriate heating system.

District and communal heating systems

London Plan Policy SI 3 requires that major development proposals within Heat Network Priority Areas (which includes most of the Borough) should have a communal low-temperature heating system that is suitable for connection to a heat network; and that these should, wherever possible, connect to an existing or planned district heating network (DHN), subject to the DHN meeting the low-carbon criteria set out in the London Plan, and the network operator confirming that there is capacity. It is acknowledged that, in the short to medium term, communal systems may require a gas boiler to provide resilience and meet peak demand. In such cases boilers should be ultra-low NOx, as required by London Plan Policy SI 3, to minimise impacts on local air quality.

Local Plan Policy EQ1 also requires that, where district networks do not currently exist, new developments with communal heating systems should make provision to connect them to any potential low carbon future heat network in the vicinity of the site, having regard to opportunities identified in area-specific energy plans. This could include, for example, allocating space in plant rooms for heat exchangers and thermal stores, safeguarding suitable routes for pipework from the site boundary and making provision for connections to the future network at the site boundary.

If a feasibility or viability assessment demonstrates that connection to an existing or planned low carbon district network is not reasonably possible, the Local Plan then requires that applicants examine the feasibility of extending a communal system beyond the site boundary – that is, they should seek to develop and/or connect to a communal heat network shared with neighbouring existing buildings and/or other new developments. To achieve this, the development itself could become an energy 'hub' which provides heat to one or more existing neighbouring buildings; alternatively, the development could be supplied with heat from an energy centre within a nearby building or development.

It is noted that, where such heat networks only supply new high efficiency buildings in which heat demand is reduced down to the level of 'Heat Autonomy' (I.e. most heat needs are met from incidental internal gains), then network distribution losses can become larger than the quantity of delivered heat, and there is little energy delivery revenue for the network operator. This is likely to be reflected in significant fixed connection and services charges being the dominant energy bill component. In such cases, networks can become more viable by seeking also to connect to existing buildings with higher energy demand.

Applicants should note that connecting their development to a communal or district system may make it easier for them to obtain DNO agreement to connect to the electricity grid, when compared with alternative low carbon heating options. This is because communal systems enable greater demand flexibility, with lower peak energy demand; while connection to a district system provides an even greater advantage, as no electricity will be consumed onsite to generate heat.

Heat network opportunities in Hounslow

The Heat Networks Feasibility Study prepared for the council in 2023 has identified a preferred option for a borough-wide heat network, to take forward for detailed project development. Applicants should consult the Council at the design stage of a development proposal for the latest information on heat network development, to establish the potential for connection. The council will also be able to advise on the likely impact of proposed Heat Network Zoning Regulations, expected to be introduced by 2025. These will introduce a legal requirement for most new development to connect to an existing or planned network, in certain locations – known as Heat Network Zones – where heat networks have been identified as offering the lowest cost source of low carbon heat.

As well as the council's preferred option for its proposed heat network, potentially viable low carbon heat network options were identified in other areas by the Hounslow Heat Map and Energy Masterplan, completed for the Council in 2022. Also, future planned growth in the Great West Corridor and Heathrow (or 'West of Borough') opportunity areas, will present development opportunities that we believe may have the potential for a district heating system, but which may not be served by the council's developing proposals – for example, the Feltham Housing Zone and the Convent Way Estate Regeneration. Major developments in such locations are therefore expected to prioritise investment in the development of local heat network opportunities identified in these or subsequent documents, in conjunction with other nearby developments if relevant.

Heat Network Design and Temperature

Communal and district systems should prioritise the use of zero-emission or local secondary heat sources (in conjunction with heat pump, if required). Given that the carbon savings from gas engine combined heat and power (CHP) systems are declining due to the decarbonisation of the national electricity grid, and increasing evidence of adverse air quality impacts, their use is now discouraged in the new London Plan in favour of electrification of heat. Existing CHP systems will need to have plans in place for their decarbonisation and, in the meantime, their expansion to supply new development should make use of low carbon heat sources to meet the additional demand.

The design of new district and communal heating systems should seek to minimise system flow and return temperatures. Lower system temperatures allow for increased system efficiencies and lower losses in conversion, storage and distribution of heat. They will also – along with careful design and installation of communal system infrastructure within buildings – reduce the risk of internal heat leakage which results in overheating in summer.

Lower temperature systems also have a greater opportunity to harness waste heat captured from existing processes to meet buildings' heating needs. Waste heat from building cooling and refrigeration systems and from local infrastructure – such as from London Underground ventilation, industrial processes, water treatment and waste treatment works – can all be captured by heat pumps for reuse as a heat source for space heating and domestic hot water systems, whilst also contributing to a reduction in the 'Urban Heat Island' (UHI) effects. Low temperature systems are particularly useful for Heat Sharing Networks in mixed use developments where there are different heating (and cooling) demand profiles, offering opportunities for load shifting and heat sharing. This also helps reduce 'urban heat island' (UHI) impacts caused by the heat rejection from building cooling systems.

Applicants proposing new data centres in the borough are encouraged to explore opportunities to make use of the rejected heat to supply communal or district heating systems in their vicinity. This may be made a condition of planning approval through the use of a s.106 agreement. In future, it may become mandatory as a result of proposed regulations on Heat Network Zoning.

Heat Network Co-benefits

The necessity of a network of underground pipes to distribute heat can, if considered at an early enough stage in the design of site layout, be turned into a positive feature. For example, most pipes for district schemes will be laid along existing roads. While initially disruptive, this should, if the network design allows, be used as an opportunity to incorporate new sustainable drainage, green corridors and active travel routes rather than reinstating the previous hard surface. As well as providing an environmental benefit, this could also result in lower installation and maintenance costs. The design of such green infrastructure, and the benefits which they provide, are described in more detail in the Hounslow Character, Sustainability and Design Codes SPD (see Part A2 – Common Considerations; Nature and Public Spaces sections).

The embodied carbon of communal heating systems is also generally lower than for individual systems. CIBSE TM65.1 (Embodied carbon of building services: residential heating) finds that connection to DHNs consistently incur the lowest embodied carbon of all non-direct electric systems, while communal heating systems become more optimal for embodied carbon with increasing density. Up to 33% of the embodied carbon of individual heat pump systems is associated with leakage of the refrigerant gases; this can be much more effectively managed for communal and district systems.

