

Guidance Note: Energy and Water Efficiency for Alterations and Extensions to Buildings

Supporting the Crawley Borough Local Plan 2015-2030

Including:

- Reducing the need for energy in your development
- Improving the sustainability of existing buildings when making improvements
- Minimising carbon emissions during the development process
- Supporting District Energy Networks
- Using renewable/low carbon energy sources
- Tackling water stress
- Coping with future temperature extremes



Introduction

This document provides guidance about how you can achieve greater sustainability and energy efficiency when carrying out alterations or extensions to buildings in Crawley. By following this guidance you can reduce the cost of the energy used by your development while also helping to reduce Crawley's carbon dioxide (CO₂) emissions and protect the borough from the effects of climate change.

The council has prepared this document to support the planning process. It is aimed particularly at those seeking planning permission for the following kinds of projects, where these do not affect more than 100 square metres of internal floorspace:

- The extension or refurbishment of a dwelling (e.g. a house or flat), or other works affecting the land belonging to a dwelling;
- The extension or refurbishment of a non-residential building;
- Changes of use which do not involve the creation of any dwellings.

Crawley's new Local Plan includes a requirement that those undertaking these kinds of projects consider how they can help to limit the extent of climate change and reduce its effects (see Local Plan Policy ENV6). The guidance provided here is intended to help you do this.

This guidance is not mandatory, but seeks to encourage environmentally sustainable measures which are relevant, feasible, and affordable. Investing in green improvements can also pay back in the long term through lower energy bills. You do not need to tell the council about your approach to environmental sustainability and energy efficiency when seeking planning permission for works of this nature. We would, however, request that you inform us of any relevant measures you intend to carry out as this will assist us in monitoring the implementation of the council's sustainability policies. A checklist which you can use to provide this information is included at the end of this document.

The document is divided into short sections dealing with particular objectives. Most of these are concerned with reducing energy and carbon emissions, and are set out according to the order of priority established in the following 'energy hierarchy':

- ▶ Be clean: use less energy
- ▶ Be lean: supply energy more efficiently
- ▶ Be green: use energy from renewable or low carbon sources

The final section addresses the issue of consumer protection, which is a government priority in the arena of retrofitting and alteration of existing buildings for higher environmental performance.

The council's Planning and Climate Change Supplementary Planning Document (SPD) contains more detailed guidance on the issues covered here and can be used instead of, or alongside, this document. It also contains guidance on Flood Risk Management and Sustainable Transport which all planning proposals must comply with, where relevant. Please see the council's website for the link to the SPD and further information at: www.crawley.gov.uk/crawley2030spd

Planning applications involving the creation of new dwellings, new non-residential buildings, or the creation, refurbishment or change of use of more than 100 square metres of internal floor space will also be required to meet specific requirements in relation to climate change mitigation and adaptation. These are outlined in the Local Plan, and further guidance on meeting them is provided in the SPD.

Reducing the need for energy in your development

This section focuses on maximising the energy efficiency of renovations or new extensions planned as part of your proposal.

The available approaches to reducing the energy needs of new parts of buildings can be divided into 'passive' and 'active' measures.

- 'Passive' measures are usually to do with the nature and positioning of walls, floors, windows, roofs and so on. They are 'passive' because they do not need energy to work, making them especially sustainable.
- 'Active' measures are about improving the efficiency of building services, such as heating, lighting, ventilation and air conditioning. Because they still involve the consumption of at least some energy they should only be considered after the potential to use 'passive' measures has been fully explored.

The following passive measures can be used to maximise the energy efficiency of new additions to buildings:

- Ensuring that new extensions, individual fabric elements and fittings exceed the minimum energy thermal efficiency requirements of Building Regulations
- Ensuring that the amount and location of new windows achieves a good balance between the requirements of adequate daylighting and adequate insulation (the Building Regulations suggest that the area of glazing in extensions to dwellings should generally be equal to around 20-25% of the corresponding floor area);
- Avoiding unnecessary gaps or parts of the building fabric which are significantly less effective at containing heat than the surrounding parts.

Active measures which are likely to be applicable include the following:

- Installing energy-efficient cooling technologies (e.g. mechanical ventilation using fans and/or evaporative cooling) and lighting technologies (e.g. LED lighting).
- Including heat recovery capacity in any mechanical ventilation services.
- Installing 'smart' energy metering, including displays showing the amount and cost of energy consumed (the UK government plans to make these standard in homes by 2020).
- Ensuring that building service controls such as lighting and gas boiler controls, and management systems are efficient, up to date, and complementary (e.g. avoid competition between heating and cooling systems and equipment).
- Use energy efficient white goods (e.g. fridges, washing machines) and electrical appliances. Suppliers are legally obliged to display an EU Energy Efficiency Label, including an energy rating, at the point of sale.

