



BEDFORD BOROUGH COUNCIL
SUPPLEMENTARY PLANNING DOCUMENT

CLIMATE CHANGE AND POLLUTION

| December 2008 |



BEDFORD
DEVELOPMENT
FRAMEWORK

BEDFORD BOROUGH COUNCIL
BEDFORD DEVELOPMENT FRAMEWORK

CLIMATE CHANGE AND POLLUTION

SUPPLEMENTARY PLANNING DOCUMENT

DECEMBER 2008





This guidance was adopted as a supplementary planning document within the Bedford Development Framework by the Council on 17th December 2008.

The preparation of this guidance took account of comments made during two periods of public consultation: on its scope and objectives, between 27th June and 8th August 2008; and on the draft supplementary planning document, between 22nd September and 3rd November 2008.

A separate sustainability appraisal of the supplementary planning document has been carried out and is available from the Council.

A summary of the Climate Change and Pollution SPD will be made available in large copy print, audio cassette, Braille or languages other than English on request. If you require the document in one of these formats please contact the Policy Section by calling (01234) 718573, sending an email to bdf@bedford.gov.uk or writing Planning Services, Town Hall St Paul's Square, Bedford MK40 1SJ.

The Climate Change and Pollution SPD can be purchased from the Town Hall, price £2.50 or through the post by sending a cheque for £4.00 payable to 'Bedford Borough Council' to the address above. The Plan is also available to view on the Council's website (www.bedford.gov.uk/planning) and at local libraries.

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INTRODUCTION

This guidance has been developed in accordance with local, regional and national planning policy and it is a material consideration to be given weight in considering development proposals. Applicants for planning permission will be expected to take it into account in preparing development schemes. Applicants are expected to set out how they have addressed these matters in a sustainability statement and energy audit.

The purpose of this document is to give detailed guidance on the implementation of Policy CP26 of the Council's Core Strategy and Rural Issues Plan, which concerns climate change and pollution. The Plan has been subject to public examination by an independent inspector following extensive public consultation and was adopted in April 2008.

POLICY CP26 - CLIMATE CHANGE AND POLLUTION

The council will require development to:

- i) Minimise the emission of pollutants into the wider environment; and,
- ii) Have regard to cumulative impacts of development proposals on air quality, in particular in relation to air quality management areas; and,
- iii) Minimise the consumption and use of energy, including fossil fuels by design and choice of materials; and,
- iv) Unless it can be demonstrated that - having regard to the type of development involved and its design - these requirements are not feasible or viable, achieve a minimum 10% reduction in carbon emissions (below the normal requirement set by the Building Regulations) in all new residential developments and above a threshold of 500m² in new non-residential developments by measures which shall include, in new developments above a threshold of 1000m² or 50 dwellings, the supply of at least 10% of the energy consumed in the new development to be provided from decentralised and renewable or low-carbon energy sources.
- v) As a minimum, meet the national standards for building performance set by the current Building Regulations. Through the Allocations and Designations DPD process the Council may identify local development or site specific opportunities which justify the adoption and application of higher standards of building performance as set out in the Code for Sustainable Homes. Such higher standards may also be required by the Council where justified by changes in national guidance.
- vi) Utilise sustainable construction techniques; and,
- vii) Incorporate facilities to minimise the use of water and waste; and,
- viii) Limit any adverse effects on water quality, reduce water consumption and minimise the risk of flooding.

Developers will be expected to submit a sustainability statement and energy audit with proposals for development.

Further information on each of the parts of the policy is given in the following sections of this document. Guidance is given on the minimum standards expected to achieve compliance with the Council's policy. Applicants for planning permission will be expected to submit a sustainability statement (including an energy audit where required) demonstrating how they have met these standards. Further information on sustainability statements and energy audits is given at the end of this document.

In some cases this guidance extends to matters covered by the Building Regulations. Although such measures cannot be required by planning policy, they are included for completeness. Where this is the case it is made clear in the text.

In addition, guidance is given on further measures that could be taken beyond the minimum. Although this is not a policy requirement, the Council will negotiate with applicants and encourage them to choose to go further, aspiring to emerging trends in good practice, looking for opportunities to help “future proof” development and ensure it that it will meet the rising standards occupiers will come to expect for many years to come. Good sustainable design will also lead to lower running costs, which is attractive for both householders and businesses. This policy applies only to new built development: it does not apply to refurbishments or existing development.

Objectives

The purpose of this guidance is:

- To provide practical advice on how to minimise pollution, incorporate sustainable energy conservation measures (including renewable energy), reduce emissions of carbon, minimise waste, conserve water and minimise flood risk as part of new development.
- To supplement the climate change and pollution policy contained in the Council's Core Strategy and Rural Issues Plan by setting out a detailed framework for formulating and assessing development proposals.
- To encourage developers to consider adaptations that may be necessary to take account of future climate change.
- To promote a more sustainable approach to energy use.

This guidance is limited to the climate change and pollution issues covered by Policy CP26 of the Core Strategy and Rural Issues Plan. It does not deal with other recognised causes of climate change, such as transport, or the effect of climate change on other matters such as wildlife habitat or the historic environment. These are addressed by other policies of the Core Strategy and Rural Issues Plan. Throughout this document the term sustainable development means “development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (World Commission on Environment and Development 1987).

Further Information

- **Bedford Borough Council:** www.bedford.gov.uk
Building Control: tel. 01234 718081 email. buildingcontrol@bedford.gov.uk
Sustainability: tel. 01234 718259/718257 email. sustainability.team@bedford.gov.uk
Environmental Health: tel. 01234 718099 email. ehadmin@bedford.gov.uk
Planning: tel. 01234 718068 email. planning@bedford.gov.uk

BACKGROUND

Bedford Borough Council has been concerned about the effects of climate change for a number of years. The requirement to produce a Core Strategy as part of the new Local Development Framework system introduced by the Government in 2004 gave the opportunity for the Council to adopt planning policies to address climate change issues. In preparing its draft policies the Council sought to be as effective as possible within the constraints set by the then current Government guidance. However, during the time between submitting its draft Plan to the Secretary of State for examination in 2006 and final adoption in 2008, Government policy has continued to evolve in response to better understanding of climate change. As a result, the adopted policy of the Council's Core Strategy and Rural Issues Plan, Policy CP26, is not now as challenging as it was originally intended to be. The nature of the Local Development Framework process means that the policy could not be changed once the draft Plan had been submitted, however the examination inspector was able to recommend additional wording to clarify that further policy could be developed as part of the Council's forthcoming Allocations and Designations Plan. As part of the process of preparing that Plan, the Council is assessing the scope for more ambitious climate change policy requirements to apply on individual sites allocated for development in the Plan. Policy CP26 of the Core Strategy and Rural Issues Plan will continue to apply borough-wide to general development proposals but more challenging targets will apply to specific sites where they can be justified.

