Coventry City Council

Energy

Supplementary Planning Document (SPD)

March 2022

Coventry City Council

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1 Glossary

BER	Building Emission Rate - the CO2 emission rate of a non-residential building based on its design specification. The BER is a metric used to assess compliance with the Building Regulations.
BREEAM	The Building Research Establishment Environmental Assessment Method for assessing, rating and certifying the sustainability of buildings the highest standards of which are 'Outstanding' (≥85% score) and 'Excellent' (≥70% score)
CCHP	Combined Cooling Heating and Power: A power plant that generates electricity and useful heating and cooling simultaneously for distribution through a network providing power and heat to buildings. The lack of energy lost means the system is highly efficient. CCHP plants and distribution networks can work at a number of scales and can be powered by fossil fuels, like oil and gas, or renewable fuels, like wood pellets. CCHP is often referred to as trigeneration and CCHP networks that serve multiple buildings may be referred to as district heating and cooling networks.
CHP	Combined Heating and Power - A power plant that generates electricity and useful heat simultaneously for distribution through a network providing power and heat to buildings. The lack of energy lost as heat results in high efficiency. CHP plants and distribution networks can work at a number of scales and can be powered by carbon-based fuels, like oil and gas, or renewable fuels, like wood pellets. CHP is often referred to as cogeneration and CHP networks that serve multiple buildings may be referred to as district heating networks.
Climate Change Adaptation	Adaptations to buildings, places or environments that make them more resilient to, and potentially benefit from, expected changes in climate and weather patterns.
Climate Change Mitigation	Action to reduce the impact of human activity on the climate system, mainly through reducing greenhouse gas emissions.
DER	Dwelling Emission Rate - the CO2 emission rate of a dwelling based on its design specification. The DER is a metric used to assess compliance with the Building Regulations.
Direct carbon emissions	The direct or operational carbon emissions are emissions that result from the use of a building (e.g. space and water heating, lighting, mechanical ventilation)
District heating	See heat network.
Embodied carbon	The carbon footprint of a material or building that results from the embodied energy used to create it.
Embodied energy	The energy consumed by all of the processes associated with the production of a material or building including mining and processing of natural resources, manufacturing, transport and product delivery.
EPC	Energy Performance Certificate is a report that assesses the energy efficiency of a property with recommendations of the requirements
EV	Electric vehicle - a vehicle powered by electricity.

Fabric First	Maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building services systems.
FSC	Forest Stewardship Council - a body that promotes responsible management of the world's forests. It provides sustainability certification for timber products by setting specific standards that timber supplier must meet.
Heat Distribution Network	See heat network.
Heat Network	A system of insulated pipes which transports heat from a source (or multiple sources) to more than one end user.
Heat Pump	A heating system that absorbs heat from the air, ground or water and uses it to heat a building. Some heat pumps can also cool buildings by transporting heat outside for both residential and commercial development. There are wide variety of technologies and further information can be found here: www.renewableenergyhub.co.uk/main/heat-pumps-information/
MMC	Modern Methods of Construction - methods of construction that are typically quicker, cheaper and more sustainable than traditional construction methods. MMC include offsite prefabrication, modular construction, precast panels and insulated concrete forms.
Offsite construction	The construction of buildings or building elements away from a development site.
Modular construction/modular buildings	Modular buildings are assembled on site from components manufactured in factories.
Operational carbon emissions	See direct carbon emissions.
PEFC	Programme for the Endorsement of Forest Certification - an umbrella brand incorporating national timber certification schemes (see FSC).
SuDS	Sustainable Drainage Systems (previously known as Sustainable Urban Drainage Systems) - drainage systems designed to reduce surface water flooding impacts from development through the use of natural systems e.g. by creating ponds and swales and using permeable materials for hard surfaces.
Sun tunnel/sun tube	A pipe or tube that transports sunlight from the exterior to the interior of a building, reducing the need for electric lighting in areas where windows would not provide enough natural light.
TER	Target Emission Rate - the target CO2 emission rate for a new building set by the Building Regulations. The TER differs depending on the detail of the building.

2 Executive Summary

What is a SPD?

2.1 A Supplementary Planning Document (SPD) is a document which contains additional detail on how the Council will interpret and apply specific policies in its Local Plan. A SPD cannot include any new policies that do not currently form part of the Local Plan and a SPD also does not form part of the Local Plan. SPDs are an important material consideration in the determination of planning applications and applicants are advised to refer to the contents of a SPD, as this will provide guidance on how the Council will carry out its decision making functions.

Aims and Objectives

2.2 The purpose of the SPD is to support the implementation of Policy EM2 – (Building Standards) of the Coventry Local Plan by providing technical guidance on energy standards and requirements to improve the environmental sustainability of new development in the city. Whilst the SPD cannot introduce new targets or standards, it will add value in a number of ways by:

- **providing transparent guidance for applicants with more detail about specific policy requirements and expectations;**
- **requiring applicants to consistently submit information to demonstrate compliance with policy;**
- **helping officers and councillors assess the environmental credentials of developments to make decisions; and**
- **encouraging developers to go further than current policy to demonstrate excellence in sustainable development.**

Applying the SPD

2.3 The requirements for this SPD apply to developments that require planning permission within Coventry. Homeowners are strongly encouraged to use the SPD to help consider what measures could be taken to improve the energy efficiency measures for their property even where planning permission is not required.

2.4 Although planning permission may not be required for certain developments, Building Regulations apply to most new buildings and many alterations to existing buildings, whether domestic, commercial or industrial. It is therefore recommended that applicants for planning permission seek early advice and guidance on Building Regulations, and opportunities to reduce carbon emissions from the Council.

2.5 The Government and other bodies are expected to prepare or amend their policies, advice and guidance in a number of areas referred to or relevant to this SPD. Where this occurs, new or changed documents could also be material planning considerations which may need to be considered alongside this SPD.

3 Introduction

3.1 The purpose of this Supplementary Planning Document (SPD) is to provide guidance for the application and implementation of Policy EM2: Building Standards, as set out in the Coventry Local Plan[1]. This SPD:

- summarises the policy within the Local Plan that is relevant, along with key aspects of national policy;
- sets out the information that should be included within energy statements and sustainability statements for major developments;
- sets out the information that should be included within energy and sustainability information for non-major development;
- provides a questionnaire that non-major developments can use instead of drafting energy and sustainability information; and
- provides guidance on good practice in sustainable design, construction and energy and climate change adaptation.

3.2 This SPD is intended principally for applicants for planning permission and their agents, and for planning decision makers. It has been produced to ensure that applicants provide the right information so that planning decision makers can assess whether development proposals comply with Local Plan policy EM2 – Building Standards.

3.3 This SPD is a material consideration in planning decisions and decision makers will use it to help determine planning applications. This SPD supersedes the 2009 Delivering a More Sustainable City Supplementary Planning Document.

Structure

Section 4 sets out the national, regional and local policy context for climate change and sustainable design, construction and low energy. It also summarises the requirements set out in the relevant policies and identifies the information that consequently must be submitted by applicants.

Section 5 applies to major developments and sets out the information that must be included in energy statements and sustainability statements submitted for major developments. It also

[1] www.coventry.gov.uk/localplan

provides general guidance on sustainable design and construction that should be referred to by developments of all scales.

Section 6 sets out the energy and sustainability information that must be submitted by non-major developments (minor and householder applications).

Appendix 1 contains a questionnaire that can be submitted for non-major development as an alternative to preparing sustainability and energy information.

4 Policy Context

National Policy Context

National Planning Policy Framework

4.1 The NPPF, revised in 2021, sets out the Government's planning policies for England and how these should be applied. Its main purpose is to protect the environment, promote healthy communities and sustainable growth.

4.2 Chapter 14 of the NPPF is dedicated to meeting the challenge of climate change and states that; "*The planning system should support the transition to a low carbon future in a changing climate*", and "*should help to shape places in ways that contribute to radical reductions in greenhouse gas emissions*", and "*support renewable and low carbon energy and associated infrastructure*." (152).

4.3 The policy ambitions are reinforced in paragraph 155; "*To help increase the use and supply of renewable and low carbon energy and heat, plans should: a) provide a positive strategy for energy from these sources..*," Furthermore, paragraph157 states that; "*In determining planning applications, local planning authorities should expect new development to: a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable"*

National Planning Practice Guidance (NPPG)

4.4 The NPPG sets out the government's planning policies for England and how these are expected to be applied and features two key categories - Renewable and Low Carbon Energy and Climate Change.