Also look for the following labels:

- ENERGY STAR®



- Energy Saving Trust Endorsed
 - EU Ecolabel (electronic equipment, heat pumps, water-based heaters)
- Ensure that building and equipment users know how to use them in an energy-efficient way and understand the importance of sustainable practices. Instructions or user guides can help with this, as can fit-out guides in non-residential buildings.



Improving the sustainability of existing buildings when making improvements

Alterations and extensions to existing buildings should be viewed as an opportunity to remedy areas of poor energy efficiency in existing parts of the building. New fabric elements such as walls, windows and doors will be required to meet minimum insulation standards under Building Regulations. Where existing parts of the building continue to use heat and/or energy inefficiently, however, there is a danger that there will be little or no overall increase in the building's performance.

Improvements to existing parts of the building may also be a more cost-effective way of increasing energy efficiency than spending additional funds on ensuring that the new additions significantly exceed the Building Regulations requirements.

The following are some of the ways in which you can improve the performance of an existing building:

- Upgrading heating, cooling, ventilation and lighting systems that are over 15 years old;
- Upgrading existing parts of the building envelope to meet current Building Control insulation standards, e.g. through replacement or addition of insulating layers to existing walls, ceilings and floors, or replacement of doors and windows;
- Installing energy metering;
- Implementing measures listed in the Recommendation Report accompanying the building's Energy Performance Certificate (EPC), where available. (An EPC should have been provided if a building was built, sold, or rented since 2008, or if certain kinds of work have been carried out on it).



Minimising carbon emissions during the development process

Building work generates carbon dioxide emissions in a number of ways, including the production and transportation of materials as well as through the treatment of waste. For this reason construction materials are described as having 'embedded' carbon.

The quantity of carbon emitted as a result of the build can be reduced by taking the following steps:

- Consider retaining and refurbishing existing buildings/features rather than demolishing and rebuilding, unless the loss of 'embedded' carbon can be offset by resulting improvements in the energy efficiency of the building;
- Design the building footprint to avoid unnecessary use of materials;
- Use low-carbon supply chains for construction materials, e.g. by using local or UK sourced materials rather than imports;
- Use materials, components, and construction techniques which make for durability and ease of deconstruction and re-use (for example, a simpler structure with fewer components and fewer, simpler fastenings will be easier to dismantle and recycle);
- Use environmentally-friendly materials identified by the BRE Green Guide to Specification;
- Use pre-fabricated off-site construction where feasible;
- Make efficient use of existing onsite building materials by adhering to the following 'waste hierarchy', which proceeds from the most desirable to the least desirable options:
 - Prevention: avoiding and minimising the generation of waste (unless offset by resulting energy-efficiency improvements);
 - Preparing for re-use: e.g. repairing and re-using or selling on building components;
 - Recycling: e.g. turning building waste into aggregate for use in foundations or driveway surfaces;
 - Recovery: e.g. generation of energy from waste through incineration;
 - Disposal: landfill or incineration without energy recovery.



Supporting District Energy Networks

District Energy Networks (DENs) generate and supply energy (potentially including electricity, heat, and cooling) on a local scale, such as within a town centre or large housing estate. By generating energy close to the point of use they are able to achieve a higher degree of efficiency in the supply of power.

Crawley's Local Plan supports the establishment of DENs in the borough as a means of providing developments with a more efficient (and reliable) power supply. Networks

are particularly likely to be possible in areas where there is a dense concentration of demand for heat, and where this is distributed relatively evenly over the average day.

Alterations and extensions to buildings may provide an opportunity to connect to a DEN where one is in place nearby, where connection is technically feasible, and where the planned changes can accommodate the necessary works to the building services.

A 'Guide for Developers' document about District Energy Networks in Crawley is being prepared by the council and will be updated as new proposals and details emerge.

Using renewable/low carbon energy sources

After any available opportunities have been taken to reduce the energy demand of your development and to increase the efficiency of the energy supply, CO₂ emissions and energy bills can be further reduced through the use of on-site renewable and low-carbon technologies. Those detailed below are likely to be feasible on a smaller scale in Crawley. For further information see the Planning & Climate Change SPD.

