

East Herts Draft
Climate Change
Mitigation
SPD

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1. INTRODUCTION

What is an SPD and what is its role in the Decision Making Process?

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

Aims of this SPD

1.2 The aims of this SPD are:

- To aid effective implementation of the District Plan Climate Change Mitigation Policies;
- To provide a clear direction to all parties on how to interpret these policies;
- To assist in assessing an application's compliance with Council policy on Climate Change Mitigation

Applying this SPD

The requirements for this SPD apply to all residential and commercial developments that require planning permission within East Herts district.

1.3 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 designers/ developers seek early advice and guidance from the Council on Building Regulations, and on opportunities to reduce carbon emissions.

1.4 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.

Relevant District Plan Policies

1.5 This SPD provides additional information and guidance to support the implementation of the Climate Change Mitigation and Design policies within the District Plan -Policies CC2 and DES4. These policies are reproduced below:

Policy CC2 Climate Change Mitigation

All new developments should demonstrate how carbon dioxide emissions will be minimised across the development site, taking account of all levels of the energy hierarchy. Achieving standards above and beyond the requirements of Building Regulations is encouraged.

Carbon reduction should be met on-site unless it can be demonstrated that this is not feasible or viable. In such cases effective offsetting measures to reduce on-site carbon emissions will be accepted as allowable solutions.

The energy embodied in construction materials should be reduced through re-use and recycling, where possible, of existing materials and the use of sustainable materials and local sourcing.

1.6 District Plan Policy CC2 covers the most important aspect of sustainable development i.e. climate change and the role of energy use in the built environment. It is the role of this document to detail what is expected and the metrics required to demonstrate compliance with CC2.

Policy DES4 Design of Development

I. All development proposals, including extensions to existing buildings, must be of a high standard of design and layout to reflect and promote local distinctiveness. Proposals will be expected to:

(a) Make the best possible use of the available land by respecting or improving upon the character of the site and the surrounding area, in terms of its scale, height, massing (volume, shape), orientation, siting, layout, density, building materials (colour, texture), landscaping, environmental assets, and design features, having due regard to the design opportunities and constraints of a site;

(b) Incorporate homes, buildings and neighbourhoods that are flexible to future adaptation, including the changing needs of occupants and users, and changes in wider employment and social trends;

(c) Avoid significant detrimental impacts on the amenity of occupiers of neighbouring properties and land, and ensure that their environments are not harmed by noise and disturbance or by inadequate daylight, privacy or overshadowing;

(d) Incorporate high quality innovative design, new technologies and construction techniques, including zero or low carbon energy and water efficient, design and sustainable construction methods. Proposals for residential and commercial development should seek to make appropriate provision for high speed broadband connectivity, ensuring that Fibre to the Premises (FTTP) is provided;

(e) Make provision for the storage of bins and ancillary household equipment. Garages and driveways should be capable of accommodating family sized vehicles. **Dwelling design and layout should make provision for electric vehicle charging points in safe and accessible locations;**

(f) All new residential developments should meet the requirements of Policy HOU7, and ensure all internal rooms are of an appropriate size and dimensions so that the intended function of each room can be satisfactorily achieved. All dwellings shall be identified by their square metrage.

1.7 District Plan Policy DES4 echoes policy CC2 in requiring under (d) innovative design including zero or low carbon energy and water efficient design and sustainable construction methods. Also part (e) requires dwelling design and layout to make provision for electric vehicle charging points.

What is the scope of this SPD?

Sustainable Construction

1.8 The scope of this SPD is:

- Energy consumption, including the siting and orientation of a building, and its energy efficiency, and insulation;
- Renewable and low carbon energy sources and the opportunities for

them in the district

- 1.9 Other important sustainability factors, which are addressed in the District Plan, are not covered in this document, except Transport insofar as assessing the energy required for electric vehicle charging.
- 1.10 It should be noted that that this SPD considers the most relevant technologies, responsibilities and advice at the time of writing, but new or emerging technologies should also be considered by developers where they can better address the policy intentions of CC2 and DES4 as clarified in this SPD,

2. MEASURING AND DEMONSTRATING SUSTAINABLE CONSTRUCTION

This section provides a brief introduction and policy context to Climate Change mitigation to deliver sustainable construction in new developments.