4.5 The chapter for **Renewable and Low Carbon Energy** states that; "*Increasing the amount of energy from renewable and low carbon technologies will help to make sure the UK has a secure energy supply, reduce greenhouse gas emissions to slow down climate change and stimulate investment in new jobs and businesses. Planning has an important role in the delivery of new renewable and low carbon energy infrastructure in locations where the local environmental impact is acceptable." (001).*

4.6 This is supported by the chapter for **Climate Change** which states that; "*taking planning decisions local planning authorities should pay particular attention to integrating adaptation and mitigation approaches and looking for 'win-win' solutions that will support sustainable development. This could be achieved in a variety of ways, for example:*

- *by maximising summer cooling through natural ventilation in buildings and avoiding solar gain;*
- *through district heating networks that include tri-generation (combined cooling, heat and power); or*
- *through the provision of multi-functional green infrastructure, which can reduce urban heat islands, manage flooding and help species adapt to climate change – as well as contributing to a pleasant environment which encourages people to walk and cycle.*" (*004*)

"*The impact of climate change needs to be taken into account in a realistic way. In doing so, local planning authorities will want to consider:*

- *identifying no or low-cost responses to climate risks that also deliver other benefits, such as green infrastructure that improves adaptation, biodiversity and amenity*
- *building in flexibility to allow future adaptation if it is needed, such as setting back new development from rivers so that it does not make it harder to improve flood defences in future*
- *the potential vulnerability of a development to climate change risk over its whole lifetime." (005).*

Future Homes Standard

4.7 The Future Homes Standard will come into effect in England in 2025 and ensure that new homes are futureproofed with low-carbon heating systems and high levels of energy efficiency. Existing homes will also be subject to higher standards, although homeowners will only be affected if they are planning on building an extension or making thermal upgrades, subject to local viability.

4.8 The Future Homes Standard was announced in the government's spring statement in 2019. Currently, a second government consultation into the standard is underway, so the full details of the standard are yet to be mapped out. A full technical specification for the Future Homes Standard will be consulted in 2023, with the necessary legislation introduced in 2024, ahead of implementation in 2025.

Building Regulations

4.9 Part L of Building Regulations (2018) contains requirements relating to the conservation of fuel and power. Builds must meet these requirements to be compliant with Building Regulations. The majority of local authorities in England have made their planning policies more ambitious by requiring a 19% improvement beyond Part L 2013 through their Development Plan Document (DPD) process. However, this cannot be achieved through a SPD as it involves the introduction of a specific policy approach.

4.10 Achieving this level of energy efficiency can be done solely through either a fabric and design first approach (maximising solar gain through appropriate location and design, enhanced insulation, glazing, airtightness and high efficiency heating and hot water heat recovery), a renewable energy approach (the use of solar photovoltaics (PV) or other renewables), or a combination of both.

4.11 The national mandatory standards for construction are set out in the building regulations. They cover all aspects of construction and set minimum Target Fabric Energy Efficiency (TFEE) rates as well as overall maximum carbon emissions rates for new buildings. The maximum carbon emissions rate for a building is referred to as the Target Emission Rate (TER). The TER differs for different types buildings (e.g. flats, detached dwellings, offices) and is expressed in annual kilograms of carbon dioxide per square metre.

4.12 The emission rate of a proposed building is based on its design specification and is expressed as:

- Dwelling Emission Rate (DER) for self-contained dwellings and individual flats (excluding common areas). The DER is the annual carbon dioxide emissions of the proposed dwelling expressed in kilograms per square meter.
- Building Emission Rate (BER) for buildings other than dwellings. The BER is the annual carbon dioxide emissions of the proposed building expressed in kilograms per square metre.

4.13 Under current building regulations, the DER or BER for the proposed building must not exceed the TER. The DER or BER of a proposed building is established through modelling. The approved national calculation methods used in the building control system are the Standard Assessment Procedure (SAP) for dwellings and the Simplified Building Energy Model (SBEM) for commercial buildings. Other models are sometimes used to give more detailed and accurate information. The models make assumptions about the embodied

carbon in different energy sources like grid electricity and mains gas, referred to as emission factors.

***Emission factors**:*

4.14 When undertaking modelling, applicants are strongly encouraged to use the national guidance SAP 2012 emission factors (or any future replacement equivalent). The energy statement should state clearly which emission factors have been used.

4.15 The key impact of the introduction of SAP 10 emissions factors will be a dramatic reduction in the carbon emissions rate for grid electricity, which reflects the continuing decarbonisation of the national grid through the increasing use of renewable energy. The electricity emission factor is proposed to change from 0.519 kg of CO2 per kWh to 0.136 CO2 per kWh10. As a result, electric technologies, such as heat pumps, will be considered to perform far better on carbon emissions under SAP 10 than under SAP 2012 in the Building Control system.

4.16 In addition to Building Regulations, there are a number of voluntary standards that can also be adopted to ensure a more sustainable built environment. Table 1 summarises the main codes used in England and it is worth noting that many local authorities are now including Building Research Establishment Environmental Assessment Method (BREEAM) targets for non-residential developments in their planning policies. The Future Homes Standard and Building Regulations are covered by a separate regulatory regime and the planning system should not seek to duplicate matters already addressed by separate regimes'.

Table 1 - Current codes and standards applicable in England

Code, standard or regulation	Description
BREEAM	BREEAM is a method of assessment developed by the Building Research Establishment (BRE) to determine the environmental performance of both new and existing buildings. The standard applies to industrial, retail, offices and health.
Home Quality Mark (HQM)	Developed by BRE, HQM is a voluntary, national standard for new homes, which uses a simple 5-star rating on a new home's design, construction quality and running costs. HQM will enable housing developers to showcase the quality of their new homes and identify them as having the added benefits of being likely to need less

	maintenance, cheaper to run, better located, and more able to cope with the demands of a changing climate.
Passivhaus	A voluntary certification developed by the Passivhaus Institute in Germany, Passivhaus buildings are designed to be highly efficient in reducing energy use and carbon emissions as well as providing high levels of comfort.
Standard Assessment Procedure (SAP)	Developed by BRE, SAP is used to assess and compare the energy and environmental performance of dwellings and is a tool for delivering energy efficiency policies. SAP is measured on a scale of one to 120, with one being very poor and 120 being excellent. A typical SAP for an average house in England is 45, for a new build it should be around 80.

Regional Policy Context

Zero Carbon Homes Strategy (Draft 2021)

4.17 The West Midlands Combined Authority (WMCA) will set clear policies supporting the delivery of zero carbon homes within the region through the evolving Zero Carbon Homes Strategy. This will clarify the Net Zero Carbon targets for the region and will support low-carbon aspirations across various sectors.

4.18 An enabling policy environment is required to build certainty amongst partners, the industry and the supply chain. Clear policies will allow for improved monitoring processes, improving compliance and quality of delivery. WMCA will look to implement requirements that encourage a fabric-first approach and passive design, in line with recommendations from industry experts such as LETI[2] and RIBA[3].

4.19 WMCA will also promote circular design and construction approaches, aiming to reduce embodied carbon and promote sustainable resource and waste management[4].In this regard, the Green Building Handbook produced by ACTAC and Queens University Belfast is particularly relevant[5].

#WM2041- Actions to meet the climate crisis with inclusivity, prosperity and fairness: a discussion document

[2] 252d09_3b0f2acf2bb24c019f5ed9173fc5d9f4.pdf (filesusr.com)
[3] RIBA-2030-Climate-Challenge.pdf (architecture.com)
[4] BuildingGreen
[5] Green Building Handbook Volumes 1 and 2: Green... [PDF] (pdfroom.com)

4.20 This document is a framework outlined in this paper is the storyboard: it outlines why we need to address climate breakdown and to adapt to climate change the opportunity it provides to create a highly productive, low carbon economy; it reflects on what we might need to do (and when we need to do it) it suggests who needs to take a lead, and how it must be done if we are do it in a way which is thoughtful and inclusive. It also suggests – based on the estimates in the July 2019 carbon budget – that an investment programme substantial enough to meet this challenge will be in the order of £40bn over 21 years (2020-2041). The actions proposed are things that individuals, communities, businesses and government at all levels can lead.

WM2041 Five Year Plan 2021-2026

4.21 In 2019 the West Midlands Combined Authority (WMCA) set the region a target to be net zero by 2041 and meet the ambitions set out by the Paris Agreement. This is the first Five Year Plan (FYP) to demonstrate how the region could deliver the 2041 target and it shows:

- Under a highly ambitious 'Accelerated' scenario, goals in domestic, commercial, industrial, transport and land use sectors could deliver a 33% reduction by 2026 (against 2016 baseline) and net zero by 2041. The "Accelerated" scenario is recommended to be used as the standard to set the delivery goal ambitions.
- When considering current efforts and actions and the scale and pace required, the region is currently not on target.
- The change in delivery pace required is huge and unprecedented. It requires collaboration and delivery across all sectors well beyond current efforts.
- Delivery of this FYP to move the region to a net zero carbon society will represent an investment in the region's future and create a better West Midlands.
- Although action and investment within the region and by WMCA is crucial, the goals will require devolution of powers, additional government investment and action by the public.
- Gross extra investment required under the 'Accelerated' scenario is £4.3bn by 2026. However, net investment will be much lower due to operational savings.
- 41% of delivery is related to technology, 16% requires behaviour changes and 43% is a combination of both. (Taken from Committee on Climate Change, Sixth Carbon Budget)

- Delivering the ‘Accelerated’ scenario could create 21,000 jobs by 2026 and 72,000 by 2041.