Solar Panels

These can take two main forms:

- Solar Photovoltaic (PV) panels convert energy in sunlight into electricity. They are currently the main small-scale renewable energy source used in Crawley.
- Solar thermal panels use heat from the sun to provide water heating



Biomass Fuel

Biomass fuel is most commonly encountered in the UK in the form of wood chips and pellets, and domestic consumption of these fuels is usually in boilers, providing space and water heating, and in heat-emitting stoves.

Micro CHP

Combined Heat and Power (CHP) involves the production of electricity and heat in combination close to the point of use. It is usually found at the scale of development- and district-wide networks and large non-residential buildings, but micro-CHP operating at the scale of individual houses is becoming more common.

Air/ground/water source heat pumps

Each of these categories of heat pump draws heat from its respective element, usually through the circulation of fluid. The heat is usually increased through compression before being transferred via an exchanger.

Government Subsidy Schemes

The generation of power and/or heat using the various sources mentioned above is subsidised by the government on a tariff basis under either the Renewable Heat Incentive or the Feed-in Tariff. See the 'Further Information' section for more details.

'Permitted Development' rights

Extensive 'permitted development' rights exist for the installation of solar equipment, boiler flues, heat pumps and other renewable and low carbon technologies, meaning that they will often not require planning permission. These rights are detailed in part 14 of the 2015 Town and Country Planning (General Permitted Development) Order (GPDO) (hard surfaces: part 1 class F; part 6 class B; part 7 classes E, G, J, N).

Tackling water stress

Crawley has been identified as an area of 'serious water stress', meaning that demand for water threatens to exceed the available supply. In order to address this situation the council is promoting greater economy in water use.

Including the following measures as part of a programme of alterations can help reduce water consumption:

- Rainwater harvesting: rainwater is considered 'grey' water, suitable for collection and re-use for irrigation or toilet flushing. It can be collected in a butt or tank or using a more elaborate rainwater harvesting system integrated into the pipework of a building.
- Water metering (including metering of units within a building such as flats) will allow better monitoring and management of consumption.
- Installation of efficient fittings and equipment, such as those identified by the European Water Label, or EU Ecolabel, or which meet or improve upon the following maximum consumption limits:



Water Fitting	Maximum Consumption
WC	4/2.6 litres dual flush
Shower	8 l/min
Bath	170 litres
Basin taps	5 l/min
Sink taps	6 l/min
Dishwasher	1.25 l/place setting
Washing machine	8.17 l/kilogram

Coping with future temperature extremes

In future decades, climate change is expected to bring more extreme temperatures, including more frequent and more intense heat waves. The potential negative impact on health and the economy can be reduced by limiting the risk of summer overheating within buildings and in the wider urban environment. This can be done in the following ways when undertaking alterations to buildings:

- Limiting the penetration of heat into buildings through high standards of insulation and air-tightness, and the use of windows with low 'g-values', which are more resistant to the transfer of solar energy, and therefore limit solar heat gain;
- Using landscape features (e.g. trees) or artificial means to shade surfaces which are exposed to the high summer sun;
- Using more reflective materials for roofs and hardstanding;
- Including features which can help cool the environment, such as trees, hedges, 'green' roofs and walls, and water bodies (including surface water drainage features).

Consumer protection

When incorporating energy efficiency measures as part of work on an existing building it is important that consumers can be confident that the installations carried out will deliver the advertised level of improvement, and that protections are in place in the event that this does not occur. This is especially important in relation to domestic premises, as the environmental performance of homes has a big impact on householders.

The Energy Ombudsman has a number of powers in relation to this area, and can consider unresolved complaints from domestic consumers and small businesses in relation to the following:

- problems with energy bills;
- problems resulting from an energy company's sales activity;
- problems resulting from switching gas or electricity supplier;
- physical problems relating to the supply of energy to a home or small business, such as power cuts and connections;
- micro generation and feed-in tariffs (FITs); and
- problems relating to the provision of services under the Green Deal.

Improving consumer confidence and protection in the energy efficiency and renewable energy sector is a government priority, and has led to the establishment of the Bonfield review, which is due to provide recommendations in the following areas:¹

- Consumer advice and protection
- Standards Framework
- Monitoring and Enforcement

¹ For further information see <https://www.gov.uk/government/publications/bonfield-review-terms-of-reference>

Note: The guidance in this document is for information only. Crawley Borough Council gives no warranty as to the accuracy of the information provided and accepts no liability for any loss, damage or inconvenience caused as a result of reliance on this information.