Sustainable development & climate change

- 2.1 Sustainable development is commonly defined as “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (Brundtland 1987).
- 2.2 Sustainable development must address the threat to future generations from climate change, which is widely acknowledged to be due to the effects of manmade global warming. The release of carbon dioxide (CO₂) and other greenhouse gas emissions into the atmosphere, particularly as a result of the burning of fossil fuels, results in a higher proportion of solar irradiation being retained within the atmosphere, warming the earth below. The resulting temperature rises modify the earth’s climate, causing polar ice caps to melt, sea levels to rise and weather patterns to be disturbed. If temperatures are allowed to rise beyond certain levels, there is concern that the effects of climate change will be irreversible with catastrophic effects.
- 2.3 The Climate Change Act 2008 contains a statutory target of securing a reduction in carbon dioxide levels of 80% below 1990 levels by 2050, with an interim target of 34% reduction by 2020. The Committee on Climate Change has issued its report on compliance with the 2016 Paris Climate Agreement. They have recommended the government to commit to net zero carbon emissions for the UK by 2050. The Government has been considering its response and has stated its commitment to this more stretching target.

Planning policy

- 2.4 The purpose of the planning system, as set out within the National Planning Policy Framework (NPPF)¹ and supported by National Planning Practice Guidance (NPPG), is to contribute to the achievement of sustainable development. The NPPF sets as a core planning principle the need to support the transition to a low carbon future in a changing climate, taking full account of factors such as flood risk, and encouraging the reuse of existing resources, including conversion of existing buildings, and encouraging the use of renewable resources (for example by the development of renewable energy). For planning purposes, the Government has interpreted sustainable development through the NPPF as a whole. The need to provide resilience to the impacts of climate change is set out in the NPPF (Section 14) and also in the NPPG (Section on Climate Change).
- 2.5 More specifically, the NPPF states that “the planning system should support the transition to a low carbon future in a changing climate” and that it should help “shape places in ways that contribute to radical reductions in greenhouse gases” (Paragraph 48); that new developments should be planned in such a way to “help to reduce greenhouse gas emissions, such as through its location, orientation and design” (Paragraph 150); and

¹ <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

that planning plays a key role in helping to increase the supply of renewable energy sources (Paragraph 151). In the Government's response to its consultation on revisions to the NPPF it confirmed that "the Framework does not prevent local authorities from using their existing powers under the Planning and Energy Act 2008 or other legislation where applicable to set higher ambition. In particular, local authorities are not restricted in their ability to require energy efficiency standards above Building Regulations."²

2.6 There is scope for planning to require new developments to contribute to both radical reduction in greenhouse gas use on their site and to their wider community. As a minimum, developments should contribute no new net greenhouse gas emissions in use – a position referred to in this document as 'Net Zero Carbon'. Developments can also help to deliver reductions in emissions for their wider area, for example by: the design of buildings providing a net export of electricity; serving other buildings in the area with district heating; or by reducing transport emissions through a modal shift to cycling or walking.

Reducing carbon dioxide emissions from buildings

2.7 According to Good Practice Guidance on Sustainable Design and Construction³, half of all of the country's carbon emissions come from the energy used in constructing, occupying and operating buildings.

2.8 The Government's Clean Growth Strategy⁴ makes it clear that a key Government priority is to reduce the energy demand and carbon emissions⁵ created by both new and existing homes. It outlines the progress already made by measures such as improved thermal insulation and increased efficiency of boilers, and sets out what more needs to be done to minimise climate impact from buildings and help reduce energy costs.