POLLUTION AND AIR QUALITY

Apart from the construction phase when pollution in the form of noise and dust can occur, the operation of completed development can lead to the emission of pollutants to the atmosphere, land or water courses. Releases of pollution from certain industrial processes are strictly controlled by the Environment Agency or the Local Authority.

Development that results in increased vehicular traffic is also likely to affect air quality. The Council has a duty to review and assess air quality to ensure that national and European standards for certain pollutants are not exceeded. Where studies show that pollution levels do exceed the standards, an air quality management area (AQMA) can be declared and an action plan produced to coordinate work towards the achievement of the standards. In the borough AQMAs have been declared in respect of raised levels of nitrogen dioxide in Bedford town centre at Prebend Street and High Street. These AQMAs will shortly be replaced by a new town centre wide AQMA also extending along the principal roads into the centre. An AQMA in the village of Great Barford is currently being reviewed following the opening of the Great Barford bypass. An AQMA has also been declared in respect of sulphur dioxide from the brickworks at Stewartby, although the brickworks has since closed. The AQMA is likely to be reviewed in 2009.

Developers are expected to minimise the emission of pollutants into the environment, having regard to the cumulative impacts of development proposals on air quality. In addition to specific industrial processes and transport, developers should consider emissions from heating, cooling and ventilation plant. Where a development is within a declared AQMA, special measures may be needed. The Council's Air Quality Action Plan states that the Council will consider the imposition of conditions to mitigate the impact of poor air quality on new development subject to planning permission. These might include, for example, the installation of mechanical ventilation, restriction on window openings and the production of travel plans to encourage walking, cycling, public transport or other measures to reduce reliance on use of the private car as a cause of atmospheric pollution. Some of these measures may overlap with the requirements of the Building Regulations. The planting of trees and other green infrastructure can help to mitigate the effects of air pollution.

Minimum Standard

- Incorporate specific measures to reduce the emission of pollutants from the development, particularly within declared AQMAs.
- Incorporate specific measures to reduce and mitigate exposure to pollution within or around the development, particularly within declared AQMAs.

Going Further

- Design development to minimise the impact on air quality of plant, vehicles and other sources over the expected lifetime of the development.

How to achieve the standards

When proposing a development that includes processes that could lead to pollution of the wider environment it will be appropriate to seek the advice of the Council's environmental health officers and/or the Environment Agency. In certain circumstances it may be appropriate to establish a programme of air quality monitoring as a condition of development approval, with costs borne by the developer.

In seeking to reduce emissions of pollutants a long-term view should be taken over the expected lifetime of the development. Sound principles of design and construction of buildings, and improved energy efficiency will help minimise pollution. These are considered elsewhere in this document.

Unexpected pollution can be avoided by regular maintenance and inspection of plant and machinery, which should therefore be easily accessible. Service agreements should be in place to maintain operational efficiency.

Further Information

- The Environment Agency website contains general information on pollution and air quality.
www.environment-agency.gov.uk
- Bedford Borough Council's website has information on sources of pollution and specific information on air quality in the borough including the declared air quality management areas and Air Quality Action Plan.
www.bedford.gov.uk

BUILDING DESIGN AND LAYOUT

The design of a building can affect the consumption and use of energy within it. The aim should be to design buildings that stay cool in summer, without the need for air conditioning, and warm in winter, without the need for excessive energy inputs. The energy of the sun through solar gain can provide significant contributions to heating and lighting in a building. A good quality of natural ventilation can almost always be achieved. Depending on the size and intended use of buildings, different approaches may be needed.

Developers are expected to minimise the consumption and use of energy, including fossil fuels by the design of proposals for development. This also requires consideration to be given to designing layouts which promote the use of sustainable modes of transport (public transport, walking and cycling) over the use of the private car. When proposing new developments designers should have regard to principles of good design set out in the Council's adopted policies and guidance.

Minimum Standard

- Design buildings to maximise solar gain.
- Design buildings to maximise natural light.
- Design buildings to make use of natural ventilation and cooling.
- Design buildings to maximise energy efficiency.

Going Further

- Take account of expected climate change over the expected lifetime of the development in the design of buildings and their surroundings.

How to achieve the standards

Solar gain and internal comfort levels can be optimised by the following:

- Siting buildings to minimise overshadowing.
- Using landscaping and porches to provide shelter from prevailing winds.
- Orientating buildings so that they broadly run east-west and face south.
- Ensuring that the roof structure includes south facing slopes to facilitate the installation of solar panels.
- Locating main rooms on the south side of the building.
- Optimising glazing on the south side of buildings while providing appropriate shading opportunities such as blinds or external louvres.
- Minimising the area of north-facing windows.
- Locating garages on the north side of homes to act as additional thermal buffers.
- Use construction materials with a high thermal mass, such as concrete, tiles and stone, which absorb excess heat during the day and release it slowly.

These suggestions will not all be relevant for every development but the principles should be taken into account as appropriate in designing layouts. Some of these measures may overlap with the requirements of the Building Regulations.

In larger non-residential developments such as offices, a large proportion of energy use is for lighting, so it is important to design buildings to maximise the availability of natural light to rooms. In hot weather however there is a danger of excessive solar gain and this can add to the heat generated by lighting, equipment and people, causing discomfort for users and increasing demand for artificial cooling. To avoid this, design features such as louvres, external blinds and large roof overhangs that provide shade in summer without reducing daylight should be considered. Hard surfaced car parks and external spaces can raise local air temperatures to uncomfortable levels in hot weather. This can be reduced by grass surfacing and landscaping which help provide natural air cooling in the vicinity of a building. Measures to consider include:

- Reinforced grass paving for low turnover car parking areas (which might also form part of a sustainable drainage system - see section on *Water and Flooding* later in this document).
- Green roofs (which can also help improve local biodiversity).

The use of air conditioning to artificially cool buildings should be avoided as this uses a great deal of energy. Natural ventilation can be achieved by fitting opening windows and vents or using an atrium which draws heat upwards within the building.