Local Policy Context

4.20 Key objectives of the Local Plan include creating an attractive cleaner and greener city, to provide housing that meets the needs of all people, and to improve the health and wellbeing of all residents. Linking these objectives together is Policy EM2 which refers to the need to achieve the highest possible standards of design and construction in new developments by creating high quality developments that are economically cheaper to operate, minimise their environmental impact, contribute to the local economy and community and provide healthy living and working conditions. Policy EM2 (see figure 1) crucially provides the statutory mandate for producing this SPD. As a signatory to the Global Covenant of Mayors for Climate and Energy back in 2008, the Council has made its position clear that the highest standards of energy efficiency will need to be achieved

Figure 1: Coventry Local Plan, Policy EM2

Policy EM2: Building Standards

1. New development should be designed and constructed to meet the relevant Building Regulations, as a minimum, with a view to:
- Maximising energy efficiency and the use of low carbon energy;
- Conserving water and minimising flood risk including flood resilient construction;
- Considering the type and source of the materials used;
- Minimising waste and maximising recycling during construction and operation;
- Being flexible and adaptable to future occupier needs; and
- Incorporating measures to enhance biodiversity value.

2. In meeting the carbon reduction targets set out in Building Regulations, the Council will expect development to be designed in accordance with the following energy hierarchy:
    a) Reduce energy demand through energy efficiency measures.
    b) Supply energy through efficient means (i.e. low carbon technologies).
    c) Utilise renewable energy generation.

3. A Sustainable Buildings Statement should demonstrate how the requirements of Climate Change policies in this Plan and any other relevant local climate change strategies have been met and consider any potential coal mining legacy issues including land stability.

4. A comprehensive update of the Delivering a More Sustainable City SPD incorporating the approach to Building Sustainability Standards will be developed.

5 Energy requirements in Coventry

5.1 This section sets out the information that applicants must provide in order for planning decision makers to assess whether the requirements of policy EM2 have been considered and, where applicable, met. The requirements as set out in this section have been informed by existing local requirements and independent evidence to help clarify and expand how policy EM2 should be implemented. The Council will expect new development to be planned in ways that mitigates and adapts to climate change thus helping to reduce greenhouse gas emissions through location orientation and design.

Energy Statements

5.2 Energy statements must be provided for **major developments** in accordance with the Councils approved local validation requirements - www.coventry.gov.uk/downloads/file/34970/validation_checklist_version_4_-_7_january_2021

5.3 When preparing and submitting proposals, applicants must show:

- how reductions in carbon emissions will be achieved;
- quantify how each action/proposal will contribute to the total reduction in carbon emissions target per dwelling;
- the approach to energy complies with the energy hierarchy, and that any energy measures proposed are appropriate and will be effective;
- the name and position/job title of the person producing the statement should be included within the submission;
- large-scale residential developments details and calculations will be provided for each proposed house type rather than on a per dwelling basis; and
- the Statement structure will not be suitable for outline applications as these proposals are high-level in nature and set out an overall energy strategy for the site with further details, such as carbon reduction calculations by house type, to be provided at detailed approval stage (usually reserved matters).

5.4 **Non-major developments** do not need to submit an energy statement but are instead required to submit “adequate information” that shows the energy requirements of policy EM2 have been met – see section 6 for more information about non-major development and appendix 1.

5.5 Applicants are expected to consider the following information when preparing their energy statement in order for decision makers to assess whether proposals are compliant with Local Plan policy:

- A non-technical summary;
- Heat networks and/or Combined Cooling Heating and Power (C)CHP appraisal or connection strategy, where appropriate;
- An appraisal of energy technologies (if the scheme does not propose the provision of low or zero carbon energy); and
- A carbon reduction calculation for each building or type of building supported by modelling outputs.

The Non-technical Summary

5.6 A non-technical summary should be included at the front of the energy statement to provide key information for planning decision makers. The summary must include the following information.

1. A description of the scheme including:
    - the number of each different type of residential unit (i.e. number of flats, number of terraced houses, number of detached houses etc. and number of bedrooms in each unit or type),
    - a summary of the floor area (m_2) proposed for each type of non-residential use.
2. A summary of the heat network appraisal (see below) or connection strategy; and
3. A summary of the low and zero carbon energy appraisal (if the scheme proposes provision of low or zero carbon energy).

Heat networks and Combined Cooling Heating and Power ((C)CHP) appraisal

5.7 Policy EM2 and supporting text encourages new development to connect to existing decentralised energy networks including (C)CHP distribution networks which is strongly supported and encouraged.

5.8 Policy EM2 was developed during a period when heat networks specifically powered by (C)CHP enjoyed strong support through national policy and energy strategies produced by the then Department of Energy and Climate Change (DECC). In recent years, national policy and guidance has broadened that support to include low carbon heat networks in general. The use of renewable energy technologies to power heat networks has become more

common and, at the same time, the decarbonisation of the national electricity grid means that the carbon savings that result from using electrically powered heat-producing technologies, such as heat pumps, have increased dramatically while the carbon savings that result from the use of highly efficient gas CHP engines remain largely the same. The government is proposing to change the emission factors that are applied to mains gas and grid electricity for Building Regulations purposes, which will mean that the reality of the decarbonising electricity grid and the benefit of electric technologies will be reflected in the technical assessments that are used to assess different forms of energy in the Building Control process.

5.9 Policy support for (C)CHP heat networks should be interpreted as support for low carbon heat networks in general. The heat networks that result in the lowest carbon emissions will receive the strongest support in line with this principle, whether driven by (C)CHP or other low or zero carbon technologies.

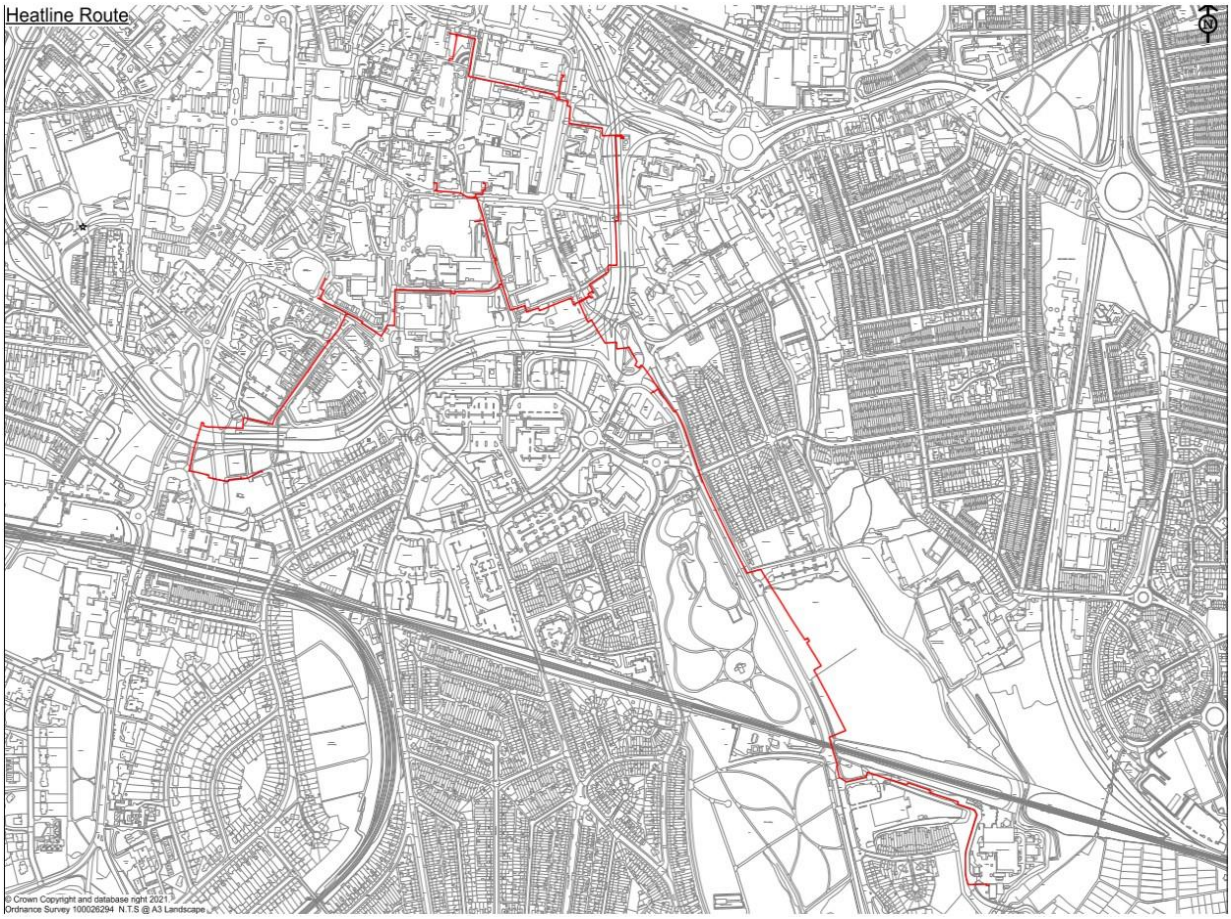
5.10 In order to show that the requirements of policy EM2 have been met, the energy statement should include an appraisal of the feasibility of provision or connection to low carbon heat networks. The content of the appraisal depends on the characteristics of the development and/or where it is located, as set out below.