2.9 The Committee on Climate Change has advised government that **"New homes should be built to be low-carbon, energy and water efficient, and climate resilient. The costs of building to tight specifications are not prohibitive, and getting the design right from the outset is far cheaper than retrofitting later. From 2025 at the latest, no new homes should be connected to the gas grid. They should be heated using low-carbon energy sources, have ultra-high levels of energy efficiency alongside appropriate ventilation, and be timber-framed where possible. New laws are needed to reduce overheating risks in new buildings, as well as greater focus on ambitious water efficiency, property-level flood protection, green spaces (for example, trees on streets, vegetation on roofs, sustainable drainage systems) and provision for pedestrians, cyclists, public transport users**

² P 48, Government response to the draft revised National Planning Policy Framework consultation https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/728498/180724_NPPF_Gov_response.pdf

³ Good Practice Guidance: Sustainable Design and Construction, Cross Sector Group on Sustainable Design and Construction, August 2012.

⁴ Clean Growth Strategy <https://www.gov.uk/government/publications/clean-growth-strategy>

⁵ The term 'carbon emissions' refers to emissions of carbon dioxide and the impact of other greenhouse gases, expressed in terms of a quantity of carbon dioxide with an equivalent greenhouse warming impact.

and electric vehicle owners.”⁶

- 2.10 Local policies on sustainable construction and renewable energy can deliver the changes set out in government policy and hence help to meet the national carbon emissions reduction targets. In general terms, this relies on measures being undertaken to:
- minimise the use of resources (including energy and water);
 - minimise carbon emissions;
 - ensure that the built environment mitigates and is resilient to the impact of climate change including reducing flood risk and minimising carbon emissions;
 - protect and enhance biodiversity and green infrastructure;
 - provide buildings and spaces that are pleasant and healthy for occupiers and users, and where appropriate flexible or adaptable to other uses or to meet changing needs (e.g. dwellings that are adaptable to meet ageing population/ people with disabilities);
 - ensure the sustainable sourcing of materials; and
 - utilise sustainable construction technologies and minimise waste.

Renewable Energy

- 2.11 The UK is committed to meeting 15% of all its energy consumption from renewable sources by 2020 to comply with the 2009 EU Renewable Energy Directive .
- 2.12 The National Planning Practice Guidance contains a section providing advice on renewable and low carbon energy which makes it clear that the Government expects Local Authorities to have an important role in the delivery of new renewable and low carbon energy infrastructure. The Government is seeking to stimulate greater investment in renewable energy generation through a wide range of measures. The Energy Act (2008) provided the basis on which the Secretary of State could introduce fiscal measures that reward the generation of low or zero carbon energy. This includes the Renewable Heat Incentive in autumn 2011 (non-domestic) and October 2012 (domestic) and Heat Networks Investment Project 2019. The Renewable Heat Incentive has been designed to provide a guaranteed income to owners and installers of small scale low or zero carbon heat generating technologies at a level and for a duration that is sufficient to incentivise significant investment in these measures. The Heat Networks Investment Project will provide similar incentives to renewable and low carbon heat generation supplying building via heat networks.

⁶ <https://www.theccc.org.uk/2019/02/21/uk-homes-unfit-for-the-challenges-of-climate-change-ccc-says/>

3. SUSTAINABLE CONSTRUCTION SUPPLEMENTARY GUIDANCE

3.1 In East Herts some reduction in carbon dioxide emissions from energy use has been achieved but there remains a need and scope for further reductions (Figure 2). The reductions achieved have largely resulted from the national decarbonisation of electricity supply. As the population of the District rises this reduction may slow. There has been less progress in reducing emissions relating to gas consumption. As set out at paragraph 2.9 above, the Committee on Climate Change has advised the Government that there is now an urgent need to eliminate the use of gas in new buildings.