Energy efficiency measures reduce carbon emissions and also offer savings in running costs during the life of the building. Improved insulation not only retains heat but can help keep buildings cool in summer. Effective measures include:

- Extra insulation of walls, roofs and floors.
- Advanced glazing systems such as argon filled low-emission double glazing or triple glazing.
- High-efficiency heating boilers with advanced temperature controls which respond to solar gain and have separate zone temperature control.
- Low energy lights and lighting controls to automatically switch off when not needed.
- The use of sun pipes to increase daylight in poorly lit areas inside buildings.

Good practice

The University of Bedfordshire information centre building (right) includes external louvres to provide shading whilst still allowing light into the building and views out of it.



Further Information

- The Building Research Establishment (BRE) website provides information on many aspects of sustainable design. www.bre.co.uk
- Information on grass paving and green roofs can be found from the Royal Institute of British Architects product selector website. www.ribaproductselector.com

CONSTRUCTION MATERIALS AND TECHNIQUES

The specification of construction materials should consider the impact they can have on climate change. Sustainable construction makes economic sense as it involves the prudent use of existing and new resources and the efficient management of the construction process. It can also help preserve local character. Reusing and recycling materials will often be the most sustainable choice. Some of the following measures may overlap with the requirements of the Building Regulations.

Some paints, treatments, insulation materials and plastics contain chemicals that may contribute to health problems for those using the building. They may also be difficult to dispose of when the building reaches the end of its life.

In specifying materials, long life and low maintenance are important considerations. However this needs to be balanced with good design and environmental impact. For example, aluminum is a low maintenance material with a long life and is recyclable, although its production involves a large energy input. Materials which have a long life can save on repair costs and reduce the long-term use of energy and resources. Where possible such materials should be provided from recycled sources. The carbon footprint of building materials should be considered.

The choice of locally sourced materials can help ensure that new buildings are in keeping with the surrounding area and reduce road transport. Traditional materials such as local stone, brick and wood are not only attractive, but are often more durable and have fewer environmental impacts in their manufacture than synthetic materials. Timber should be from a sustainable source so that forests are not depleted.

The U-value is a measure that expresses the heat loss factor of a material: the lower the U-value, the less the amount of heat that can be transmitted through the material. The U-value of alternative materials should be taken into account when selecting materials to be used in the construction.

The materials and techniques used in construction can have an influence on climate change. Developers are expected to minimise the consumption and use of energy, including fossil fuels, by the choice of materials and to use sustainable construction techniques.

Minimum Standard

- A significant proportion (target - 50%) of timber and timber products to come from Forest Stewardship Council (FSC) source or other known source with a sustainable purchasing policy.
- Insulation materials containing substances known to contribute to ozone depletion or with the potential to contribute to global warming not to be used.
- Avoid the use of toxic glues, solvents, treatments and coatings, where possible.
- Minimise the use of non-recycled aggregates.
- Reduce waste during construction and demolition phases and sort waste streams on site where practical to encourage reuse and recovery.
- Use locally sourced construction materials where possible.
- Choose construction materials with a low U-value.

Going Further

- The majority (target - 90%) of timber and timber products to come from Forest Stewardship Council (FSC) source or other known source with a sustainable purchasing policy.
- No peat or natural weathered limestone to be used in landscaping.
- Maximise the use of materials derived from recycled and reused content in products and materials selected.

How to achieve the standards

The starting point for achieving sustainable construction is site clearance and preparation. If demolition is necessary, consideration should be given beforehand to the types of materials present and how they can be dealt with to maximise recovery. Waste streams should be sorted to add value and thus maximise recycling and reuse of materials. Further information on handling demolition waste is given in the section on *Waste Minimisation* later in this document.

Waste during construction can be minimised by specifying and purchasing only what is needed for the project. Reclaimed materials and/or recycled materials (such as crushed concrete aggregate) should be used wherever possible during construction. This minimises energy use and environmental impacts linked to extraction, processing and disposal. Ideally existing building materials should be recycled on site and then re-used in the development, with the appropriate exemption or authorisation from the Environment Agency, eg crushing and reuse of concrete. In addition recycled building materials may be available from nearby sites. Just like new building components delivered to site, materials recovered for recycling should be stored in such a way as to minimise losses due to damage by weather.

When specifying new materials and components, the following factors should be borne in mind.

- Wherever practical, source materials locally in order to reduce the need for transport.
- Select materials that have low levels of embodied energy (energy used in manufacture).
- Select materials that have a long life and require little maintenance.
- Specify materials with low toxicity. Use natural, non-toxic and low VOC (volatile organic compounds) glues, solvents, treatments and coatings wherever possible.
- Consider the full life cycle of alternative materials ie the impacts of raw material extraction, processing, manufacture, transport, use and disposal. Consider also the impact on biodiversity of the use of peat, weathered limestone and other materials from vulnerable habitats. This applies to landscaping materials as well as buildings.
- Maximise the use of timber from sustainable Forest Stewardship Council (FSC) sources. If other timber is used it should be from a known source with a sustainable purchasing policy.

Further Information

- The Building Research Establishment (BRE) Environmental Profiles website provides information about building materials and components. Another useful information source is the BRE Green Guide to Specification.
www.bre.co.uk
- The U.K Green Building Council provides information on sustainable building techniques.
www.ukgbc.org
- Information on the procurement of sustainable timber is available from the Central Point of Expertise on Timber Procurement (CPET).
www.proforest.net/cpet

- Product information on certified timber and timber products is available from the Forest Stewardship Council.
www.fsc-uk.org
- Information on reducing the amount of timber in the waste stream is available from the Timber Recycling Information Centre.
www.recycle-it.org
- The Construct Sustainably website provides practical advice and information on sustainability.
www.constructsustainably.com
- Information on recycled materials can be found from the Royal Institute of British Architects product selector website.
www.ribaproductselector.com
- More information and advice on the use of waste on a construction site including required authorisations or exemptions can be found from the Environment Agency.
www.environment-agency.gov.uk/subjects/waste

CARBON EMISSIONS

It is important to reduce the emission of carbon as carbon dioxide is a greenhouse gas that contributes to global warming. Reductions in carbon emissions can be achieved by the following means, which are set out as a hierarchy, the order of which should be followed in reducing a building's carbon footprint.