Alternative low-carbon heating options

In developments for which a district or compatible communal heating system would viable, an alternative low carbon heating option should only be considered if it demonstrates a meaningful performance improvement in comparison, and the development is not strategically important for an existing or proposed heat network. For example, exhaust-air heat pumps (EAHPs) could be considered if the proposal will achieve PassivHaus building certification (secured through legal agreement), such that the small heating capacity of an EAHP is sufficient to supply the minimal heating demand of the building.

Where district or communal heating is not viable, individual heat pumps will usually be the next best option – demonstrating significant carbon reductions with the new carbon factor for electricity in Part L 2021.

Proposals using direct electric heat will only be considered acceptable if the developer can demonstrate, through Passivhaus certification or equivalent, that energy use has been significantly reduced by achieving ultra-high fabric efficiency. This is to ensure that direct electric heating systems do not result in high energy bills. Heat pumps are more efficient and, because they use low flow temperatures and large emitters to spread heating throughout the day, they reduce peak heating demand compared to direct electric systems.

Developments proposing to use heat pumps must demonstrate that these are of high quality and achieve a good standard of fabric efficiency suitable for low temperature heating, to ensure they do not result in high energy bills. New developments are also encouraged to incorporate waste-water heat recovery systems. LETI recommend the following ways in which the switch to heat pumps can be supported:

Design for lower operating temperatures – Building heating systems which can operate at lower temperatures are better placed to make use of renewable technologies (heat pumps, solar thermal etc.) which work most efficiently at relatively low temperatures. A common example of how this can be achieved is by specifying underfloor heating (UFH) instead of radiators for space heating. Whereas radiators typically require a water flow minimum temperature of 45-55˚C, UFH can operate at flow temperatures as low as 25-35˚C because of its larger surface area for transferring the required heat into the room. This larger warm surface area also means comfort levels can be achieved at lower room air temperatures. The same principle in reverse applies to room cooling in summer. Improved fabric efficiency also means that comfortable air temperatures can be achieved with a lower system temperature.

Lean Design – Rather than applying the generous oversizing margins buried in conventional rules of thumb when carrying out heat loading calculations, detailed load modelling will provide better predictions of energy use and help size plant requirements more accurately. Furthermore, sizing heating plant capacity using the 96th percentile approach rather than providing capacity for the full load at design conditions, reduces the heat generation equipment size and increases efficiency of the equipment in operation. Similarly, sizing and increased efficiencies are achieved by eliminating the rounding margins conventionally applied at each stage of design, plant selection and commissioning. As the thermal performance of a building improves, it responds more slowly to drops in outdoor temperature, permitting the use of less onerous outdoor design conditions. Highly insulated buildings also mean intermittent control strategies deliver reduced benefit due to limited room temperature drops during off periods. Consequently, a strategy of trickle charge over extended operating hours can greatly reduce plant capacities and improve energy efficiencies.

Co-location of solar panels with other infrastructure

Energy Hierarchy Stage 3:
Be Green – Renewable Energy

As UK renewable energy generation increases, grid electricity will continue to decarbonise. This progress will be supported by using electricity as efficiently as possible. Furthermore, the local electricity distribution grid electricity is already close to its maximum capacity and is expected to remain constrained for the foreseeable future, as demand in the Borough is expected to increase due to population growth, the electrification of heat and increased uptake of electric vehicles.

To limit this additional demand, and in addition to the efficiency measures described in Stages 1 and 2 of the hierarchy, all development proposals should seek to make the best possible use of on-site renewable energy generation. The use of renewable technologies provides new developments with a viable, cost-effective and practical opportunity to ensure that the heating and hot water they use are fossil fuel free, and will play a crucial role in achieving our net-zero carbon target [e.g., see BEIS Clean Growth Strategy, 2017].

All applicants are therefore required to demonstrate (e.g., in their energy statement) that, in line with London Plan requirements, onsite renewable energy generation capacity for their proposal:

i. Has been maximised; and

ii. Is sufficient to achieve, at a minimum, 35% onsite improvement over Part L 2021 emissions standards, when combined with the savings delivered through fabric efficiency and low carbon heating.

Failure to meet either of these requirements will weigh heavily in the planning balance.

For most buildings, the most feasible source of on-site renewable energy is likely to be photovoltaic (PV) panels. In some cases, a combination of solar PV and solar thermal panels may provide the greatest benefits for occupants. Applicants should therefore use their energy statement to demonstrate:

i) How they have made the best use of roof space to maximise renewable energy capacity, through both coverage (taking into account other reasonable demands on the available roof space) and selection of higher efficiency panels.

ii) How appropriate roof spaces have been utilised to maximise the delivery of multifunctional benefits, through the co-location of renewable energy generation with other plant, and/or with green, brown or blue infrastructure.

iii) How demand-side response measures have been incorporated to enable the available renewable generation capacity to be used more effectively to reduce demand on the electricity grid.

Advice on each of these points is set out below.

It is perfectly possible to combine PV panels with a green roof system – typically, they will be mounted on legs with vegetation growing both around and underneath them. PV panels may even work more efficiently in such circumstances, as they can lose efficiency when hot and the planting can have a cooling effect in summer.

PV panels can also be mounted onto sunshades on roof gardens, or on the protective housing for plant. Further advice on such solutions can be found on the Livingroofs website.

Figure 3.5 – Combining Solar PV panels with green roof systems

Photovoltaic Installations for Operational Net Zero buildings

As explained by LETI in their Climate Emergency Design Guide, in order to genuinely operate at net-zero operational carbon, all buildings must be 100% powered by renewables.

Applicants are encouraged to bring forward schemes which, wherever possible, meet 100% of energy demand through on-site renewable energy generation – that is, the amount of renewable energy generation is at least equivalent, on an annual basis, to the estimated total predicted energy use on-site (i.e., matching the predicted EUI, which should have been minimised through the previous steps of the energy hierarchy). Where this is not possible, e.g. for larger scale development, they are encouraged to meet the LETI targets in the table below. Applicants can expect case officers to seek to understand why these targets might not be achievable in individual circumstances.

In the UK, it may be possible for apartment blocks up to six storeys high to achieve a net zero operational energy balance on-site with rooftop PV, heat pumps and efficient building fabric. LETI have suggested the following renewable energy generation targets for key building typologies:

Development Type	Onsite Renewable Generation Target
Small-Scale Residential	100% of annual requirement
Medium to Large-Scale Residential	Cover 70% roof area
Offices	Enough to meet requirements of at least 2 floors
Schools	Cover 70% roof area

No target is suggested for industrial buildings, due to the wide variety of potential building forms and uses. However, the targets suggested for the most similar typologies above should be taken as indicative, e.g. covering 70% of roof area of single-level industrial buildings.