Figure 2: Coventry's combined heat and power network infrastructure

Developments within the vicinity of existing heat networks

5.11 Local Plan policies EM2 and EM3 both encourage all new developments to connect to Coventry's existing decentralised heat network (see figure 3 below), wherever practicably possible, or demonstrate how the objectives of the policies have been met through alternative equivalent carbon solution in the Sustainable Buildings Statement.

Figure 3: Coventry's existing heatline network



5.12 The energy statement must set out the actions taken in order to investigate whether heat networks exist within the vicinity of the site and document the results. The investigation of opportunities should cover all scales and should not be limited to district heating systems[6].

5.13 Where such networks exist and developments propose to connect to them, the energy statement should set out details showing how connection will occur (a connection strategy). Where such networks exist, and developments do not propose to connect to them, the energy statement must set out clear reasons as to why the connection is not feasible, or why

[6] It is expected such matters to be determined by the applicants in discussion with the Council on a case by case basis.

an alternative source of energy would be more sustainable.

5.14 Where a development proposes not to connect to an existing network that is within the vicinity, it must still be connection-ready and the energy statement must set out how this is could be achieved[7].

5.15 Developments will be considered to be connection-ready if they use a centralised communal wet heating system and comply with the minimum requirements outlined in the Chartered Institute of Building Services Engineers (CIBSE) Heat Networks Code of Practice, and this should be reflected in the evidence provided in the energy statement.

Scale and design of heat networks – CHP/(C) CHP networks:

5.16 For CHP based heat networks, such as the example in Coventry's city centre based heat infrastructure network, carbon and financial savings will only be generated when it is running so it will be more energy efficient and cost-effective the more it runs. As a result, a new CHP system will likely only be appropriate where there is a high and constant demand for heat.

5.17 A recommendation of at least 4,500 – 5,000 hours per year, depending on the application. The scale of the system should be determined by the heat load and demand profile. If there is a high demand for cooling then (C)CHP, which also provides cooling, may also be environmentally and economically viable. (C)CHP systems should be designed and operated to be energy efficient, with the selection of optimum operating temperatures and measures to minimise heat losses. The energy statement should set out consideration of these issues in order to demonstrate that the scaling and operation maximises carbon reduction.

5.18 In order to facilitate connection from other developments, new heat networks, including building level systems, should be designed to be able to expand to connect with future systems. The energy statement should set out how this will be facilitated. New heat networks should be smart, incorporating data collection, monitoring and performance management into the design. Proposals for new heat networks should show that the chosen technology, or mix of technologies, will deliver the greatest carbon saving.

[7] It is expected such matters to be determined by the applicants in discussion with the Council on a case by case basis.

5.19 CHP engines can be powered by a number of fuels. When a CHP engine is powered by natural gas, it can be considered a low carbon technology because it operates at very high efficiency resulting in low carbon heat and power. The efficiency is increased if the system also provides cooling (CCHP). National emission factors are likely to be updated in 2021 and this change will mean that gas technologies will compare less favourably with electric technologies than at present, and consequently the benefits of gas CHP in the assessment will reduce. This change should be taken into account when selecting a CHP technology alongside the continuing decarbonisation of grid electricity.

5.20 Zero carbon fuels should be favoured, taking into account potential impacts on air quality. Where gas engines are proposed, the distribution network should be designed to facilitate the replacement of the gas engine with a zero-carbon alternative once the gas engine reaches the end of its life[8]. Where biomass engines are proposed, the Council will take into account the short to medium term impact on carbon emissions that results from burning wood.

5.21 It can be expensive and difficult to convert high temperature heat networks powered by gas boilers or gas (C)CHP engines to low carbon/renewable sources such as heat pumps and waste heat because heat networks that use these sources typically operate at lower temperatures than those fuelled by gas. Therefore, in order to facilitate a future shift to zero carbon energy, the system should be designed to be able to operate at lower temperatures suitable to very low carbon heat sources (fifth generation networks run at a temperature close to ambient ground temperature). This should not compromise the ability of the system to run at the optimal temperature for the energy source used at the outset.

5.22 Heat networks based on natural gas CHP systems should be supplemented by heat from renewable sources wherever feasible, and consideration must be given to future heat source(s) when natural gas is no longer an option without carbon capture. Integrating heat pumps into district heating can deliver large CO2 emissions reductions[9]. CHP heat networks run at higher temperatures than heat networks powered by renewable heat technologies and can present an overheating risk for the building in which it is installed. Industry and regulation is fast moving to accept that heat pumps will be the source of low temperature heat for buildings, including the Climate Change Committee. Most pertinently, from 2025 the

[8] Zero carbon fuels for CHP include biomass, biomethane and, in the longer term, hydrogen.
[9] www.gov.uk/government/publications/heat-pumps-in-district-heating

UK government has already confirmed that fossil fuels will not be allowed for new buildings. Given this, the promotion of suitable low carbon technologies, such as ground source heat pumps, air source heat pumps and increased thermal storage will be encouraged wherever possible. Overheating is a key consideration in climate change adaptation. Heat networks should be designed to prevent overheating, including through the choice of heat technology.

Low and zero carbon energy appraisal

5.23 There are several low and zero carbon energy technologies available on the market that can supply electricity and/or heat to residential and commercial buildings. These include (but are not limited to):

- ground, air and water source heat pumps,
- solar photovoltaic (electricity),
- solar thermal (heat),
- biomass power and heat,
- small scale hydro power,
- geothermal energy,
- ground source heat pumps
- micro CHP, and
- Combined Heat and Power (CHP) systems.

5.24 Where new development is designed and constructed to meet the relevant Building Regulations in accordance with policy EM2, the sustainable buildings statement should demonstrate that the most effective technology or mix of technologies has been selected. The energy statement should quantify the carbon reduction that will be achieved, supporting the figure with calculations.

5.25 In order to be sure that proposed energy technologies will be effective, decision makers will need to be sure that the building occupants will use them to meet all or most of their energy needs. As a result, technologies that may be used sporadically (including fireplaces and log burners) will not be accepted as low carbon energy technologies.

5.26 This is not the case for biomass heating technologies, which are usually primary sources of heat and/or power for the building in which they are installed. The appraisal should consider all reasonable options for renewable and low carbon energy, assessing the

feasibility and benefits of each in turn. Decision makers will need this information in order to confirm that the most effective and appropriate energy technology has been selected.

5.27 The appraisal should reflect current costs and up-to-date technology specifications alongside local factors. In particular, where the Energy Statement assesses the carbon saving potential of energy technologies, it should use real-world performance and take into account the future decarbonisation of the national grid, rather than relying on the emission factors used in the Building Control system which are updated infrequently.

5.28 Where schemes propose a mix of renewable energy technologies, it will be important to demonstrate how they will work in tandem and, where applicable, how they will be integrated into a heat network (for heat generating technologies) and, again where applicable, also how they will integrate with a cooling system/strategy.

Heat pumps*:*

5.29 The government envisages heat pumps (alongside heat distribution networks) will be the principal means of providing heat for buildings once the new "Future Homes" standard is fully implemented[10], and expects the supply chain for these technologies to develop rapidly in the next few years, subject to local viability. When appraising heat pump technologies, at least two heat sources (from air, water and ground) should be considered and a separate appraisal of each presented.

5.30 Appraisals of heat pumps should take account of the high efficiencies (expressed as the Coefficient of Performance, or COP) at which heat pumps provide useful heat when calculating the carbon emissions, they would produce when running on grid electricity. The carbon intensity per kWh of energy output should be the prime concern, as opposed to the carbon intensity of the energy input which, although important, is not the decisive factor in energy appraisals. The reason for this is that while gas has a lower carbon intensity than electricity under SAP 2012 emission factors[11], domestic heat pumps are typically over three times more efficient than gas boilers (e.g. a COP of around 300% or higher), so the projected amount of carbon per unit of heat produced will be lower than with a domestic gas boiler that has an efficiency of c.90%, even if SAP 2012 emission factors for grid electricity and mains gas are used. The calculated carbon emissions for heat pumps running on grid

[10] www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-building-regulations-for-new-dwellings

[11] The SAP 2012 carbon emission factors are 519g CO_2 per kWh for grid electricity and 216 for mains gas.

electricity will be considerably lower than gas boilers if up-to-date emission factors are used[12].