- Reduce energy consumption by increasing building insulation and other sustainable design techniques outlined earlier in this document.
- Increase the efficiency of energy generation through the use of combined heat and power (CHP) and district heating (DH) systems. Producing energy close to the point of use reduces transmission losses from the national grid.
- Generate energy from renewable sources such as: solar water heaters, photovoltaic (PV) arrays, wind turbines, air or ground source heating / cooling and biomass heating / power plants.

Not all of these will be suitable or viable for every development and a careful assessment of the contribution of each will be necessary to achieve the Council's policy requirements. Some of the following measures may overlap with the requirements of the Building Regulations.

Minimum Standard

- Carbon emissions from the development must be reduced by at least 10% below the normal requirement of the Building Regulations for all new residential development and above a threshold of 500 square metres in new non-residential development.
- For larger developments above a threshold of 50 dwellings or 1000 square metres (non-residential development), reduce carbon emissions from the development by at least 10% below the normal requirement of the Building Regulations by measures which include the supply of at least 10% of energy requirements from decentralised and renewable or low-carbon energy sources.
- Carry out an energy audit of the proposed development to demonstrate the achievement of the required carbon emission reduction (all new dwellings and above a threshold of 500 sq. m. in new non-residential development).
- All other development to minimise emissions of carbon.

Going Further

- All development to exceed the minimum standards aiming to achieve carbon neutrality in line with government targets.
- All development to carry out an energy audit to demonstrate reduction of carbon emissions.
- Provide guidance to building occupiers to optimise use of heating and lighting systems.

How to achieve the standards

The relationship between energy consumption, carbon and carbon dioxide

Within buildings much of the energy that is consumed comes from either electricity or gas drawn from a national grid. Whereas the carbon content of gas is a known quantity, that of electricity depends on the mix of primary fuels used to generate that electricity ie oil, gas, coal, nuclear, etc and this can vary from time to time. The mix of gas and electricity to be used in a development therefore needs to be taken into account when calculating carbon emissions (as do generation and transmission losses within the national electricity grid).

The Council's policy is expressed in terms of *carbon* emissions as opposed to *carbon dioxide* emissions. The difference is important as 1 kilogramme of carbon dioxide is equivalent to only 0.272 kilogrammes of carbon. (This is because carbon dioxide is made up of both carbon and oxygen thus increasing its molecular weight.) It is important therefore consistently to use carbon in calculations rather than mix carbon and carbon dioxide.

The requirements of Policy CP26

The Council's policy sets different standards for small (1 - 49 dwellings or 500 - 999 square metres non-residential development) and large developments (50+ dwellings or 1000+ square metres non-residential development). For small developments the requirement is to achieve a minimum 10% reduction in carbon emissions (below the normal requirement set by current Building Regulations). For larger developments the requirement is to achieve a minimum 10% reduction in carbon emissions below the normal requirement of the Building Regulations by measures which include the supply of at least 10% of energy consumption from decentralised and renewable or low-carbon energy sources.

In some cases the Council may ensure compliance with the policy by granting planning permission for the development conditional on the submission of an energy audit. Information concerning energy audits is given in the final section of this document and this gives details of how to calculate reductions in carbon emissions. Model planning conditions that the Council may use are attached as Appendix B to this document.

On some sites it may not be practicable to achieve these requirements through on-site measures alone and connections will need to be made to neighbouring decentralised renewable and low-carbon supply infrastructure by 'direct wire' or heat transmission conduit. (Low carbon energy is supplied from sources of waste heat, such as from industrial processes or electricity generating plant, through district heating and cooling networks.) Merely purchasing "green electricity" from the national grid would not satisfy the objectives of the policy.

Reducing energy consumption

The *Building Design and Layout* section in this guide contains information about how energy consumption can be reduced in the design of buildings. The behaviour of individuals can also have a significant effect on energy consumption and education is important. Designed-in features, such as lights that automatically switch off when not needed can be effective. In addition, occupiers should be well informed about the efficient use of their heating systems - this could be included as part of a 'welcome pack'. Electrical appliances supplied as part of the development should be highly rated for energy efficiency and the fitting of 'smart meters', which allow users to directly monitor their energy use, can encourage energy saving behaviour. Residential development should wherever possible be provided with external space for drying washing naturally. Measures such as these that reduce energy consumption should be fully explored before measures for generating energy are considered.

Increasing energy generation efficiency

The use of energy from the national supply system (gas and electricity) is often not the most efficient or sustainable source, even when a green energy tariff from a renewable off-site source is used. All buildings benefit in efficiency terms from a centralised heating system, with individual time and temperature controls to each area. Even greater efficiency can usually be achieved with combined heat and power (CHP) systems, which are now available even for small scale developments.

CHP systems involve the simultaneous generation of heat and power (usually electricity) in a single process. This means that waste heat, that would otherwise be lost to the environment, is instead put to beneficial use. CHP also avoids transmission losses. These decentralised low-carbon energy supply systems are far more fuel efficient than conventional forms of power generation. CHP systems work well for larger mixed-use schemes that include residential use, as these tend to balance heat and power needs through the day.

Using renewable energy

A number of renewable energy (low and zero carbon) technologies may be suitable for on-site and decentralised power generation. These include:

- solar water heating
- ground / air source heating / cooling
- wind turbines
- photovoltaics (PV)
- biomass heating / power.

Solar water heating

These use a heat collector or 'panel', generally mounted on a roof, which contains a liquid that absorbs heat from the sun. The heat from the liquid is transferred using a coil to a conventional water storage cylinder. Provision must be made for the water to be further heated through a standard boiler or electric immersion heater. For the system to be effective, collectors should face between south-east and south-west at an angle of about 40° and not be shaded by obstructions.

Ground / air source heating / cooling

Ground and air source heat pumps operate on similar principles to refrigerators. An electric pump extracts heat (from the ground or air) using an exchanger and transfers it to a heating distribution system - usually through under-floor pipes. The pump can be designed to operate in reverse to provide cooling. Ground source heat pumps generally require a large outdoor space for the burial of the heat exchanger pipes, although vertical boreholes can be used instead. Air source heat pumps can be fixed to the outside of a building. Both ground and air source heat pumps require a supply of electricity to power the system but generally contribute around four to five times the amount of energy consumed.