Unless it is demonstrated that the site is overshadowed, buildings should be able to achieve a predicted annual renewable energy generation of at least:

- 100 kWh/m2 of building footprint for blocks of flats
- 150 kWh/m2 of building footprint for houses

Roof shape and orientation have a big impact on the amount of renewable energy which can be generated – see Figure 3.6 below. These should be optimised from the earliest design stages to maximise solar PV outputs.

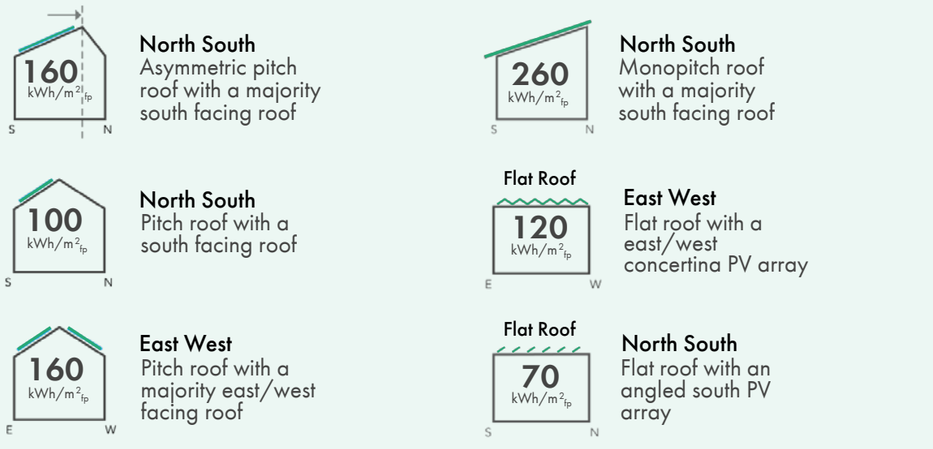


Figure 3.6 – Expected PV output from different roof designs and orientations

Other renewable technologies

For some new developments, it may also be worth considering hydro-electric and wind turbines, but these are not expected to be feasible for most developments which come forward in Hounslow. Due to the carbon and air quality costs of producing, transporting and burning biomass, the Council does not consider this to be a sustainable source of energy.

Character, heritage and other impact considerations

When considering renewable sources of technology, other planning matters, including appearance and impact on neighbours, should be considered. Developments in conservation areas or involving heritage assets need to provide careful consideration of how sustainable energy measures may be incorporated without adversely impacting on the character, function and preservation of a specific area or asset, in accordance with the policies on design in this Local Plan.

However, in such circumstances, development proposals should not presume that a viable sustainable solution cannot be provided. For developments in sensitive locations, priority should be given to more discreet locations for renewable technologies. The Council will determine whether the provision of sustainability measures causes any adverse impact upon the asset or area and, where appropriate, will prioritise safeguarding of the asset in line with the NPPF. Early pre-application engagement with the Council's planning and conservation teams is therefore considered critical to ensuring that an appropriate balance can be struck between preserving & enhancing our heritage assets and delivering renewable energy solutions on sensitive sites.

Impact on light/outlook to neighbours and noise disturbance should also be considered. Heat pumps should be set away from the boundaries of properties and sufficiently enclosed/mounted to ensure noise impact is minimised. Wind turbines of a large scale are likely to cause harm in an urban environment so will likely be objected to on constrained sites.

Demand-side Management

Developments should, as good practice, include measures to reduce peaks in electricity demand and increase energy flexibility (that is, the ability to reduce consumption for a period of time, e.g., in response to external drivers such as energy price change, grid availability). Such measures can contribute to net zero carbon by enabling renewable generation capacity to be used more effectively. They include:

Peak reduction – reduce peak energy demand through:

- Heating peak reduction – reducing peak heating demand through high performance fabric (slow to respond to changes in external temperature), a good level of airtightness, a compact form factor and thermal mass. An efficient heating system also reduces the heating peak demand. In particular, heat pumps installed into buildings with high fabric efficiency spread heating demand throughout the day
- Cooling peak reduction – appropriate glazing ratio, external shading, thermal mass, efficient cooling system and efficient lighting
- Domestic hot water peak reduction – low-demand outlets, reducing distribution heat loss and installing an efficient heating system

Energy storage – should be considered to retain and release energy as required, providing system flexibility in response to specific energy demands. Options for this include:

- Hot water storage
- Thermal storage in communal or individual heating systems
- Battery systems to store excess generation to use when needed

Active demand response measures – such as heating set-point controls

Electric vehicle turn-down – Installing smart chargers to enable users to specify off-peak charging only (which may also reduce consumer costs), and allowing the electricity supplier to stop charging during times of peak grid demand

Behaviour change – incentives to reduce power consumption and peak grid constraints

Energy Hierarchy Stage 4:
Be Seen – Energy Monitoring

Post construction energy and quality monitoring is needed to develop a true understanding of a buildings' operational energy use, to determine whether a building and its systems work as expected when occupied, or where they do not, the extent of the performance gap (difference between predicted and as-built performance).

London Plan 2021 Policy SI 2 therefore requires developers and owners of all new major developments to monitor and report actual operational energy performance for at least five years post-occupancy through the 'Be Seen' portal, as set out in the GLA's **Be Seen – Energy Monitoring Guidance** (September 2021). Performance indicators include contextual data, building energy use, renewable energy generation, energy storage and plant and carbon emissions. Where actual performance differs from estimated performance, developers are required to identify the causes and potential mitigation measures.

The onus is on the developer / owner of the reportable units to provide this information, and this will be secured via a legal (S106) agreement. Details of the legal agreement (S106) wording may be found in the 'Be Seen – Energy Monitoring Guidance'.

Breaches of planning control will be handled in line with the Council's Planning enforcement plan.

3.5 Carbon offsetting

The previous section sets out the requirement for all new development proposals to demonstrate that they are taking all reasonable steps to minimise on-site carbon emissions resulting from operational energy use. Only if developers can clearly demonstrate that it is not possible to achieve operational zero-carbon on-site, will residual emissions be permitted. Any residual emissions are subject to a carbon offset payment.