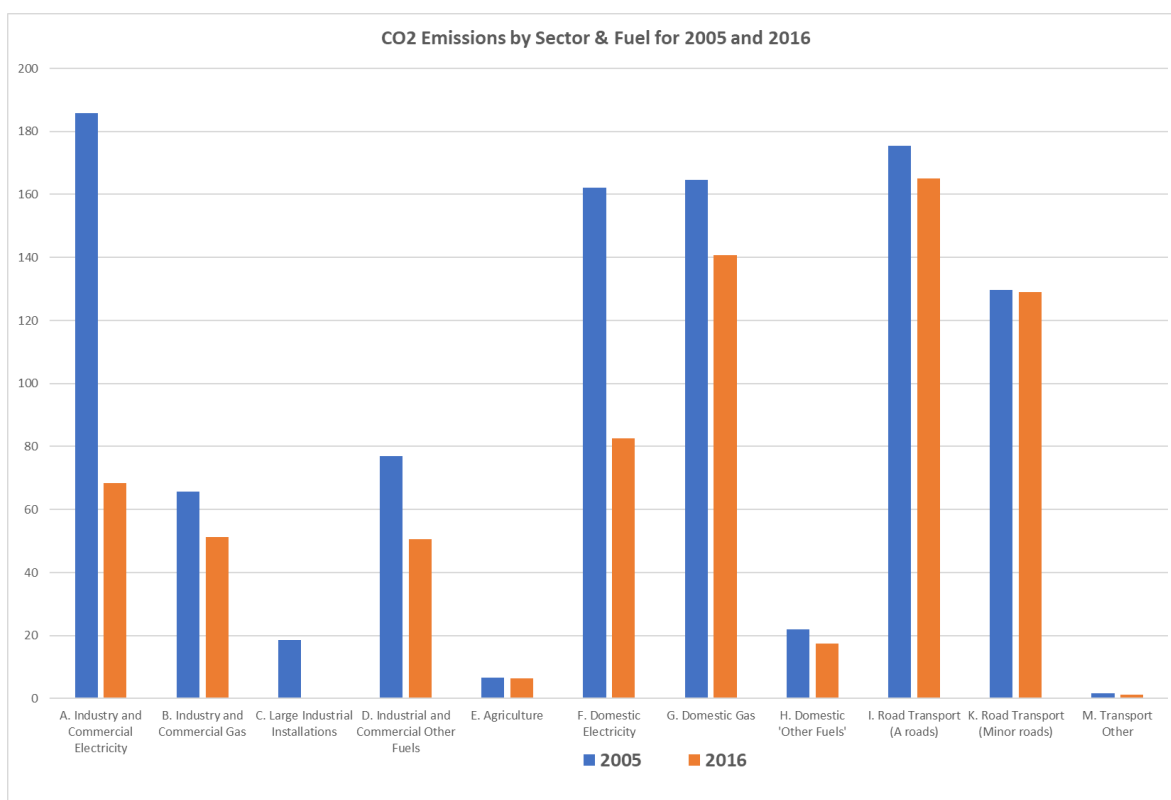


Figure 2 East Herts CO2 Emissions by Sector & Fuel 2005 and 2016⁷

3.2 This SPD provides supplementary guidance to deliver a net zero carbon target, to implement the policies CC2 and DES4 of the District Plan, which require all new developments to demonstrate how carbon dioxide emissions will be minimised across the development site; and be to a high standard of design and incorporate innovative design, new technologies and construction techniques, including zero or low carbon energy and water efficient, design and sustainable construction methods. This guidance helps developers comply with policies CC2 and DES4 in such a way that meets the NPPF intention that planning should contribute to “radical reductions in emissions”. Developments that achieve negative carbon emissions are encouraged.

⁷ This chart relates to use of fuel by sector and does not include emissions from non-energy sources, for example in agriculture it excludes emissions from livestock or use of fertilizer. Source: <https://www.gov.uk/government/statistics/uk-local-authority-and-regional-carbon-dioxide-emissions-national-statistics-2005-2016>



Figure 3 The Zero Bills Home at Building Research Establishment - achieves net negative carbon through efficient design, a heat pump, solar PV plus battery