Wind turbines

Energy is extracted from the wind using either a vertical axis rotor or a two / three blade rotor. Vertical axis turbines do not have to re-orientate with changing wind direction and are generally more efficient at low wind speeds. Wind turbines can be either mounted on a free-standing pole or (if small) fixed directly to a wall or roof. For wind turbines to be effective average wind speeds will need to exceed 4.5 metres per second, although small roof-mounted turbines (typically up to 1.5kW) can work at wind speeds as low as 3.5 metres per second. Noise, appearance and 'shadow flicker' may be a concern in some locations. Large scale wind turbines need to be carefully sited to avoid adverse effects on biodiversity, landscape and views.

Photovoltaics

Photovoltaic (PV) systems convert energy from the sun into electricity through semi-conductor cells. A cell consists of a junction between two thin layers of dissimilar semi-conducting materials, usually based on silicon. When light shines on the junction an electrical current is produced. PV systems can be designed as wall cladding or roof tiles as well as roof-mounted arrays. For optimum results, PV arrays should face between south-east and south-west and should not be shaded.

Biomass heating / power

This uses plant or animal material as a fuel source for energy production. Although carbon is emitted when such material is burned, this is equivalent to the amount absorbed from the environment during its growth. Thus biomass fuel is carbon neutral and is a renewable source of energy, provided that it comes from a local sustainable supply. Common biomass fuels include: fast-growing energy crops such as willow and miscanthus, poultry litter, wood chips and wood pellets. As biomass fuels tend to be bulky in relation to the amount of energy they provide, transport costs (and carbon emissions resulting from transport) can be a significant factor which should be taken into account in assessing their suitability.

Government guidance in Planning Policy Statement 22 *Renewable Energy* and its companion guide contain further information concerning these technologies and the planning considerations to be taken into account in such schemes. If a developer is proposing a renewable energy scheme, information should be provided concerning rated power output in kW or mW as this is required for monitoring purposes.

Local area energy networks

Decentralised and renewable or low-carbon technology energy sources (supplying heating, cooling or electricity) can be linked with multiple energy users to produce a local energy supply network. The advantage of such a network is that users who require power at different times during a day such as businesses and residents, can even out the total energy load, meaning that energy suppliers can run under optimum conditions. The carbon saving potential and cost effectiveness of local supply networks increases with scale. A third party organisation (an energy service company or ESCo) will often be required to fund and manage a network. The existence of a local area energy network means that individual developments can connect to it for their energy needs rather than provide their own on-site renewable energy or rely entirely on the national grid.

Exceptions to Policy CP26

Policy CP26 states that the requirement for carbon emission reduction may not apply if it can be demonstrated that the requirement is not feasible or viable having regard to the type of development involved and its design. It will be up to the proposer of the development to provide detailed evidence, including a technical and financial appraisal of alternative approaches, that the policy's requirements cannot be met and that some reduced requirement should be made instead. It is the Council's view that there will be few occasions when an exception can be justified.

For buildings located within or near to conservation areas, listed buildings and other historic assets where there is a requirement to protect, preserve or enhance the fabric or character of the site/area special care may be needed before deciding on how the requirements of Policy CP26 will be met. Whilst in some instances it will be possible to integrate new technologies and modern solutions into historic areas and buildings, in other instances a traditional approach may be more appropriate and can be just as environmentally friendly. The opportunities to meet the policy should be assessed on a site by site basis and specialist advice obtained in relation to historic environmental issues. Further advice on climate change and the historic environment, including a range of publications, is produced by English Heritage.

Carbon neutrality

The Government's *Building a Greener Future Policy Statement* of 2007 aims to ensure that all new homes built after 2016 will have zero net carbon emissions from all energy uses, with interim targets to reduce emissions regulated by Building Regulations (ie excluding energy use by electrical appliances, lighting and cooking) by 25% at 2010 and 44% at 2013. The reduction in emissions required post-2013 is particularly significant as it will need also to take account of the unregulated emissions resulting from electrical appliances, lighting and cooking.

For development to achieve carbon neutrality (going further than the Council's policy requirement), developers will need to show that there is no net increase in carbon emissions resulting from the energy used in occupying the proposed building, including heating, hot water, cooking, lights and appliances. This will involve more intensive use of the measures described above and may well require connection to a local energy network.

The Council's forthcoming Allocations and Designations Plan will consider the scope for more ambitious climate change policy requirements to apply on individual sites allocated for development in the Plan. This will require the cooperation and enthusiasm of promoters of new sites. Where higher climate change requirements can be justified, this will facilitate higher sustainability credentials in comparison to other competing sites.

Good practice

This wind turbine at 53 North End, Bletsoe has a rated power output of 5 kW.



These photovoltaic roof tiles at Kingsway House, 13 Kingsway, Bedford have a rated power output of 1.25 kW.

Further Information

- Planning Policy Statement (PPS) 22 *Renewable Energy* and its companion guide contain information on renewable energy technologies.
www.communities.gov.uk
- The Building Research Establishment offers guidance on a variety of energy conservation measures, Building Regulation requirements, SAP and SBEM.
www.bre.co.uk
- The Energy Saving Trust offers advice on renewable energy, energy efficiency and conservation.
www.est.org.uk
- The Carbon Trust promotes low carbon technology and gives information on how to work out the carbon emissions associated with energy use.
www.thecarbontrust.co.uk
- Information on combined heat and power and community heating is available from the Combined Heat and Power Association.
www.chpa.co.uk
- The National Energy Foundation gives information on energy conservation, energy efficiency and renewable energy technologies.
www.nef.org.uk
- Information on product suppliers can be found from the Royal Institute of British Architects product selector website.
www.ribaproductselector.com
- English Heritage provides information on climate change and the historic environment.
www.english-heritage.org.uk/climatechange and www.climatechangeandyourhome.org.uk
- Information on woodfuel heating is available from the regional initiative Woodfuel East.
www.woodfueleast.org.uk

WASTE MINIMISATION

Waste that is generated as a result of development adds to the burden of existing waste that must be managed. Despite the efforts of many agencies, a large proportion of waste is still disposed of to landfill. This is harmful to the environment and a waste of resources. Developers are expected to follow the waste management hierarchy and incorporate facilities to minimise waste as part of development proposals both during construction and when subsequently occupied.