London Plan policy SI 2 D requires that, for any residual emissions, a carbon offset payment is to be paid, for each tonne of carbon expected to be emitted by a development as a result of its operational energy use over its first 30 years.

Carbon offset payments received by the Council will be paid into its Carbon Offset Fund, which has been set up by the Council to finance its own initiatives for addressing climate change in the borough, such as the Hounslow Community Energy Fund.

Contributions to the Carbon Offset Fund should be seen as a last resort, an option to be used only once all other on-site carbon reduction options have been exhausted. The Council will review all applications to ensure that a contribution to the Offset Fund is not used as an alternative to maximising carbon reductions simply because it is cheaper.

The London Plan Energy Assessment Guidance states, at paragraph 6.6, that "a cash in lieu payment should not be used as a cost comparison with delivering CO_2 savings on-site. Policy SI 2 requires carbon reductions to be achieved as far as possible on-site and a cash in lieu contribution will be considered acceptable only in instances where it has been clearly demonstrated that no further savings can feasibly be achieved on-site.

3.5.1 Carbon Offset Price

In order to genuinely deliver net-zero carbon development, the cost of offsetting residual carbon emissions must ensure that contributions are sufficient for the local authority to pay for measures which achieve carbon savings equivalent to the development's carbon shortfall.

Contributions to the Carbon Offset Fund are currently charged at a rate of £95 per tonne of CO_2e, as suggested in the GLA's Carbon Offset Fund Guidance (updated alongside the 2021 London Plan). However, the London Plan (footnote 155) permits boroughs to develop their own carbon offset price based on the cost of offsetting carbon across the borough.

In 2022, Hounslow and 18 other London boroughs commissioned the Delivering Net Zero report (published in 2023), which updates and augments the earlier Towards Net Zero Carbon Report (published in 2020). This study undertook detailed modelling and research on the costs of delivering operationally net zero carbon buildings in London. Some of its key findings include that:

- It would cost London local authorities £480/tCO_2 to make equivalent carbon savings in a sustainable way, e.g., through retrofit, taking into account administration and management costs.
- Following the adoption of SAP 10.1 carbon factors in Part L 2021, the cost of saving carbon onsite through the installation of additional PV capacity is now at least £340/tCO_2, increasing from £190/tCO_2 under Part L 2013, as a result of the decarbonisation of grid electricity. An offset price above this level would therefore have the additional effect of incentivising maximum delivery of PV capacity on new buildings, as this would be more cost effective for developers than paying for equivalent carbon offsets. (NB: this cost may increase further for future iterations of Part L, as the grid decarbonises and, thus, more PV is needed to mitigate the same amount of carbon).

Impact of increased onsite carbon savings on viability

The Delivering Net Zero report also undertook modelling across several typologies which showed that:

- A 60% improvement in emissions over Part L 2021 would be approximately consistent with zero carbon objectives for new development – i.e., meeting Part L 2021 and GLA standards, and broadly consistent with the LETI definition of an operationally zero carbon building.
- For a typical development, on-site emissions reductions of up to 60% below Part L 2021 could be achieved with only small increases in construction costs. Furthermore, construction costs are typically less than half of total development costs, i.e., when the cost of land is included. For example:
    - o A mid-rise residential block with air-source heat pump can achieve the GLA on-site emissions reduction target of 50% below Part L 2021, with only a 1.7% increase in construction costs against a Part L 2021-compliant baseline (including FEES) with gas boiler heating. This equates to a likely <1% increase in total development costs.
    - o The same block with 'Be Lean' compliant, ultra-low energy fabric and heat pump would be 3.3% more expensive to construct than the baseline (so <2% increase in total development costs).

LB Hounslow is gathering further evidence to support a possible increase in the carbon offset price through future Local Plan policy, in order to more accurately reflect the true costs of carbon reduction and to further incentivise on-site improvements. In the meantime, the Council will attach significant positive weight to the achievement of building standards which achieve as close as possible to net zero carbon on site, in line with the advice set out in Section 3.4.

3.6 Designing for a Changing Climate

As well as moving towards zero carbon, new developments will need to be designed with the changing climate in mind – that is, to be able to cope with climatic changes which are already happening now and those which are 'locked-in' over the coming decades – and to be further adaptable to possible future extremes. We can expect to experience more frequent weather extremes including hotter summers, extended dry and wet periods, and more intense rainfall events. The design of building fabric and services therefore needs to adapt to increased risk of overheating and flooding, in order to protect residents and their property, and to reduce the costs and carbon emissions associated with future requirements for mechanical cooling and flood recovery or protection.

3.6.1 Overheating & Ventilation

Summers are expected to be hotter in future, and so the risks associated with overheating in buildings are expected to increase. Temperature rises for London are predicted to be higher than the global averages, particularly when exacerbated by the Urban Heat Island (UHI) effect, where the concentration of buildings and hard surfaces in urban areas which absorb and retain heat can raise the temperature by several degrees relative to surrounding countryside. In 2019, a review of evidence commissioned by Caroline Russell AM (Green Party member of the London Assembly), used Met Office UKCP09 modelling to identify that London has already seen mean summer temperature increase by c.1.9°C between 1961 and the early 21st Century; and by the 2050s, is expected to experience a mean daily maximum temperature 3.7°C higher than the 1961-1990 baseline (under a medium emissions scenario and with a 50% probability level). The London Climate Change Partnership's summary of the IPCC's 6th Assessment predicts even bigger increases of up to 5-6°C by mid-century.

This will have an impact on health, infrastructure, comfort, and the operation of the city. For example, the Committee on Climate Change estimates that the number of heat-related deaths is projected to increase from 2,000 per year in 2015 to 7,000 per year by the 2050s. Therefore, alongside a design focus on minimising the energy needed for space heating in winter, attention also needs to be paid to minimising overheating risks in summer – and not just for current conditions, but able to cope with the significantly warmer climate expected during a building's lifespan.

London Plan policy SI 4 B requires all developments of 10 or more homes to demonstrate, through an Energy Strategy, how they will reduce the potential for internal overheating in accordance with the cooling hierarchy.

The London Plan encourages developers to carry out robust overheating modelling for their proposals against extreme weather scenarios and design in appropriate mitigation measures, prioritising natural ventilation and other passive measures. Good ventilation is also important to maintain good indoor air quality and manage moisture levels.