Calculating net carbon dioxide emissions from developments

- 3.3 The net zero carbon emissions target for new developments means developers are required to set out calculations for the projected emissions from their proposed developments, in an Energy Statement.
- 3.4 The calculations for projected emissions should use SAP 10 emissions factors. SAP 2012 emission factors should not be used as they do not reflect the huge progress in decarbonizing electricity since 2012. SAP10 emission factors (or SAP factors that supersede SAP10 during the period of this SPD) should be used, including the SAP10 emission factor for electricity, which is 0.233kg/kWh.
- 3.5 Unregulated emissions should be included in the calculation. Unregulated emissions are those not covered by the Buildings Regulations. This means that calculations for a domestic context would include estimates of use of appliances and electric vehicle charging, which are unregulated emissions. Appliance use should be estimated from a BREDEM12 model or from the equations that underpin this. In a non-domestic development this should include an assessment of the unregulated emissions that will take place on site.
- 3.6As stated in policy DES4 **“ Dwelling design and layout should make provision for electric vehicle charging points in safe and accessible locations ”**. The emissions associated with electric vehicle charging should be estimated and taken into account in determining net zero carbon emissions. For a single car this should be based on 1900 kWh of electricity per annum. This is based on car efficiency of 15 kWh/100km and an average UK car kilometrage of 12,700 km.

Allowable solutions

3.7 In cases where it is genuinely impossible to achieve net zero carbon on site, for example because there is insufficient roof area on the site to generate sufficient renewable energy, the final option is to offset any remaining estimated CO₂ emissions through allowable solutions, as defined in the Energy Hierarchy, below. This will be paid through a section 106 agreement and paid into an offset fund which will help reduce carbon emissions in the existing building stock in the district. The cost of allowable solutions will be set at the level of 20% above the cost of offsetting through solar PV, in order that the amount takes account of the additional administrative cost of delivering an alternative programme of projects to deliver CO₂ reductions.

Energy hierarchy

3.8 The East Herts District Plan defines an 'Energy Hierarchy' that prioritises the order in which energy saving and renewable energy measures should be applied, so as to provide the most practical and cost effective methodology to achieve low carbon development. Methods are prioritized as follows, where option 1 is the most preferred and where option 4 acts as a last resort.

1. Reduce the need for energy;
2. Use energy more efficiently;
3. Use renewable energy;
4. Allowable solutions i.e. offsetting approaches

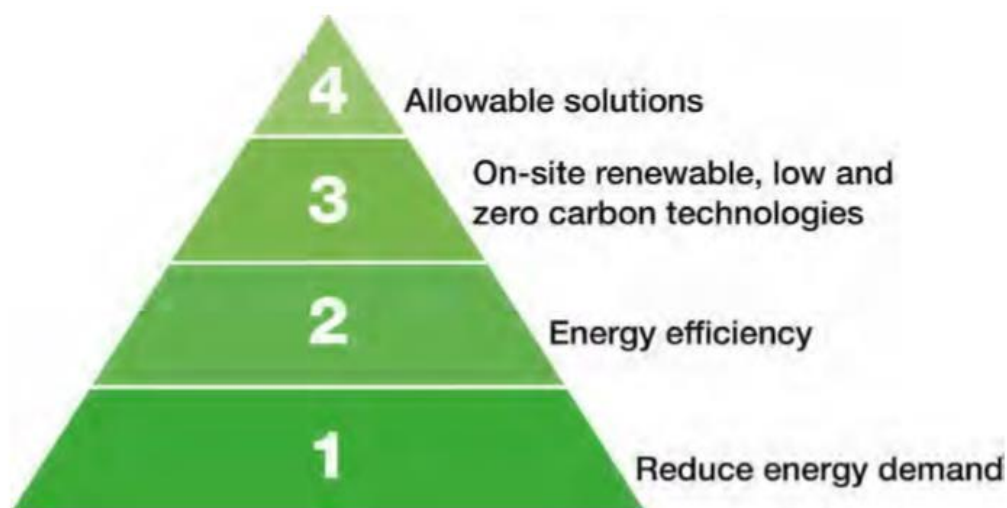


Figure 1 Energy Hierarchy (the East Herts District Plan)

3.9 Where possible developers should first identify and draw upon opportunities for developments to reduce energy demand, option 1 within the Energy Hierarchy, to reduce carbon dioxide emissions on site. This will make developments more cost-effective and allows investment costs to be recovered through operational savings. On some developments it may be appropriate to have a mixed approach as the best outcome, drawing on options 1 to 3. The mix of options selected should be supported in the Energy Statement by evidence of the costs of the options appraised and associated detailed cost information on the chosen option in the viability assessment.