Minimum Standard

- Comply with the requirements set out in Bedfordshire County Council's *Managing Waste in New Developments* supplementary planning document. This provides guidance on reducing, recycling and recovering waste during the demolition, construction and occupation of developments. It requires the submission of a waste audit for major developments.
- Comply with the requirements set out in Appendix C to this document. New residential units should be provided with appropriate storage capacity for domestic refuse and recyclable waste which is convenient both for users and for collection.
- Provide a home composting unit for new residential units that have private gardens.
- Provide guidance prior to occupation to householders about composting, local refuse and recycling arrangements.
- Adhere to the waste hierarchy (prevention, minimisation, reuse, recycling, energy recovery and disposal as the least favoured option).
- Comply with the legal requirement to have a site waste management plan (SWMP) for all new construction projects worth more than £300,000.
- Ensure a registered waste carrier is used to convey any waste material off site to a suitable authorised facility.
- Comply with the Duty of Care regulations for dealing with waste materials. The developer as waste producer has a duty of care to ensure all materials removed go to an appropriate licensed disposal site and all relevant documentation is completed and kept in line with regulations.
- Obtain the appropriate exemption or authorisation from the Environment Agency if any waste is to be used on a site.

Going Further

- Prepare a waste audit for all developments.

How to achieve the standards

The minimisation of waste needs to be considered:

- during demolition and site clearance
- during construction
- when development is finally occupied.

Consideration should be given to re-using site preparation and demolition waste on-site as part of the new development or otherwise recycling it. Secondary and recycled construction materials should be used wherever possible as part of the development. The ordering of construction materials should be carefully monitored to avoid wasteful over-ordering.

A waste audit should be produced at an early stage in planning development proposals to demonstrate how waste will be minimised during implementation and occupation of the scheme. Bedfordshire County Council's *Managing Waste in New Developments* supplementary planning document adopted in April 2006 requires a waste audit for major developments (ten or more dwellings, and other developments over 1,000 square metres floorspace or 0.5 hectares). The principles of sustainable waste management are just as valuable for smaller developments, however and a waste audit should be considered for them also.

The design of developments should ensure that there is sufficient space for occupiers of completed schemes to store separated waste awaiting collection for recycling and disposal. Appendix C to this document contains guidance about the Council's requirements for refuse and recycling and ensuring that they are designed as an integral part of new residential development. Residential schemes with private gardens should also make provision for home composting units.

Further Information

- Bedfordshire County Council's *Managing Waste in New Developments* provides guidance on reducing, recycling and recovering waste during demolition, construction and occupation of new developments.
www.bedford.gov.uk
- The Construction Industry Research Information (CIRIA) publishes guidance on various construction issues, including aggregate recycling.
www.ciria.org.uk
- The Building Research Establishment in partnership with Sustainability East has produced a practical guide for small builders to help them reduce waste and operate more sustainably.
www.bre.co.uk/filelibrary/rpts/sustainable_construction_simpleways_to_make_it_happen.pdf
- More information and advice on the use of waste including waste management legislation, Duty of Care and required authorisations/exemptions can be found from the Environment Agency.
www.environment-agency.gov.uk/subjects/waste

WATER AND FLOODING

MINIMISING WATER USE

Climate change is likely to reduce rainfall and hence the ready availability of piped drinking quality water and could increase demand. It is important therefore to conserve water and reduce wastage. Furthermore, minimising the use of water reduces carbon emissions since there is an energy cost involved in treating and supplying water. It also reduces the amount of waste water produced and the need for infrastructure to deal with it. Developers are expected to incorporate facilities to minimise the use of water as part of development proposals, reducing water consumption. Incorporating water saving technologies that ensure efficient use of natural resources could also support the environmental benefits of a development and could help to attract investment to the area. Some of the following measures may overlap with the requirements of the Building and Water Regulations.

Minimum Standard

- Ensure that all development has a water meter installed.
- Provide water butts for new residential units that have private gardens prior to occupation.
- Commercial development that includes areas of landscaping will be expected to make appropriate provision for collecting rainwater.
- Wherever possible, specify low water use fittings and appliances.
- Provide guidance to householders on how to conserve water.
- Ensure that the design of buildings and their surrounding landscape maximises water efficiency and minimises water wastage.

Going Further

- Provide a rainwater harvesting and 'grey water' recycling system as part of the development.
- Ensure that the design of surface water drainage systems take into account expected future changes in rainfall.
- Assess the amount of water likely to be used during the construction and operation of any development and identify opportunities to use water more efficiently.
- Incorporate products and systems that detect leaking and burst pipes that either sound an alarm or shut off the water supply to reduce the amount of water wasted in a development.

How to achieve the standards

Water conservation can be achieved by incorporating water saving devices, using alternative water sources and by careful design of landscaping / garden areas.

Water saving devices

Water-efficient toilets

Toilets can account for a quarter of water-use in a typical household and more in non-domestic situations. Low-flush toilets and dual-flush toilets, which enable the flush to be varied depending on the amount of waste, reduce water usage.

Waterless urinals

These can replace existing flushing systems. They are most effective in buildings with high occupancy rates such as schools, offices and public buildings.

Taps

Spray and low-flow taps reduce the amount of water used. Self closing and infrared controlled taps ensure that water cannot be left running.

Showers

Showers (apart from power showers) generally use less water than baths. Low volume baths are also available. (Tapered or peanut shaped baths may provide more space for bathing with less water.)

Appliances

Where these are supplied by the developer rather than the occupier, low water use washing machines and dishwashers should be specified.

Meters

Although water meters do not themselves save water, by making the user more aware of the cost of supply they can reduce water wastage.

Alternative water sources*Rainwater harvesting*

This involves collecting rainwater from a building's roof and storing it in a tank, often underground. Such water, once filtered, can be used in toilet flushing, cleaning and washing. If used within the building it should be additional to the standard mains supply which is needed to provide drinking water and a backup. If used outside, it can take the form of a simple water butt. All buildings with gardens or landscaped areas that require regular maintenance should be provided with water butts fitted via a diverter to the rainwater down pipe. Such water can also be used in general cleaning and car washing.

Water recycling

'Grey water' (water that has already been used in hand basins, baths and showers) can be stored, filtered and disinfected, and then reused for toilet flushing, garden watering or car washing. It is also possible to recycle 'black water' (water used for toilet flushing and washing up) although this is more resource intensive. Both 'grey water' and 'black water' systems will require regular maintenance to ensure their ongoing quality and effectiveness. A separate standard mains supply will always be needed in addition to provide drinking water.