Developers are also recommended to:

- Make use of the GLA's **London Climate Risk Map** to identify whether their site is within an area of particular heat risk, which will need greater attention to mitigation
- Apply the Cooling Hierarchy below to their proposals and incorporate the recommended measures into their designs to mitigate overheating risk
- Adopt approaches to counter the Urban Heat Island effect set out in the **Hounslow Character, Sustainability and Design Codes SPD** (Part A2 – Common Considerations).

The Cooling Hierarchy

Overheating risk should be addressed first through the design of buildings rather than through air conditioning, which will increase energy use and exacerbate the Urban Heat Island effect. Major development proposals should demonstrate through an energy strategy how they will achieve this, in accordance with the following cooling hierarchy:

FIRST PRIORITISE PASSIVE DESIGN PRINCIPLES:

(i) Minimise heat gains in summer – this can be achieved through a variety of means, such as:

- **Thermal insulation** – It is a myth that increased levels of insulation and airtightness cause overheating. Well-insulated walls, floors, roofs, windows and doors can keep out heat in summer as effectively as they keep heat in, in winter. However, it does need to be combined with adequate ventilation, particularly in flats, to ensure that internally generated heat can escape – see points (ii) and (iv) below. As described above for heat loss, minimising heat gain is also facilitated by designing simpler and more compact forms, and by avoiding breaks in the building envelope (thermal bridging).
- **Optimising orientation, glazing ratios and shading elements** – the Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations; Passive Design section) describes how to balance minimising heat gain in summer with desirable passive heat gains in winter, and also with urban design and daylight considerations. See also see the Window Area Guide below.
- **External surfaces which reduce heat absorption,** such as:
  - Green roofs and walls – these can have an insulating and cooling effect
  - High albedo surfaces, especially roofs – e.g., white or otherwise having high solar reflectivity
- **Green Infrastructure** – helps to reduce temperatures both by shading the building and the surrounding areas; and also, through evapotranspiration cooling the air. Trees are the most effective at both; but simply replacing hard paving with any green space will have a positive effect. More information on this, including the Biodiversity Net Gain (BNG) and Urban Greening Factor (UGF) policies, is included in the Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations).

(ii) Minimise unwanted internal heat generation through energy efficient design – e.g.:

- Minimising pipe-lengths for communal heating systems
- Ensuring hot water tanks / thermal storage units are carefully located and well-insulated
- Limiting waste heat from appliances – these are often the cause of summer heat build-up, particularly in flats.

(iii) Use internal thermal mass and high ceilings to stabilise internal temperature

(iv) Maximise passive ventilation – manipulate building form and fabric to enable cross-ventilation, passive stack and other wind driven ventilation to purge excess heat and provide good indoor air quality and moisture control. In particular:

- All properties should be dual aspect to enable cross-ventilation.
- Where possible, ventilation openings, gardens, balconies and outdoor amenity spaces should be positioned away from sources of air and noise pollution to ensure they can be used – further detail on how this can be achieved is set out in the Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations; Mitigating Poor Air Quality and Gardens and Balconies sections). The impact of noise, air quality and security on window-opening, particularly at night, will need to be taken into account very early on in design process.
- Where this is not possible, provide winter gardens in preference to balconies on busy road frontages and under flight paths, where night-time noise is an issue.

THEN, HAVING MINIMISED THE NEED FOR COOLING THROUGH PASSIVE MEANS:

(v) Provide whole-house mechanical ventilation (with summer bypass) – where needed to ensure that buildings are adapted for the increased likelihood of heatwaves, as well as maintaining good indoor air quality and moisture management. Where used, MVHR units should be located on an external wall, to optimise their performance. Plant cupboards should be tightly planned and optimised, and separated from storage cupboards to ensure good access for maintenance and servicing. For homes that are predominantly mechanically ventilated, the CIBSE fixed temperature test must be followed.

(vi) Provide active cooling systems – to be considered only where passive cooling potential has been maximised and requirements CANNOT be met by other means. If modelling shows that a building passes an overheating assessment now but could be at risk during its lifetime under future weather files, even with all the above strategies deployed, consider including space (for plant, ducting, etc.) to facilitate future installation of efficient active cooling systems.

Other measures which can help manage overheating risk include:

- Arrangement of internal layout – residents can benefit from buildings being designed to have hot and cool refuges; for example, locating living spaces in the warmest areas of the property (e.g., south-facing aspect), while protecting bedrooms from excessive afternoon heating (e.g., avoid west-facing windows).
- Providing the necessary space within homes near adequately sized, well-located windows to allow clothes to be dried naturally, thus removing the need for appliances which generate heat. (This will also reduce embodied carbon, energy use and the urban heat island effect.)

London Plan Policy D6 requires that housing developments maximise the provision of dual aspect dwellings and normally avoid the provision of single aspect dwellings, and in particular those which are north facing, contain three or more bedrooms or are exposed to noise levels above which significant adverse effects on health and quality of life occur. Where single aspect dwellings cannot be avoided, these must demonstrate that they will have adequate passive ventilation, daylight and privacy, and avoid overheating.

Window Area Guide

It is important to minimise heat loss to the north (i.e., with smaller or fewer windows) while providing sufficient solar gain from the south (larger windows) - see Figure 3.6 below. Also consider that:

- Windows should open as widely as possible
- Horizontal windows are better than vertical to maximise daylight while controlling solar gain.
- Where the sizing guide results in window sizes which seem ungenerous, use of architectural features such as stepped reveals or textured panels can improve the balance of solid to 'apparent' void.
- Other solutions, such as lowering the g-value of windows – while having their place – are very much secondary measures.