Minimising Energy Use

3.10 Insulation and airtightness to Passivhaus standards are encouraged. As a minimum it is expected that buildings should achieve the following standards:

Aspect	Solution	
U-Values (W/m ² .K area weighted average)	External Walls	0.15
	Roof	0.12
	Windows	1.2
	Solid Doors	1.0
	Glazed Doors	1.2
Air tightness	Better than 2.0 air changes per hour where mechanical ventilation with heat recovery (MVHR) is proposed, or better than 4.0 air changes per hour where no MVHR is proposed	
Proportion of energy efficient lighting	100% use of LED Lamps	

3.11 Opportunities for modifying building orientation, form and the layout of rooms to ensure those spaces that require most warmth and daylight receive most passive solar gain (and those spaces that need least warmth/daylight, such as computer server rooms, receive least) should be considered in order to minimise heating, lighting and cooling demands. This should be balanced with the need to minimise summer over-heating and the need to use a simple external building form (minimising surface area in relation to volume) to reduce heat loss.

3.12 Steps to reduce the need for cooling are encouraged, such as:

- Provision of natural ventilation. This is the process of supplying and removing air through an indoor space without using mechanical systems. This enables the flow of external air to an indoor space as a result of pressure or temperature differences.

It can be increased by a variety of measures including:

- Cross ventilation which is obtained when cool air from outside enters a building and forces warm air out through an outlet such as a window or door.
- Passive stack effect which uses pressure differentials to bring cool fresh air from outside the building, without the use of mechanical systems.
- Selection of materials such that buildings have capacity to absorb, store and ultimately release heat.
- Specification of energy efficient lighting.
- Planting trees to improve the environmental performance of buildings by

providing shading, thereby reducing cooling costs.

Developers can advise consumers on energy efficient appliances. Advances have been made in recent years so that consumers can now compare appliances based on the amount of energy that they consume.

Supplying Energy Efficiently

- 3.13 To approach net-zero carbon by 2050, the Committee on Climate Change report advises that no new homes can be connected to the gas grid from 2025 onwards. This recommendation assumes that the gas grid is unlikely to decarbonise in the near future but that electricity will be largely decarbonised by 2030. Action is required now due to the lifetimes of gas boilers which lock in carbon emissions for some time. The Chancellor committed the Government to introducing new standards for future housing which would ban gas boilers from new homes with effect from 2025.⁸ To meet the zero carbon target, developers will be expected not to include gas boilers in new developments.
- 3.14 Developers are expected to use heat pumps as they are the most efficient heating solution. Direct electric panel heaters will not be accepted as they do not provide an optimal solution as can be seen in the table below. They are also a less efficient use of the electricity available from the distribution network, reducing the electricity supply capacity available for future community developments, such as the installation of further electric vehicle charging points.

Technology	Efficiency
Direct electric panel heaters	100%
Individual air source heat pump	250%
Ground source heat pump	300%
Water source heat pump plus communal heating	500%

- 3.15 In developments consisting of over 10 flats in a single block or in street property developments of over 50 dwellings a communal or district heating solution will be expected, to enable the wider community the opportunity to link into district heating in the future. Communal heating and hot water provision allows the use of larger more efficient heat pump solutions from either surface water sources or ground water sources. Gas fired district heating solutions must be excluded as an option as they will build in additional reliance on the gas grid.
- 3.16 The main opportunity for sourcing renewable heat for heat pumps in East Herts is considered to be water source i.e. using either borehole water or waterways, such as the river Stort. In Bishops Stortford records from the British Geological Survey show that good yields are available from 50 m below ground. The use

⁸ <https://www.gov.uk/government/speeches/spring-statement-2019-philip-hammonds-speech>

of secondary sources of heat, such as heat from sewage treatment, electricity substations or waste heat from industry, should be explored.