Groundwater

In some locations it may be feasible to source water from a borehole or river. Permission will be required from the Environment Agency

Landscaping and gardens

When considering detailed landscaping schemes as part of development proposals, careful consideration should be given to the design of gardens and landscaped areas to minimise the amount of water needed to maintain them but also to ensure that they can cope with episodes of heavy rain. Drought-resistant plants should be chosen as a preference and these should ideally be native species found locally. Set out plants and lawns as early in spring as possible as less watering is required than if planted in the summer. Where regular watering cannot be avoided, automatic drip irrigation systems can be efficient and plants should be watered in early morning or late evening to reduce evaporation. Water-retaining mulches, adding organic matter to the soil and using ground-cover plants can also help to retain moisture in the ground. Water should be obtained from water butts or recycled sources.

FLOODING

Climate change is predicted to increase the number of storms and heavy downpours of rain. Flash flooding can occur almost anywhere, especially in built-up areas with a high proportion of impermeable surface. Developers are expected to minimise the risk of flooding, including likely future flood risks.

Minimum Standard

- Use sustainable drainage systems (backed by management and maintenance provisions) wherever practical, justifying the use of conventional systems if they are not chosen.
- Avoid use of large areas of impermeable hard-surfacing.

Going Further

- Achieve 100% attenuation of the undeveloped site's surface water run-off.

How to achieve the standards

Government guidance in Planning Policy Statement 25 *Development and Flood Risk* advises on the types of development that are appropriate in areas at risk of flooding. The Environment Agency publishes flood risk maps showing these areas. When proposing development in areas at risk of flooding (Flood Zones 2 and 3) and development proposals of 1ha or greater in Flood Zone 1, it will be necessary to submit an individual flood risk assessment to show that the development will not add to, and should where practicable, reduce flood risk. Any new development should remain safe throughout the expected lifetime of the proposed development and it has to demonstrate that the development will not be at flood risk and that it will not have a negative impact on third parties, taking climate change into account.

Local flooding is exacerbated by surface water run-off. The rate of run-off can be reduced by avoiding large areas of impermeable hard-surfacing and using soft landscaping wherever possible. Sustainable drainage systems (SUDS) allow surface water run-off to be controlled as near to its source as possible. SUDS are an approach to managing surface water run-off, which seeks to mimic natural drainage systems and retain water on or near the site as opposed to traditional drainage approaches which involve piping water off-site as quickly as possible. SUDS offer significant advantages over conventional piped drainage systems in reducing flood risk by attenuating the rate and quantity of surface water run-off from a site, promoting ground water recharge and improving water quality and amenity. The variety of SUDS techniques available means that virtually any development should be able to include a scheme based around these principles. SUDS involve a range of techniques including the following.

Green roofs – the plants and their growing medium reduce the flow of rainwater from the roof due to absorption by the substrate, evaporation and transpiration. Green roofs can also provide valuable wildlife habitats.

Rainwater harvesting – the collection of water that would otherwise have gone down the drain, into ground or been lost through evaporation. Rainwater from roofs and hard surfaces such as car parks can be collected and stored for a range of non-potable uses.

Permeable paving – permeable concrete blocks, crushed stone, gravel, porous asphalt or other porous surfacing allows water to soak into the subsoil. Grass paving systems ('engineered grass') are particularly suitable for low-turnover car parking areas. They are almost self-maintaining if a suitable species of grass is used.

Infiltration trenches, basins and filter drains – these are essentially types of soakaway where rainwater is diverted to gradually infiltrate the ground.

Swales and detention basins – provide temporary storage for water, with some filtration and infiltration, reducing peak flows to drains. They can be designed as landscape features, providing opportunities for the creation of wildlife habitats.

Retention ponds and wetlands – enhance flood storage capacity and enable high levels of filtering through plants and algae. Ponds and wetlands can be fed by swales, filter drains or piped systems. Ponds can be designed to overflow into vegetated wetland areas which serve as a natural soakaway. As for swales and basins, they can provide opportunities to create wildlife habitats.

The suitability of different natural filtration methods depends on various factors, including surface water run-off rates, soil permeability, ground stability and topography in relation to the size and type of development. Sustainable drainage systems must therefore be designed to match the local geological and hydrological conditions. Soakage tests should be carried out to BRE365 standard to help determine the scope for infiltration on the site. The Environment Agency should be consulted regarding any SUDS requirements as early as possible. To ensure their continued successful operation, they must be properly maintained. The long term costs of maintenance need to be provided for the lifetime of the development. Responsibility for management and maintenance needs to be assigned to an appropriate party which, together with fully costed and funded proposals, will need to be agreed with the Council before planning permission is granted.

Woodland and other green infrastructure can help to reduce surface water run-off by slowing precipitation, binding soil to prevent erosion and expiring water to the atmosphere.

Protecting water quality

It is important to protect rivers and groundwater sources from pollution. SUDS can benefit water quality by removing pollutants from run off; SUDS return cleaner water to the environment compared to conventional drainage systems. Additionally, by reducing the peak flow of water in areas served by combined foul and surface water sewers, SUDS reduce the number of times sewer overflows operate and therefore there is less discharge of polluted water to watercourses.

There are other basic measures to be included within a development that can help to protect the water quality such as: prepare a drainage plan and mark manholes to prevent pollutants accidentally reaching surface water sewers; carry out any potentially polluting activities in designated, bunded areas away from rivers or boreholes and where possible with a connection to the main public foul sewer; use settlement ponds to remove silty water; store all oils and chemicals in a fully bunded area to prevent leaks or spills.

Good practice

This shows how sustainable drainage systems can be attractive in landscape terms as well as effective in dealing with surface water.



Further Information

- The Construction Industry Research Information (CIRIA) publishes guidance on various construction issues, including sustainable drainage systems.
www.ciria.org.uk
- The Environment Agency website contains information on flood risk, sustainable drainage systems and water abstraction.
www.environment-agency.gov.uk
- Planning Policy Statement (PPS) 25 *Development and Flood Risk* contains guidance on developing in areas at risk of flooding.
www.communities.gov.uk
- The Department for Environment, Food and Rural Affairs website contains information on the efficient use of water and on the *Water Supply (Water Fittings) Regulations 1999*.
www.defra.gov.uk
- Information on product suppliers can be found from the Royal Institute of British Architects product selector website.
www.ribaproductselector.com
- Advice regarding water saving technologies can be obtained from the Environment Agency.
www.environment-agency.gov.uk/savewater
- Further information on SUDS can be found in: PPS25 Annex F; PPS25 Practice Guide; the CIRIA C522 document *Sustainable Drainage Systems – design manual for England and Wales*; the CIRIA C697 document SUDS manual; the Interim Code of Practice for Sustainable Drainage Systems, which provides advice on design, adoption and maintenance issues and a full overview of other technical guidance on SUDS.
- The Environment Agency has published a series of Pollution Prevention Guidelines which any development must comply with.
www.environment-agency.gov.uk/ppg

ADAPTING TO CLIMATE CHANGE

Dealing with climate change means more than just reducing greenhouse gas emissions. Our climate is changing and will continue to change even if emissions are significantly reduced now. Therefore we must adapt to effects that cannot be avoided.