5.31 Heat pumps work best when producing heat at a lower temperature than traditional boilers. As a result, it is essential that buildings that rely on heat pumps are built to high levels of energy efficiency (well insulated and draught-proof) in order for the heating system to be efficient, both in terms of cost and energy use. They generally perform better with underfloor heating systems, but if radiators are used, they should be larger than with traditional gas-fed or electric systems to increase the area of heat emitting surfaces. There is an expectation that heating systems need to operate at lower flow temperatures, no higher than 55 degrees to help ensure an improved heat pump performance, as it is recognised the need to improve the thermal performance of building stock and adapting passive measures for energy reduction.

Biomass*:*

5.32 Energy and heating systems that are powered by biomass (such as wood chips, wood pellets and organically derived fuels like biomethane) are usually considered to be zero carbon in operation in the long term because while burning the biomass (or digesting it in the case of biomethane) releases carbon dioxide, this carbon dioxide was originally extracted from the atmosphere when the energy crop grew, and will be removed again when the crop is replaced, adding no new carbon to the carbon cycle. This analysis does not take into account the energy required to harvest/extract, process and transport the fuel, as well as carbon that may be released from the soil in the process of planting.

5.33 Additionally, biomass sourced from forestry results in a negative impact on the climate in the short and medium term because burning wood releases carbon quickly but growing trees to a size at which they can be harvested can take several decades. As a result, burning wood results in a sharp spike in atmospheric carbon that takes decades to fall. This is not the case for quick-growing energy crops; for example, any carbon released when burning annual crops like straw will be removed from the atmosphere within a year as the next crop grows. Additionally, wood chips and wood pellets are often sourced abroad and imported over long distances resulting in large transport emissions. Where wood fuelled energy systems are proposed, the energy statement should take into account both the impact of burning on atmospheric carbon levels in the short to medium term and the

[12] The proposed changes to SAP emission factors (SAP 10.1) would reduce emissions from grid electricity to 136g CO2 per kWh and mains gas to 210g CO2 per kWh.

potential embodied carbon emissions that result from harvesting, extraction, processing transport of the fuel.

5.34 Biomass energy can have negative impacts on local air quality which should also be taken into account – please refer to the Councils adopted Air Quality SPD[13].

[13] www.coventry.gov.uk/downloads/file/30877/air_quality_supplementary_planning_document_spd

Sustainability Statements

5.35 Policy EM2 sets out the requirement for a sustainable buildings statement together with the Councils approved local validation requirements: www.coventry.gov.uk/downloads/file/34970/validation_checklist_version_4_-_7_january_2021

This section provides guidance on those matters and sets out the information that **major developments**[14] should submit so that decision makers can assess whether development proposals comply with Local Plan policy. This section does not cover compliance with the carbon emission and low and zero carbon energy requirements as compliance with these requirements is established through energy statements. In line with usual practice, the name and position/job title of the person producing the statement should be included within the submissions.

5.36 **Non-major developments**[15] do not need to submit a sustainability statement, but instead should submit sustainability information that is proportionate to the size of the development – see section 6. This requirement can be met by submitting a completed Climate Change, Energy and Sustainable Development questionnaire (see Appendix 1). The guidance provided in the 'sustainable design and construction guide' later in this section should still be used to guide non-major development proposals and applicants should refer to it when drafting sustainability information or completing the questionnaire.

What do sustainability statements need to cover?

5.37 It is expected that developers of major developments will have access to either in-house or external expertise in sustainable development. These experts will be able to guide emerging schemes to ensure that they comply with the sustainability requirements of the Local Plan, and will be able to draft a sustainability statement setting out how compliance has been achieved.

5.38 This section sets out guidance on sustainable design and construction and climate change adaptation, but it is not intended to be exhaustive or to replace the large amount of

[14] more than 10 residential dwellings or site area of more than 0.5ha/ more than 1000 sq.m of commercial floorspace or site are over 1 ha.

[15] up to 10 dwellings or site area of less than 0.5ha)/ change of use to residential or less than 1000 sq.m of floor space or site area of less than 1ha)/ change of use.

guidance that is available elsewhere. However, the sustainability statement is expected to consider the following matters in order to demonstrate that the proposals comply with Local Plan policy and other Coventry City Council adopted SPDs such as Green Spaces and SuDS technical guidance:

1. Natural resources:
   a. Efficient use of mineral resources and incorporation of a proportion of recycled and/or secondary aggregates.
   b. Minimisation of waste and reuse of excavation and demolition waste.
2. Sustainable design:
   c. The Council's strong support for zero carbon development.
   d. Reduction of energy demand in line with the energy hierarchy, including through landform, layout, orientation, massing and landscaping, with regard to the efficient use of natural resources and to maximise the use of the sun's energy for heating and cooling.
   e. Performing positively against Building for Life guidance.
   f. Incorporation of measures that enable sustainable lifestyles for building occupants.
   g. Compliance with the highest national standards of water efficiency, which for residential developments of one or more gross units means achieving a water efficiency standard of a maximum of 110 litres per occupant per day.
3. Climate change adaptation:
   h. Adaptation that provides resilience and reduces vulnerability to a changing climate and changing weather patterns and the full range of expected impacts.
   i. Prioritisation of SuDS to manage surface water drainage
   j. Mitigation measures to reduce overheating/urban heat island effect.
   k. the use of the Good Homes Alliance's Overheating tool as a simple way to assess risk for new residential development
4. Heritage assets:
   l. can be a valuable aid to achieving sustainable development, in both climate change mitigation and adaptation, rather than a constraint. Further information can be found through the following link: https://historicengland.org.uk/

5.39 Information and guidance on these matters are set out in the following 'sustainable design and construction guide. This SPD is a material consideration in planning decisions and the guidance in the guide will help decision makers to decide whether schemes comply with the sustainability requirements set out in Local Plan policy.

Sustainable design and construction

5.40 This section highlights the key sustainable design and construction and climate change adaptation principles and matters that development proposals should take into account (alongside good design, place-making and other considerations). The guidance should not be considered exhaustive; bodies such as the Building Research Establishment and the UK Green Building Council provide extensive guidance covering a range of matters and issues related to sustainable development. The guidance that follows sets out approaches that are generally considered to be good practice. However, there may be instances where local circumstances mean that a greater sustainability benefit can be achieved by taking a different approach.