- 3.17 Strategies are encouraged whereby heat pumps generating heat for heating and hot water use could also be operated to provide cooling services as a byproduct (the prosumer approach).
- 3.18 Design of heat networks should achieve the best practice standards of the ADE & CIBSE Code of Practice for Heat Networks⁹.

On Site Renewable Energy

- 3.19 On site renewable energy will be required to meet the zero carbon target, because of the continuing carbon emissions associated with the use of electricity, as shown in the SAP calculations. The table below provides a list of renewable energy options and their suitability in East Herts.

Renewable Technology	Suitability
Solar PV	Yes
Micro wind	No, unlikely to be economic because of poor energy yields experienced in practice.
Large scale wind	Yes, in appropriate locations with sufficient wind speeds.
Biomass boilers	Only suitable for very small, rural developments. Not otherwise suitable on air quality grounds.
Solar thermal	Yes
Air source heat pumps	Yes, where communal solutions are not possible
Ground source heat pumps	Yes, where communal solutions are not possible
Water source heat pumps	Yes, best suited to large scale communal heating solutions. Suitable sources include rivers, canals and boreholes.

- 3.20 For illustration the table below shows the amount of renewable energy that would be required to offset the emissions associated with different choices of heating and hot water supply. The renewable energy technology selected is solar PV on the basis that this is the most suitable on-site technology to offset the remaining emissions. This is based on a rough estimate of heating and hot water demand for a house of around 100 m².

⁹ <https://www.theade.co.uk/resources/ade-cibse-code-of-practice-for-heat-networks>

	Efficiency	Space Heating and Hot Water Demand inc Losses kWh/yr	Gas / Electrical Input kWh/yr	CO ₂ Emissions kg/yr	Solar PV (kW) required to achieve Net Zero Carbon for Heating and Hot water
Gas condensing boiler 90% efficiency (not allowed but shown for illustration)	90%	7,000	7,778	1,633	7.0
Direct electric panel heaters (not allowed but shown for illustration)	100%	7,000	7,000	1,631	7.0
Individual air source heat pump	250%	7,000	2,800	652	2.8
Water source heat pump plus communal heating	500%	8,400	1,736	404	1.7

3.21 For illustration the table below shows the amount of renewable energy that would be required if the same house was built to passive house standards. This shows the advantage of building in energy use reduction and energy efficiency into the design so that the total amount of renewable energy required to offset the remaining emissions is reduced. To be noted that while gas condensing boilers are shown in the analysis below alongside direct electric panel heaters this is purely for demonstration purposes and these technologies are not expected to be seen in developments.

	Efficiency	Space Heating and Hot Water Demand inc Losses kWh/yr	Gas/Electrical Input kWh/yr	CO ₂ Emissions kg/yr	Solar PV (kW) required to achieve Net Zero Carbon for Heating and Hot water
Gas condensing boiler 90% efficiency (not allowed but shown for illustration)	90%	4,500	5,000	1,050	4.5
Direct electric panel heaters (not allowed but shown for illustration)	100%	4,500	4,500	1,049	4.5
Individual air source heat pump	250%	4,500	1,800	419	1.8
Water source heat pump plus communal heating	500%	5,400	1,116	260	1.1

Energy Statement and what it should contain

- 3.22 This SPD requires an Energy Statement to be produced for all new developments of seeking planning permission

What is the purpose of an Energy Statement?

- 3.23 The purpose of an Energy Statement is to demonstrate that energy use mitigation measures have been taken into account in the design process, and that they are appropriate in the context of the development.

When is an Energy Statement required?

- 3.24 A number of studies have shown that planning for renewable and low carbon energy is most effective at the design stage. It is therefore important that it is considered at the earliest opportunity and where relevant as part of the planning application process.
- 3.25 All newbuild properties require an energy statement.
- 3.26 Where a planning application for a dwelling or commercial extension a statement is also required. This should also demonstrate net zero carbon for the extension element. This may be achieved by modifications to the existing building.
- 3.27 Energy statements should be included at the outline planning stage.