Further Information

Government Legislation/Regulations

Building Regulations Approved Documents L1A, L1B, L2A, L2B (via the planning portal)

<http://www.planningportal.gov.uk/buildingregulations/approveddocuments/partl/approved>

Town and Country Planning (General Permitted Development) (England) Order 2015

<http://www.legislation.gov.uk/ukxi/2015/596/contents/made>

Crawley Borough Council Policies/Information

Local Plan – Crawley 2030 (see especially policy ENV6 & pp. 98-101)

http://www.crawley.gov.uk/pw/Planning_and_Development/Planning_Policy/Crawley_2029/index.htm

Energy Efficiency Advice

http://www.crawley.gov.uk/pw/Environment_and_Health/YourEnergySussex/PUB230908

Renewable/Low Carbon Energy Subsidy Schemes

Feed-in Tariff

<https://www.ofgem.gov.uk/environmental-programmes/feed-tariff-fit-scheme>

Renewable Heat Incentive

<https://www.ofgem.gov.uk/environmental-programmes/domestic-renewable-heat-incentive>

Other Organisations

Carbon Trust

<http://www.carbontrust.com/home?qclid=CKed5sXBpMkCFcgSwwodnosNjQ>

Energy Saving Trust

<http://www.energysavingtrust.org.uk/?qclid=CLrN-9TBpMkCFaYSwwod8B8P2w>

EU Ecolabel

<http://www.ecolabel.eu/>

Contact:

Forward Planning

Strategic Housing and Planning Services

Town Hall

The Boulevard

Crawley

West Sussex RH10 1UZ

forward.plans@crawley.gov.uk

01293 438644

Environmental sustainability and energy efficiency measures checklist for alterations to buildings

Please complete as fully as possible and send to the council. You can include it with your planning application, but since it is not a formal planning requirement you can also send it separately to:

Forward Planning
 Strategic Housing and Planning Services
 Town Hall
 The Boulevard
 Crawley
 West Sussex, RH10 1UZ
forward.plans@crawley.gov.uk

Applicant/agent name	
Site Address	
Development Description	

Do the proposed works include any of the following?

Reducing the need of your development to consume energy:

Fabric thermal efficiency standards which significantly improve upon the Building Regulations requirements?	<input type="checkbox"/>
Further comments:	
100% low-energy lighting for new parts of building	<input type="checkbox"/>
Further comments:	
Energy efficient cooling technologies for new parts of building	<input type="checkbox"/>
Further comments:	
'Smart' energy metering	<input type="checkbox"/>
Further comments:	
User/fit out guides regarding energy efficient use of building services	<input type="checkbox"/>
Further comments:	

Improving the sustainability of existing buildings when making improvements:

Upgrades to existing heating, cooling, ventilation and lighting systems	<input type="checkbox"/>
Further comments:	
Upgrades to insulating quality of existing walls, roofs, windows etc	<input type="checkbox"/>
Further comments:	
Measures identified in Recommendation Report accompanying the building's Energy Performance Certificate (EPC)	<input type="checkbox"/>
Further comments:	

Minimising carbon emissions during the development process

Use of low-carbon supply chains for construction materials	<input type="checkbox"/>
Further comments:	
Use of recognised environmentally-friendly materials	<input type="checkbox"/>
Further comments:	
Pre-fabricated off-site construction	<input type="checkbox"/>
Further comments:	
Re-use or recycling of building waste or recovery of energy from waste	<input type="checkbox"/>
Further comments:	

Supporting District Energy Networks (DENs)

Provision for connection to a DEN	<input type="checkbox"/>
Further comments:	

Use of renewable/low carbon energy sources

Solar PV installation	<input type="checkbox"/>
Further comments:	
Solar thermal installation	<input type="checkbox"/>
Further comments:	
Use of biomass fuel	<input type="checkbox"/>
Further comments:	
Combined Heat and Power (CHP)	<input type="checkbox"/>
Further comments:	
Air/ground/water source heat pumps	<input type="checkbox"/>
Further comments:	
Other technologies	<input type="checkbox"/>
Further comments:	

Tackling water stress

All new water fittings meeting max. consumption limits shown on p.7	<input type="checkbox"/>
Further comments:	

Coping with future temperature extremes

Use of windows with low g-values	<input type="checkbox"/>
Further comments:	
Passive shading	<input type="checkbox"/>
Further comments:	
Use of reflective materials for hard surfaces exposed to summer sun	<input type="checkbox"/>
Further comments:	
Use of 'cooling' landscape features (e.g. green infrastructure, water)	<input type="checkbox"/>
Further comments:	