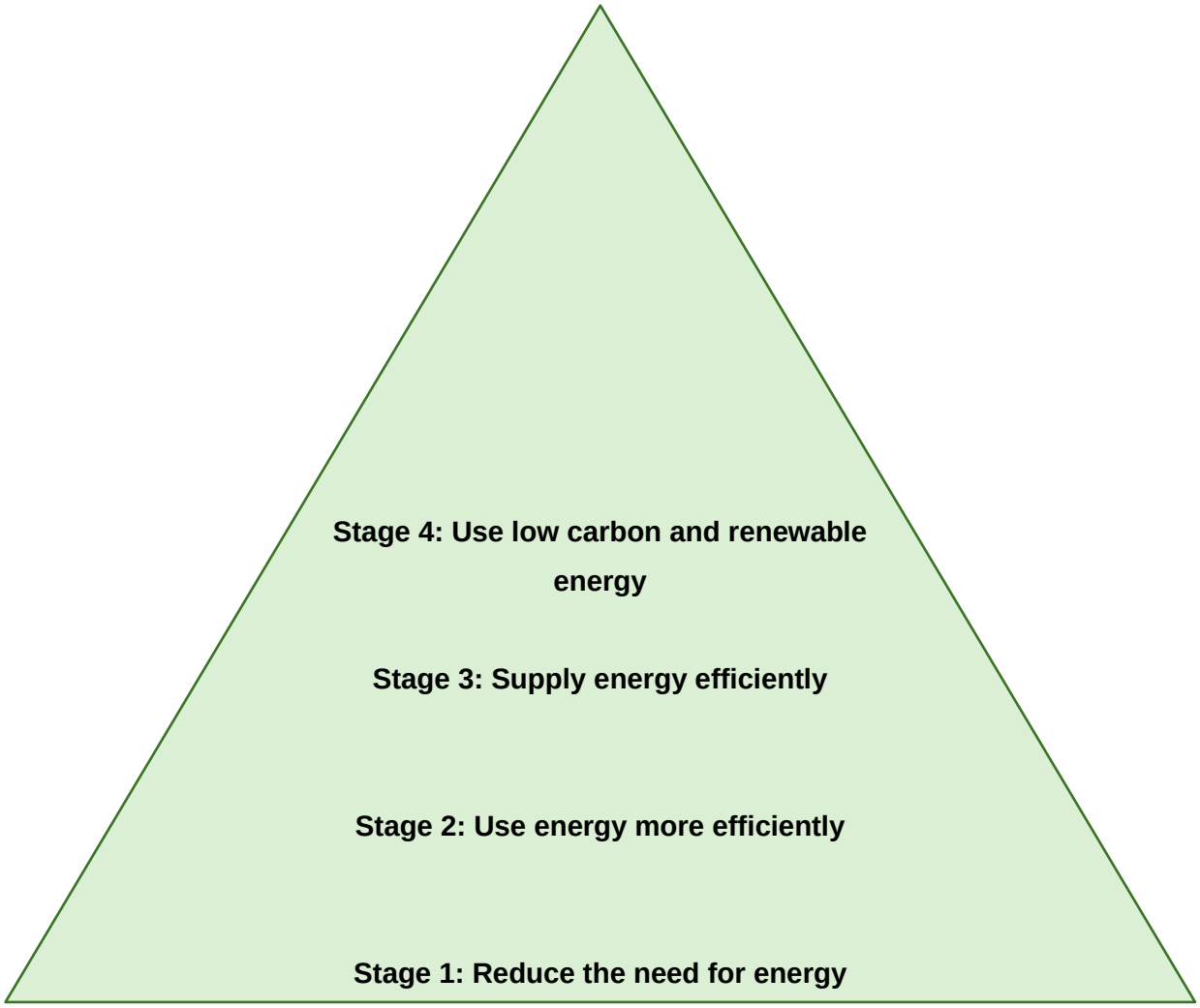
The energy hierarchy

5.41 The energy hierarchy (see Figure 4 below) is a fundamental principle of sustainable development. It shows the sequence of steps that should be taken in order to reduce operational carbon emissions from new developments. Energy demand should be eliminated in the first instance wherever possible. Where energy demand cannot be eliminated, energy use should be reduced as much as possible through efficiency. After these steps, the remaining energy demand should be met from renewable and low carbon energy sources. This approach is often summarised as "**be lean, be clean, be green**".

5.42 The Council fully supports the development industry term "**fabric first**". This means that energy demand should be reduced by maximising the performance of the components and materials that make up the building fabric and designing the building to make best use of the surrounding environment, before improving efficiency further through the use of efficient building services or lowering carbon emissions further through low carbon energy.

5.43 The Council does not, in general, support carbon offsetting as a means to deliver zero carbon projects. However, if all other emissions have been minimised and there is no technological means (or this can be proven to be cost prohibitive to the development going ahead, by means of a specialist/recognised third-party assessment) to achieve zero carbon on a development, relevant Council officers can discuss options that may be available to assist.

Figure 4: The energy hierarchy



Zero carbon development

5.44 Proposals for zero carbon development are strongly encouraged wherever possible. Zero carbon means that emissions from all regulated energy use are eliminated or offset[16] [17].

5.45 Regulated energy refers to energy from building systems (e.g. heating, lighting, hot water) as opposed to unregulated emissions that refers to energy from other sources, like appliances. Fully zero carbon and carbon negative developments, that eliminate emissions from all regulated and unregulated sources, are also strongly encouraged.

[16] www.leti.london/
[17] www.ukgbc.org/

5.46 Where schemes have been designed to achieve zero carbon, the information submitted with the application should show the measures employed and the stages at which carbon reductions have been achieved (e.g. demand reduction, low and zero carbon energy and offsetting). This information must be consistent with the submitted energy calculations.

Site layout, landscaping and urban form

5.47 To maximise solar receipts and reduce shading, taller buildings in a development should be located to the north of the site. Locating parking and garages to the north of a building will allow solar receipts to be maximised in southerly orientated living spaces. Pitched roofs are a common feature in the local vernacular and care should be taken to ensure that roof heights do not overshadow neighbouring buildings unnecessarily.

Figure 5: maximising site layout, landscaping and urban form

5.48 The relationship between buildings and open spaces is important to create a quality public realm and a comfortable microclimate for people using outdoor spaces. Placing buildings too close to each other can result in excessive shadowing and little solar gain on external surfaces – (see figure 5). Well positioned buildings will create spaces that maximise receipts of natural light and heat. Some building designs have inherently different energy requirements to others. For example, flats and terraces are generally more energy efficient

than detached or semi-detached dwellings because they have fewer external walls relative to living space from which heat can escape.

5.49 All placed deciduous trees can increase the shading and natural cooling of buildings and spaces during the summer months and allow more natural light and heat to be received during the winter months after the leaves have fallen and when demand for heating and lighting is highest. Tree planting can also be used to shelter buildings from the wind and minimise unwanted cooling (see figure 6 below).

5.50 The slope or topography of a site should be considered. Partially or fully building into a slope or setting a building into the ground will enhance thermal buffering. A compact urban form is generally more energy efficient as there is less opportunity for heat to escape. However, this needs to be balanced with the need to avoid the Urban Heat Island effect (see ‘Climate change adaptation’ later in this section). A compact form can sometimes lead to deeper floor plans which then can lead to poor natural lighting and ventilation: where this is the case it can be offset by including central atriums or sun tunnels.

5.51 Planting can be used to create a more favourable microclimate and help to manage flood risk; strategically sited tree belts can provide shelter from prevailing winds and shade in the summer without blocking light in the winter. Use of native, non-invasive plant species are often most valuable to local wildlife and have the further benefit of being able to thrive and sustain the local soil and climate conditions.

Figure 6: Strategic planting

5.52 The prevailing wind should be a consideration in site design as exposure to cold winds will increase heat loss and energy use. Conversely in the summer, gentle breezes can be used positively within design to enhance natural ventilation improving comfort levels and reducing energy use on mechanical cooling systems. Shelter belts (wind breaks) may be used to protect buildings from excessive winds. Shelter belts should be set out in a convex layout against the prevailing wind direction, rather than concave, to deflect the wind instead of blocking it. They should be dense enough to reduce wind speeds by allowing some wind to pass through but not block the wind in its entirety as this can result in an airflow accelerating over the top of the trees and descending in a turbulent fashion on the building.

Building design

Flexibility and adaptation

5.53 Where possible, buildings should be designed from the outset to be flexible to accommodate changing needs (including family size, home working, old age and disability). This will reduce the need for refurbishment and extensions and will prolong the life of the building. This is particularly the case where buildings are designed to occupy a specific niche, such as student housing. Alongside this, buildings built today will need to become zero carbon in the future. Buildings should be designed to enable, and not impede, future retrofit measures that improve energy efficiency or allow the use of zero carbon energy.

Figure 7: flexibility and adaptation

Passive solar gain, passive cooling and overheating

5.54 Passive solar gain refers to the process whereby a building is heated by the sun, either directly from sunlight passing through a window and heating the inside of the building, or indirectly as sunlight warms the external fabric of the building and the heat travels to the interior. The level of passive solar gain can significantly impact upon the quality of a building, how it is used and the energy needed for it to be inhabited comfortably. Passive solar gain can reduce the need for mechanical heating, which in turn reduces energy use and carbon emissions.

5.55 Key factors that influence passive solar gain include the physical characteristics of the site, immediate surroundings, orientation of buildings, external design, internal layout and the construction materials used. Whilst passive solar gain can reduce the carbon emissions associated with heating, if used incorrectly it can lead to overheating, which in turn can lead to the installation of mechanical cooling equipment (e.g. air conditioning). Mechanical cooling increases energy consumption and requires maintenance, resulting in costs and carbon emissions. Mechanical cooling units also produce heat that requires dissipation. The need for mechanical cooling can be avoided or lessened by designing-in passive ventilation and passive cooling measures.

Figure 8: Solar gain

5.56 Developments should not incorporate mechanical cooling unless passive measures have been fully explored and appraised and proposals that include mechanical cooling should clearly demonstrate that passive measures would not be adequate. The following list includes some of the key considerations in the design of new schemes:

- Orientation and layout of habitable rooms, and window size and orientation, should be carefully considered in relation to the path of the sun.
- Rooms that are most frequently occupied should benefit from a southerly aspect, but with appropriate measures to avoid overheating.
- Rooms that include a concentration of heat generating appliances (e.g. kitchens) or are less frequently occupied (e.g. bathrooms) should be located in the cooler part of the building, generally the northern side.
- Conservatories and atria can be used to assist natural ventilation in the summer by drawing warm air upward to roof vents, and to collect heat during the spring and autumn.
- Deep projections that overshadow windows should be avoided, particularly on south facing elevations. Projections should be sized appropriately so that they provide shading from the sun during the hottest part of the year but allow solar gain in the colder months.