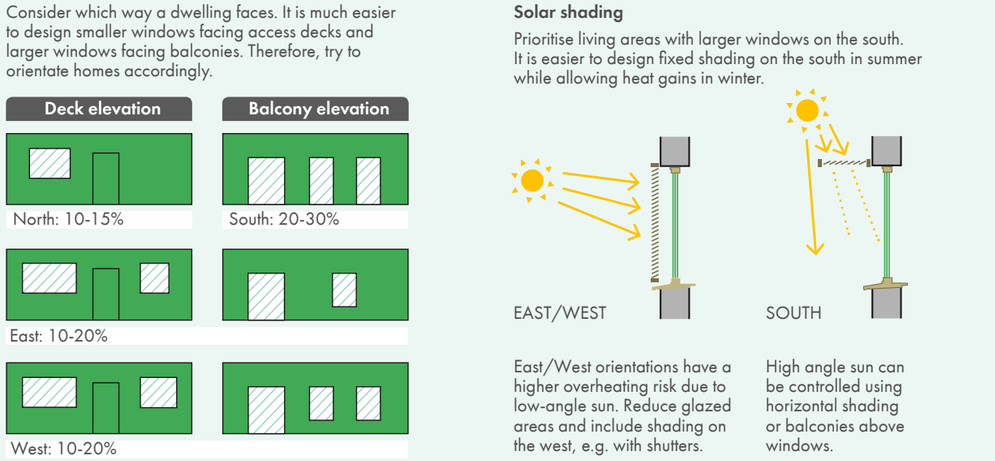


Figure 3.6 – window area and orientation guide

Assessing Overheating Risk

The 2021 update to Building Regulations saw the introduction of a new Approved Document O on Overheating, which aims to limit unwanted solar gains in summer and provide adequate means of quickly removing excess heat from indoor environments. Compliance can be demonstrated through two methods:

1. The Simplified Method, under which the building must meet the acceptable design parameters for glazing, shading and ventilation set out in Approved Document O.
2. Where these parameters are too prescriptive, Dynamic Thermal Modelling may be used to demonstrate that a building nonetheless complies with limit overheating risk, as set out in CIBSE guidance documents TM 59 (domestic developments) and TM 52 (non-domestic developments) This should be carried out at the detailed design stage.

Applicants should note that:

- All rooms in the development will need to pass the relevant tests. In larger developments, those rooms identified as being most at risk should be selected for modelling and assessment – this choice will need to be justified and will include those with large / sun-facing glazing areas, top floor, less shading, single aspect and limited opening (e.g., ground floor).
- Although internal blinds or external foliage such as trees will help to reduce solar gain and are actively encouraged, they should not be taken into account when considering whether the overheating requirement has been met.
- Where air quality, noise or crime concerns pose limitations to the opening of windows and cannot be mitigated, two separate overheating analyses should be submitted: one with openable windows and one with closed windows.

CIBSE Assessment Limitations – to be addressed in designs

Future Climate – The TM52 and TM59 methodologies do not include, as standard, assessments for expected future summer temperatures. CIBSE TM49 guidance and Design Summer Year (DSY) datasets should therefore also be used to ensure that all new development is designed for the climate it will experience over its design life. At a minimum, this should include the DSY2 (2003 – very intense single warm spell) and DSY3 (1976 – prolonged period of sustained warmth) weather files. It is also recommended to include the 2050s and 2080s scen`arios to demonstrate what mitigation measures might need to be incorporated in future. The GLA's Energy Planning Guidance provides further information on how these guidance documents and datasets should be used.

It is possible that developments which comply with TM59 now are unable to meet this requirement for future weather files over its design life, using passive techniques alone. Where dynamic modelling shows this to be the case, developments should be designed to be adaptable to future climate – e.g., by allowing space for plant and ducting needed to retrofit efficient mechanical cooling systems.

Window Control – assumptions on occupant behaviour in relation to window opening ONLY considers internal temperature – but this will be counterproductive if the outside temp is much hotter, or may not be desirable if there is night-time noise. Therefore, while TM59 may be used to demonstrate compliance, applicants are recommended to use modified assumptions for design purposes; e.g., sensible window control plus night-time purge only where this is feasible.

3.6.2 Reducing water use

Climate change is resulting in hotter, drier, summers with increased risk of drought. This results in reduced reliability of water supply, which – in combination with the challenge of a growing population and greater demand for water during hot spells – has led the Environment Agency to designate the Thames Water region to be "seriously water stressed" (Water Stressed Areas - Final Classification, 2021). Action is required now to ensure the availability of water for the future. It is therefore important that any new development does not lead to an overall increase in demand for water, as set out in the London Plan.

London Plan Policy SI 5 C requires:

- Residential buildings to achieve a target internal consumption rate of <105 l/p/d
- Commercial development to achieve at least the BREEAM Excellent standard for the 'Wat 01' water category).

Applicants are strongly encouraged to go beyond this, to achieve the RIBA 2030 Climate Challenge target for residential buildings of <75 l/p/d.

To achieve the requirement, and get as close as possible to the aspirational target:

- All developments are required to demonstrate that the use of mains water has been minimised by incorporating measures such as smart metering, water saving taps and appliances, and recycling measures.
- All major developments and high water-use developments (such as hotels, hostels and student housing) are expected, where feasible, to include water saving measures such as rainwater harvesting and greywater recycling to reduce mains water consumption.
- All developments are strongly encouraged to incorporate rainwater collection and / or grey-water reuse for flushing toilets or other uses.

For example, in commercial buildings with low internal water use, this could include irrigation of planting or vehicle wash.

Conserving water and energy go hand in hand. To reduce hot water-use, new developments should incorporate:

- Reduce flow rates - 'Green' Euro Water Label should be used for water outlets (e.g.: certified 6 L/min shower head – not using flow restrictors).
- Reduce distribution losses - Maximum dead leg of 1 litre for hot water pipework. Tapping points (e.g., taps, shower connections) should be clustered near the hot water source.

3.6.3 Protection from flooding

The London Plan Policy SI 12 requires that development proposals ensure that flood risk is minimised and mitigated, and that residual risk is addressed. This should include, where possible, making space for water and aiming for development to be set back from the banks of watercourses. For guidance on this, please see Stage 2 of the Design Process in Section 2.2.1 above, and in the Hounslow Character, Sustainability and Design Codes SPD (Part A2 – Common Considerations; Nature section). Developers should have regard to any flood risks identified for the site in the Mayor of London's Regional Flood Risk Appraisal (RFRA). Where building has been permitted in locations where there is a risk of flooding – whether now, or in the future due to changing weather patterns – there are a number of measures which can be incorporated into building fabric to increase their resilience and enable them to recover more easily from flood events. The Environment Agency recommends that, in these cases, proposals incorporate into their building fabric design:

- Finished Floor Levels (FFLs) that are built to the appropriate levels, including climate change allowances
- Other flood resistance and resilience measures such as physical barriers, raised electrical fittings and special construction materials.

3.7 Major Refurbishments

All existing buildings will also need to decarbonise if we are to achieve net zero targets. Proposals for major renovations/refurbishments, changes of use, and extensions which require planning permission, are therefore expected, as far as is practicable, to use this as an opportunity to minimise operational energy use and address climate adaptation needs.