- Where there is a chance that overheating can occur (e.g. due to large expanses of glazing on roofs and south facing elevations), design measures such as roof overhangs, external shuttering, photochromatic and thermochromic glass and a lighter colour palette can help.
- Zonal heating and ventilation systems and controls can be used allowing areas subject to high solar gain to occupy their own temperature control zone. Dynamic controls reduce energy waste.
- Use of materials to build in thermal mass to absorb excess heat during warmer periods and release it slowly during cooler periods (e.g. day/night, summer/winter).
- Buildings should be designed for passive ventilation, where possible:
  o cross ventilation with windows located on opposite walls and/or roof mounted turbines or wind cowls that assist with circulation of air by drawing air through windows or top floor openings and
  o passive stack ventilation (PSV) that uses pressure differences to draw in fresh air from outside to replace rising warm air which is released from the top of the building. A heat exchanger can be placed where the air escapes the building to reduce heat loss.

Natural light

5.57 Natural lighting reduces the energy used for artificial lighting and creates a healthier internal environment. Issues to consider include how much of the sky is visible through a window (the more, the better), the dimensions of the interior living/working space and distance from the window, and the proportion of glazed surfaces. The depth of the room is an important factor in determining the amount of natural light received. Naturally dark rooms may be lit naturally through measures such as sun tubes which ‘pipe’ sunlight from sunny areas to internal areas (see figure 9 below).

5.58 Non-residential buildings should be designed to best meet their intended use. Natural light is beneficial to a good working environment, but care is needed to avoid creating spaces with excessive heat gain. This could occur if solar gain is combined with the heat associated with internal lighting, high occupancy and operating equipment such as machinery and computers.

Figure 9: Natural light

5.59 A higher proportion of glazing on north facing surfaces can increase natural lighting without significantly increasing solar gain, thereby minimising excessive heat gain. Glare created by natural or artificial light can be uncomfortable for people both inside and outside a building. This can be minimised if considered early in the design process through building layout (e.g. low eaves height) or building design. If considered together with a lighting strategy this can reduce energy consumption.

Energy demand reduction

5.60 Where dwellings or commercial units are sold or leased fully fitted/furnished, low energy appliances should be provided in order to reduce the energy used by building occupants, where possible. An energy calculation showing the consequent reduction in unregulated carbon emissions should be included to quantify the improvement. However, this should not form part of the carbon reduction calculation included in the energy statement as that calculation should only address regulated emissions.

5.61 Buildings can be designed to remove the need for appliances. For example, by providing space to dry clothes naturally, the need for a dryer is removed. Adequately sized and well-located windows reduce the need for artificial lighting during the day and daylight systems (e.g. sun tunnels, fibre optics) can deliver natural light to areas that are too deep

within a building for windows to be effective. Self-regulating smart meters and smart controls on heating, lighting and appliances can reduce energy waste. These devices measure, control and optimise the use of energy, delivering benefits including:

- maximising consumption of locally generated energy,
- reduce energy costs by responding to time-of-use tariffs,
- enable and optimise the use of smart energy grids by providing demand response services to grid and network operators, and
- provide useful feedback to the building occupant that helps them to improve efficiency.

Figure 10: Optimising smart energy grids

Building for a healthy life

5.62 Building for a healthy life sets out design guidance for new housing developments and includes criteria that relate to environmental and social sustainability, as well as promoting design that generally creates good places. The most recent version of the standard is Building for a healthy life (2020), sets out questions to assess how well proposals provide attractive, functional and sustainable places. The questions are designed to help structure discussions between local communities, the local planning authority, the developer of a

proposed scheme and other stakeholders.

5.63 Applicants for planning permission should include a checklist against the questions set out in the latest Building for a healthy Life guidance. The Council will engage positively with applicants to assist in achieving 'Built for life' status.

5.64 Policy EM2, via Building Regulations, encourages new development to perform positively against the recommendations in Building for a healthy Life guidance. What this means in practice is that each of the recommendations should be followed, unless there are genuine reasons for not doing so, which should be explained in the submitted sustainability information. The Building for a healthy Life guidance can be found here:

www.udg.org.uk/publications/othermanuals/building-healthy-life

The performance gap

5.65 It is generally accepted that the carbon and energy performance of buildings as-built falls short of the performance anticipated at the design stage. Studies have shown that this 'performance gap' can be extreme, with some new buildings emitting many times more carbon than expected from both regulated and unregulated sources[18]. Most new homes do not achieve the levels of energy efficiency predicted by their SAP assessments.

5.66 The Building Control system does not require new buildings to be tested against their design specifications after construction. The exception to this is airtightness, which is tested after construction and where buildings generally perform much better than Building Regulation standards. The Government may change the method for assessing the performance of new buildings through a change to Building Regulations (see the 'Future Homes' consultation for details of the proposed changes)[19].

5.67 One of the reasons for the performance gap may be a lack of post-construction testing and post-occupancy monitoring and feedback, which means that problems in construction are not identified, occupant behaviour is not corrected, and future projects do not benefit from changes that correct problems in the construction process. The Council strongly

[18] www.gov.uk/government/publications/low-carbon-buildings-bestpractices-and-what-to-avoid and www.gov.uk/government/publications/low-carbon-homes-best-strategies-and-pitfalls

[19] www.gov.uk/government/consultations/the-future-homes-standard-changes-to-part-l-and-part-f-of-the-buildingregulations-for-new-dwellings

supports the use of measures that would act to close the performance gap. Where such measures will be employed, the Sustainability Statement should provide details. Such information could include:

- detailed information setting out the site developer's robust internal processes and quality controls,
- the implementation of a third-party process or system that focuses on ensuring that standards are met during construction e.g. the BEPIT Better Building Tool Kit or NEF's Assured Performance Toolkit, and
- the use of a post construction testing regime for the proposed development and/or for previous developments undertaken by the same developer, with details of the outcome on previous developments.

Smart Energy

5.68 Many organisations across the city are currently electrifying their transport and heat requirements. This is happening in parallel with an electrical supply system increasingly dependent on intermittent or inflexible wind, solar and nuclear power. This has made the flexible use of electricity crucial in our transition to a zero-carbon country. By switching demands, such as chillers, hot water and EV charging, on and off a building can reduce CO2 emissions, peak demand and energy bills, whilst allowing more renewable energy to be deployed and less fossil fuel power. Energy storage is an important part of this, in the form of hot water, building fabric and electro-chemical storage. These examples of smart energy practices are encouraged to be considered, wherever possible.

Electric Vehicles

5.69 As vehicles electrify they will increasingly play a role in building energy systems. This is because the charging infrastructure often comes from the buildings, but also vehicle to grid and vehicle to building technology will mean that they will act as large energy storage devices, reducing energy bills and balancing supply and demand on the network. This approach to electrification is encouraged to be considered, wherever possible.

6 Non-major development requirements

6.1 Policy EM2 stipulates that new development should be designed and constructed to meet the relevant Building Regulations, as a minimum. This section sets out the approach to **non-major developments** and in this regard, proposals must provide the following information:

- “adequate information” showing how the energy and carbon requirements have been met, and
- “information proportionate to the size of the development” covering the other sustainability matters set out in the policy.

6.2 Applicants for non- major development may also submit energy and sustainability information statements instead of a completed questionnaire. If this route is taken, applicants must ensure that the submitted information complies with the requirements of Local Plan policy, and that energy information complies with the carbon reduction calculation methodology set out later in this section. Sustainability information should refer to the Sustainable Design and Construction Guide in section 4.

6.3 The questionnaire or statements should be produced at an early stage in the initial design work as they should inform the scheme as it emerges. Where schemes are not subject to a full plans application, a partially completed questionnaire or partial information statements may be submitted at the outline stage covering the matters covered by the outline application. A fully completed questionnaire or final information statements may then be provided at a later stage.

6.4 The remainder of this section sets out guidance on how to complete the questionnaire. Additionally, there are signposts throughout the questionnaire back to the sections of this SPD that provide relevant guidance on sustainability matters.

Questionnaire Part 1: Sustainable design and construction

6.5 Part 1 of the questionnaire deals with sustainable design and construction matters and asks a series of questions that link to specific requirements in Local Plan policy. The matters it covers are:

- minerals and waste,

- low energy site and building design,
- water efficiency,
- measures that enable sustainable lifestyles, and
- climate change adaptation.

6.6 There is a large amount of guidance covering sustainable design and construction available nationally and some guidance on the key points is provided in the sustainable design and construction guide in section 5 of this SPD.

Self-build and custom-build homes

6.7 Self-build and custom-build homes are types of housing (defined nationally)[20] for people who want to play a role in developing their own homes, either by directly organising the design and construction (self-build) or by hiring a specialist to deliver the home (custom-build).

6.8 In order to qualify as self-build or custom-build, the owner of the home must have primary input into its final design and layout, which means that the end user of the home is able to balance the benefits of building an energy efficient and climate adapted home against the long-term costs that result from energy bills and adaptative retrofitting.

6.9 Self and custom housebuilders are encouraged to exceed the minimum requirements of Policy EM2 and achieve very high levels of sustainability. Small projects such as custom and self-build are likely to be suitable for offsite and modular construction methods (small schemes do not benefit from the traditional build economies of scale that volume housebuilders enjoy), which can offer a range of benefits.