Local Plan Policy EQ2 requires that major developments involving refurbishments should be assessed against BREEAM Domestic / Non-Domestic Refurbishments and achieve a rating of Excellent as minimum.

Smaller refurbishments are also encouraged to use the BREEAM retrofit standards, or others which are available – such as Enerphit for domestic projects.

Paragraph 167 of the NPPF (December 2024) states that in determining planning applications "local planning authorities should also give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights)." The NPPF also notes that where such a proposal affects a designated heritage asset, decision makers should apply policies related to conserving and enhancing the historic environment.

Any such development involving the refurbishment, change of use or conversion of an existing building will not be required to offset the carbon shortfall. This is to disincentivise the demolition of retrofittable buildings and encourage their refurbishment, in order to minimise embodied carbon emissions from development.

However, all such development will be expected to maximise on-site carbon savings, getting as close as possible to the net-zero carbon target. Building owners or developers should adopt the approaches set out in this chapter, to aim to achieve – for those building elements within scope of the refurbishment – the same energy performance and other targets set out for new construction, as far as is technically, functionally and economically feasible, and taking embodied carbon into account (i.e., seeking to minimise whole-lifecycle emissions). Where they do not, they should fully justify the solutions adopted.

Developers will benefit from appointing a Retrofit Co-ordinator to prepare a bespoke Decarbonisation Plan, using a 'whole building' approach appropriate to its age and construction method, to set the building on a pathway to zero carbon, with clear staged steps to get there. Historic England provide further information on this approach for traditionally constructed buildings, on their Energy Efficiency and Retrofit in Historic Buildings webpages

Particular attention should be paid to:

- The building fabric – walls, roof and floor should be upgraded to be as close as possible to modern standards of thermal efficiency as is possible within the constraints of the planned refurbishment. Insulation should be selected according to the original building construction and materials – for example, in historic buildings, breathable insulation will reduce the risk of moisture build-up in walls
- Location of uses with the building or site – if the scope of the refurbishment permits, consider adjusting the locations of different uses within the constraints of the existing structure to optimise the use of passive heating and cooling.
- If replacing the heating system – these should meet modern standards and avoid the use of fossil fuels, following the heating hierarchy set out in Section 3.3 above; connecting to a district heating system where possible, otherwise using a heat pump as the next best option.
- Windows and doors – where being replaced, high performance products should be selected, with windows preferably being triple-glazed. The sizing, shading and openability of new windows should be optimised to enable natural ventilation and reduce overheating risk, in line with advice above.
- Overheating risk – follow the cooling hierarchy above before replacing or installing a cooling system. Provision should also be made to ensure good indoor air quality, including natural ventilation where possible. An overheating assessment should be undertaken to ensure the building will remain usable for expected climate within its lifespan. Where this indicates an overheating risk for future weather files, developers should consider what measures could be retrofitted structurally into the development to mitigate this risk in dynamic thermal modelling.
- Where toilets, taps and showers are replaced, these should meet high water efficiency standards. Other water saving measures such as rainwater harvesting and grey-water recycling, should be incorporated wherever possible.
- Installation of photovoltaic panels should be considered in all cases. Arrays can be integrated into existing roofs (subject to them being able to bear the additional weight), installed over existing plant, alongside green roofs and on extensions. They can work efficiently on east- and west-facing elevations, as well as south-facing. The opportunity may be greater if the roof is to be replaced, in which case the additional weight of PV panels can be accounted for in the design.
- Embodied carbon – work with a structural engineer to consider the benefits of alternative options for extensions and structural works.
- Conservation areas and listed buildings – many of the above measures can be successfully integrated into heritage buildings, subject to expert advice. A 'whole-building' approach is needed for traditionally constructed buildings, to ensure that the most appropriate interventions are carried out, while avoiding adverse impacts on the significance, character, function and preservation of a specific area or asset, in accordance with the policies in the Hounslow Character, Sustainability and Design Codes SPD (Part A2 - Common Considerations). Early conversations with conservation officers are recommended to ensure that action towards net zero can be maximised without adversely impacting on the character, function and conservation of conservation areas or assets.

Key Definitions

Regulated energy: Energy consumed by a building, associated with fixed installations for heating, hot water, cooling, ventilation, and lighting systems.

Unregulated energy: Energy consumed by a building that is outside of the scope of Building Regulations, e.g. energy associated with equipment such as fridges, washing machines, TVs, computers, lifts, and cooking.

Operational carbon ($kgCO_2e$): The carbon dioxide and equivalent global warming potential (GWP) of other gases associated with the in-use operation of the building. This usually includes carbon emissions associated with heating, hot water, cooling, ventilation, and lighting systems, as well as those associated with cooking, equipment, and lifts (i.e. both regulated and unregulated energy uses).

Embodied carbon (EC): The carbon emissions associated with the extraction and processing of materials and the energy and water consumption used by the factory in producing products and constructing the building. It also includes the 'in-use' stage (maintenance, replacement, and emissions associated with refrigerant leakage) and 'end of life' stage (demolition, disassembly, and disposal of any parts of product or building) and any transportation relating to the above.

Whole life carbon (WLC): This includes embodied carbon, as defined above, and operational carbon. The purpose of using WLC is to move towards a building or a product that generates the lowest carbon emissions over its whole life (sometimes referred as 'cradle-to-grave').

Circular economy: A circular economy is an industrial system that is restorative or regenerative by intention and design. It replaces the linear economy and its 'end of life' concept with restoration, shifts towards the use of renewable energy, eliminates the use of toxic chemicals and aims for the elimination of waste through the design of materials, products, systems that can be repaired and reused.

Energy Use Intensity (EUI): An annual measure of the total energy consumed in a building. It is a good indicator for building fabric performance as the metric is solely dependent on how the building performs in-use; rather than carbon emissions, which also reflect the carbon intensity of the grid. EUI is a metric that can be estimated at the design stage and very easily monitored in-use as energy bills are based on kWh of energy used by the building. This metric can be used to compare buildings of a similar type, to understand how well the building performs in-use. It includes all of the energy consumed in the building, such as regulated energy (heating, hot water, cooling, ventilation, and lighting) and unregulated energy (plug loads and equipment e.g. kitchen white goods, ICT/AV equipment). It does not include charging of electric vehicles. EUI can be expressed in GIA (Gross Internal Area) or NLA (Net Lettable Area).