6.10 Many modular and pre-fabrication systems use timber in place of other materials and in doing so sequester carbon that is removed from the air during the growth of the trees from which the timber is sourced. This benefit will be recognised during the planning process.

Questionnaire Part 2: Energy

6.11 Part 2a of the questionnaire deals with low and zero carbon energy provision. It covers Combined (Cooling) Heating and Power ((C)CHP) and other low and zero carbon energy

[20] www.gov.uk/guidance/self-build-and-custom-housebuilding

technologies.

(C)CHP Distribution Networks

6.12 When completing question 7, the reference to (C)CHP distribution networks should be taken to cover a broad range of scales from small scale systems that distribute cooling and/or heating to a number of dwellings or units within one building up to district scale systems that serve entire neighbourhoods (district heating systems). It should also be interpreted as a reference to all types of heat network and not just CHP based systems (see paragraphs 5.7 -5.10 for more information).

6.13 In order to answer the questions, applicants will need to have undertaken investigation work to establish whether such systems exist in the vicinity of the proposed development, taking account of this broad definition.

Low and zero carbon energy technologies

6.14 Question 8 asks for details of any proposed low and zero carbon energy technologies. There are a number of low and zero carbon energy technologies available on the market that can supply electricity and/or heat to residential and commercial buildings. These include (but are not limited to):

- solar photovoltaic (electricity),
- solar thermal (heat),
- ground, air and water source heat pumps,
- biomass power and heat,
- small scale hydro power, geothermal energy,
- micro CHP, and
- Combined Heat and Power (CHP) systems.

6.15 In order to be sure that proposed energy technologies will be effective, decision makers will need to be sure that the building occupants will use them to meet a significant portion of their energy needs. As a result, heat sources such as log burners, which may be used sporadically, will not be accepted as low carbon energy technologies. The section “Low and zero carbon energy appraisal” in section 5 sets out information about low and zero carbon energy technologies.

Building regulations and emission rates

6.16 The national mandatory standards for construction are set out in the Building Regulations 2010 (as amended). They cover all aspects of construction and set minimum Target Fabric Energy Efficiency (TFEE) rates as well as overall maximum carbon emissions rates for new buildings, referred to as the Target Emission Rate (TER). The TER differs for different types buildings (e.g. flats, detached dwellings, offices) and is expressed in annual kilograms of carbon dioxide per square metre.

6.17 The emission rate of a proposed building is based on its specification and is expressed as:

- Dwelling Emission Rate (DER) for self-contained dwellings and individual flats (excluding common areas). This is the annual carbon dioxide emissions of the proposed dwelling expressed in kilograms per square meter.
- Building Emission Rate (BER) for building types other than dwellings. This is the annual CO2 emissions of the proposed building expressed in kilograms per square metre.

6.18 Under the building regulations, the DER or BER for the proposed building must not exceed the TER. The DER or BER of a proposed building is established through modelling. The approved national calculation methods used in the building control system are the Standard Assessment Procedure (SAP) for dwellings and the Simplified Building Energy Model (SBEM) for commercial buildings. Other models are sometimes used to give more detailed and accurate information. The models make assumptions about the carbon emissions from different energy sources (like electricity and gas), referred to as emission factors (see ‘Emission factors’ in section 5 for more information).

Appendix 1 – Climate Change and Energy Questionnaire

When should this questionnaire be used?

This questionnaire is for minor developments (developments from one to nine residential units and one to 1000 square meters of non-residential floor space) and householder developments. Developments of a scale above these thresholds (major developments) should not use the questionnaire, but should instead submit a Sustainability Statement and an Energy Statement as detailed in this SPD.

What is the purpose of this questionnaire?

Policy EM2 requires developments to be designed and constructed to meet the relevant Building Regulations. These requirements for information will be deemed to have been met if a correctly completed questionnaire is submitted.

The questions in the questionnaire are based on requirements set out in Local Plan policies and you should refer to these to make full use of the questionnaire. The Energy SPD sets out guidance on the matters covered within the questionnaire. The questionnaire is not an exhaustive list of sustainability matters and additions to the questionnaire are welcome.

The questionnaire is intended to guide development towards sustainable outcomes through compliance with Local Plan policy, from the initial proposal and site layout through to detailed design proposals, the construction process and finally the operation of the completed building. As a result, it is important that the questionnaire is first considered at the outset of planning and at the earliest stage of design. It should be updated as plans evolve. If planning permission is granted, a condition will be applied requiring work to be carried out in accordance with the information provided in the questionnaire. It is important that the questionnaire is completed in good faith and any works identified within it are deliverable.

Applicant's name:	
Agent's name:	
Site Address:	
Application reference (if known):	
Description of proposal: (e.g. total and types of units/floorspace)	
Questionnaire prepared by: (name and qualification/job title)	
Energy information prepared by: (name and qualification/job title):	

Please note: If the answer is 'no' to any of the following questions, please provide justification.

Part 1: Sustainable design, construction and climate change adaptation

1. Efficient use of minerals, use of secondary aggregates, waste minimisation and reuse of material from excavation and demolition.

1.a Will the use of primary minerals be minimised through e.g. the use of renewable materials, recycled and secondary aggregates, and other recycled and reused materials? Please provide details.

1b. Will demolition/excavation material from the proposed works be reused on site? Please provide details of where material will be derived and where it will be used.

1c. Will unused mineral waste be sent for reuse or recycling? Please provide details.

1d. Will non-mineral construction waste (e.g. packaging, timber, plastics) be minimised? Please provide details.

1e. Will locally sourced materials be used? Please provide details.

1f. Will materials be sustainably sourced (e.g. FSC certified timber)? Please provide details.

2. Low energy design: landform, layout, building orientation, massing and landscaping (Policy EM2). See 'Site layout, landscaping and urban form' and 'Building design' in the sustainable design and construction guide in section 5 of the SPD.
2a. Will operational energy demand be minimised through low energy design and the use of energy efficient fabric? Please provide details. This information should align with the energy data provided in parts 2a and 2b of this questionnaire.

2b. Has the layout of the site, landscaping and orientation of buildings taken account of solar receipts and other environmental factors to reduce the need for mechanical heating and artificial lighting in the development? Please provide details.

2c. Will the internal layout of buildings make best use of solar gain and natural light? Please provide details.

2d. Will passive cooling/ventilation measures be incorporated into the scheme? Please provide details.

2e. Will the scheme include mechanical cooling (e.g. air conditioning)? If so, explain why passive measures would not be adequate.

3. Water efficiency (Policy EM2). See 'Water efficiency' in the sustainable design and construction guide in section 5 of the SPD.

3a. If the scheme includes new dwellings, will these be designed to the national optional building regulation water efficiency standard of 110 litres per person per day (regulation 36(2b))? The relevant Water Efficiency Calculation(s) (Part G) for the new dwellings should be submitted to the Council prior to occupation.

3b. For all developments, will water efficiency measures be incorporated into the scheme to reduce the demand for water? Please provide details.

3c. For all developments, will water harvesting measures be incorporated into the scheme? Please provide details.

4. Measures that enable sustainable lifestyles for building occupants (Policy EM2).

4a. Will measures that enable sustainable lifestyles for building occupants be incorporated into the scheme? Please provide details.

5. Climate change adaptation.

5a. Will the scheme incorporate adaptations for the full range of expected climate impacts including: hotter/drier summers, warmer/wetter winters, more frequent and severe heatwaves and overheating, and more frequent and severe heavy rainfall events and flooding? Please provide details.

5b. Will the use of soft landscaping and permeable surfaces be maximised (as opposed to hard surfacing)? Please provide details.

5c. Will surface water be managed by Sustainable Drainage Systems (SuDS)? Please provide details.

6. Any further information

6a. Please provide information about any other sustainable design, construction and climate change measures that will be incorporated into the scheme.

Part 2: Energy

7. Combined (Cooling) Heating and Power ((C)CHP) networks (Policy EM2).

7a. Will the development fall within the vicinity of a (C)CHP/heat distribution network (of any scale from single building to district heat)? If so, please list the identified networks.

7b. If the development will fall within the vicinity of a (C)CHP/heat distribution network, will the proposed development connect to it or be connection-ready? If not, please set out a clear justification.

7c. Is the development within a Heat Priority Area? If so, is a (C)CHP or heat distribution network proposed as the primary source of energy for the development? If not, please set out a clear justification.

7d. If a new (C)CHP or heat distribution network is proposed, is it designed in accordance with the CIBSE Heat Networks Code of Practice? If not, please provide a clear justification.

8. Low and zero carbon energy
8a. If the scheme includes the provision of low and zero carbon technologies, provide details of the proposed energy systems here including: type of technology, location of installation and predicted energy yield.

9. New buildings: Carbon reduction calculation
9a. Will the proposed scheme deliver any new buildings (net or gross)?

9b. If the answer to 9a is yes, please complete the following carbon reduction calculation template in part 2b.

If you need this information in another format or language please contact us

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