ANNEX A: POLICY AND LEGISLATIVE CONTEXT

Annex A: Policy and Legislative Context

A1 Overview

This Annex sets out the international and national policy context and legislation on climate change which may be relevant to planning decisions in London Borough of Hounslow. The guidance contained within this document draws on this context and interprets it for development within the Borough. The policies set out below will, where relevant, and appropriate, be taken into account when considering planning applications made to the Council.

A2 International Policy Context

The threats of human-induced climatic change have become a growing area for policy research in the past few decades, rising to the forefront of global and national policy agendas as the research base has become increasingly extensive and convincing, and the impacts have started to present themselves.

From the first United Nations Framework Convention on Climate Change (UNFCCC) back in 1992, which aimed to prevent 'dangerous' human interference with the climate system, the breadth of global policy seeking to adapt to and mitigate against anthropogenic climate change has advanced, with the Kyoto Protocol of 1997 setting legally binding emission reduction targets and the Paris Agreement of 2015 requiring countries to work together to keep the global average temperature increase well below 2 degrees above pre-industrial levels, and ideally limited to 1.5 degrees. A further summit held in 2019 (the Climate Action Summit) identified key sectors where differences can be made to minimise impacts, which include cities and energy supplies.

The evidence base underpinning is provided in regularly updated assessments published by the International Panel for Climate Change (IPCC), whose latest (5th) report was published in 2014, demonstrating categorical evidence of human-driven climate change. Its 6th report is due out in 2022 (following publication of The Physical Science Basis report in August 2021).

A3 EU Level

At the European Union (EU) level, the EU's climate change programme has committed to cut emissions across the bloc by 80-95% by 2050 compared to 1990 levels. To this end, the EU's Adaptation Strategy (2013) has three objectives: (1) promoting action by member states (i.e. to develop mitigation strategies and build up adaptation capacities); (2) 'climate proofing' action at the EU level; and (3) Better-informed decision-making (to address gaps in existing knowledge and inform all sectors of how they can act).

Though the United Kingdom has left European Union, it is likely that a policy agenda similar to that required by EU member states will be imposed in the UK. At any rate, tackling climate change will require joined-up action between the UK and its neighbours so it is valuable to understand the EU policy context.

A4 National Policy Context

The challenge of tackling climate change is addressed at all levels of planning policy in the UK.

In light of growing public awareness about the impacts of climate change, a 'climate emergency' was declared by the UK Government in May 2019, following a surge in national and international attention. Though not legally binding, this signalled the will of parliament to act on the issue, and shortly after 261 Councils across the country followed suit in declaring their own local climate emergencies (including Hounslow Council). In response, authorities will be expected to set ambitious targets and find innovative ways of responding to climate change, within the means and regulations of national, regional and local policy. Pursuant to this, on 27 June 2019 the UK Government became the first major economy in the world to pass laws to end its contribution to global warming by 2050.

The sub-sections below cover very briefly some of the historic policy context underpinning the NPFF and contemporary climate change policy.

A5 Historical Legislative Context

Planning and Compulsory Purchase Act 2004 (as amended by the 2008 Planning Act)

The PCPA sets the structure of the local planning framework in England and was the first piece of legislation to formally introduce a legal duty requiring plan-making authorities to include policy aimed at mitigating and adapting to climate change. Section 19(1A), as amended by the Planning Act 2008, requires that 'Development plan documents must (taken as a whole) include policies designed to secure that the development and use of land in the local planning authority's area contribute to the mitigation of, and adaptation to, climate change.' When combined with other legal and policy requirements relating to climate change, Section 19 represents a strong foundation for climate action through plan-making.

Climate Change Act 2008

The *Climate Change Act 2008* (CCA) introduced an ambitious statutory target of bringing CO_2 emissions down to at least 80% below 1990 levels by 2050 (with interim five-yearly carbon budgets of 37% by 2020, 51% by 2025 and 57% by 2030); it also established a framework for the ongoing reporting of climate change risks in England and how Government funding has been used to tackle and adapt to these impacts. The CCA (in conjunction with reports published in its wake) therefore serves as a key evidence base for identifying risks and priorities for action and adaptation. The CCA has subsequently been updated by the 2008 Act (2050 Target Amendment) Order 2019 which amends the statutory target to 100% reduction in emissions (or 'net zero') by 2050.

Planning Act 2008

This Act introduced a new planning regime to regulate large-scale, 'Nationally Significant' infrastructure projects. To guide decisions on such projects, the Government has produced National Policy Statements (NPS), which LPAs have a duty to apply when determining major renewable energy applications.

Planning and Energy Act 2008

The Planning and Energy Act 2008 was amended in 2015 to provide Government with powers to stop local planning authorities from being able to exceed the minimum energy efficiency requirements of the Building Regulations. A written ministerial statement in the same year set out an 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). The Government has so far not commenced this amendment, causing confusion and uncertainty amongst LPAs and developers. In order to address this, the Government clarified their position through the Future Homes Standard consultation response (January 2021) by stating that it would not amend the Planning and Energy Act 2008. As such local planning authorities still retain powers to set local energy efficiency standards for new homes through local plan policy.

The PEA also introduced the ability for LPAs to require that a proportion of the energy demand for new developments is generated locally, within the vicinity of a development, via renewable or low-carbon technologies. This approach can be used to promote area-based solutions such as district heating, which can form part of a lucrative zero-carbon policy whereby local communities and planning authorities are able to reap benefits from localised renewable energy production.

In this context, it is helpful to note that the Council initiated work in early 2022 to prepare a heat map and energy masterplan for the borough. This will be used to identify areas where we will expect developers to connect new developments to proposed heating networks to support their development – see Chapter 5 for more information.

This approach will be further supported by the government's commitment in the 2020 Energy White Paper to implement heat network zoning by 2025, on which BEIS launched a consultation in October 2021. This would involve designating areas within which heat networks are the lowest cost, low carbon solution for decarbonising heating. Within a zone, certain types of building would be required to connect to their local heat network in a given timeframe.

Localism Act 2011

The Localism Act catalysed radical reforms to the planning system, which the Government saw as key to meeting climate change obligations. At the local level, the Act encouraged increased transboundary 'co-operation' between councils when adapting and mitigating to climate change, and facilitated community action on climate change through the development of Neighbourhood Development Plans and Neighbourhood Development Orders. However, perhaps more importantly, it laid the foundation for a new National Planning Policy Framework. This is explored in **Section 1.3.2.**

London Borough
of Hounslow