Our present built environment has evolved partly in response to a relatively stable climate, but historic climate data can no longer be considered to be reliable grounds for decision-making. Designing buildings to be energy efficient now does not mean that they will still be efficient in 20 years' time when temperatures are higher and weather more volatile.

The *Going Further* actions throughout this document illustrate how developers can take steps towards future proofing their developments against expected further changes in climate.

Minimum Standard

- Design development that adapts to and mitigates expected changes in climate.
- Design buildings for flexible use during their expected lives.
- Design-in facilities for bicycles and electric vehicles.
- Ensure that future phases of major developments which take several years to build-out are able to keep step with the most up-to-date sustainability requirements.

How to achieve the standards

With continuing climate change we can expect extreme events and changes in long-term climatic conditions, including:

- Rising temperatures and increasing risk of heat waves.
- Changing rainfall patterns with wetter winters, more intense downpours and drier summers.
- Increasing risk of drought and flood.
- Increased intensity and frequency of storms.

Development should take account of the expected changes in climate over its expected lifetime or be capable of adaptation. Conflicts between adaptation and mitigation should be avoided such as when inappropriate cooling measures in buildings may increase demands for energy.

Whilst there is uncertainty over future economic, social and environmental demands, and technological advances, it makes sense to design buildings (and their heating, lighting and ventilation systems) flexibly so that they can be adapted and updated and so that they do not become obsolete. Flexible space created by the use of non-load bearing partitions means that buildings are capable of being used for different purposes. Provision should also be made for incorporating renewable energy generation in the future. The inclusion of green spaces and trees as part of development can reduce heat around buildings whilst also giving opportunities to encourage people to walk or cycle and enhance local biodiversity. Trees can also provide shelter from cold winds, thus reducing the need for heating.

In the future, transport is increasingly likely to be less dependent on fossil fuels such as oil. Facilities can be designed-in to new developments to support different transport modes such as the provision of secure cycle parking and charging points for electric vehicles. Showers and changing facilities should be provided in non-residential buildings to encourage cycling.

Major development schemes may take several years to build-out, during which time minimum sustainability standards set in policy may become outdated. Where planning permission is given for such development it would be appropriate for the Council to negotiate appropriate mechanisms to ensure that future phases of the development are able to keep step with the most up-to-date requirements.

Further Information

- UK Climate Impacts Programme offers information on the potential national and regional impacts of predicted climate change.
www.ukcip.org.uk

SUSTAINABLE CONSTRUCTION CODES

Following a sustainable construction code is a useful means of ensuring that a development takes account of a range of sustainability factors, including those described in this guidance document. The *Code for Sustainable Homes* is specifically aimed at new dwellings, whereas the Building Research Establishment's Environmental Assessment Method (BREEAM) covers other types of development. The Government is considering introducing a national code for non-residential buildings to replace BREEAM.

The benefits of using independent environmental assessment methods to rate new developments include:

- helping to meet the various sustainability requirements of planning authorities
- demonstrating environmental credentials to investors, thus minimising investment risk
- making customers aware of environmental advantages such as reduced running costs.

Minimum Standard

- Meet the national standards for building performance set by the current Building Regulations.

Going Further

- All residential development to achieve a *Code for Sustainable Homes* rating which would exceed the requirements of the current Building Regulations.
- All non-residential development to achieve a BREEAM rating which would exceed the energy requirements of the current Building Regulations.

How to achieve the standards

The *Code for Sustainable Homes* provides a national standard for designing and constructing sustainable homes. It also involves an independent assessment, which gives new homes a star rating from 0 to 6 based on their sustainability against a variety of categories including: energy, construction materials, waste, water and ecology. To achieve a star rating there is a mix of minimum standards plus the ability to obtain points for additional sustainable design features. The sustainability of a new home is assessed independently by specially trained and accredited assessors. There is a design stage assessment and then a post completion check to verify the rating.

The Government's *Building a Greener Future Policy Statement* of 2007 aims to ensure that all new homes built after 2016 will have zero net carbon emissions from all energy uses, with interim targets to reduce emissions regulated by Building Regulations by 25% at 2010 and 44% at 2013. These are equivalent to the energy requirements of a 3 star and 4 star rating of the *Code for Sustainable Homes* respectively, with zero carbon being equivalent to a 6 star rating.

The *Code for Sustainable Homes* is derived from *EcoHomes*, the Building Research Establishment's Environmental Assessment Method (BREEAM) for residential development, which it replaced. BREEAM can also be applied to other types of development, including offices, retail, industrial buildings and schools. Other building types, such as leisure facilities, can be assessed using a bespoke version of BREEAM. The method of assessment for BREEAM is similar to that for the *Code for Sustainable Homes*, but ratings are awarded as 'pass', 'good', 'very good' or 'excellent'. A software tool to assist with the assessment is available from the Buildings Research Establishment.

The Council's forthcoming Allocations and Designations Plan will consider the scope for more ambitious climate change policy requirements to apply on individual sites allocated for development in the Plan.

Further Information

- Code for Sustainable Homes
www.planningportal.gov.uk
- BREEAM
www.bre.co.uk

SUSTAINABILITY STATEMENT AND ENERGY AUDIT

The purpose of a sustainability statement is to demonstrate how the proposed development has taken account of climate change and other sustainability issues. Designing for sustainability will affect site layout, form and building design. It therefore needs to be considered from the very start of a project. The preparation of a sustainability statement will assist a developer in making a scheme as sustainable as possible, ensuring that the minimum requirements of the Council's policy as set out in this guidance document have been met and, where appropriate, exceeded.

A sustainability statement (including an energy audit where appropriate) should be submitted with all planning applications for built development. The statement will be used by planning officers in their assessment of the planning application. A condition may be imposed requiring the submission of further information at a later stage.

Minimum Standard

- All planning applications for built development must be accompanied by a sustainability statement.
- The sustainability statement should include an energy audit where there is a requirement to demonstrate a reduction of carbon emissions.

How to achieve the standards

Sustainability Statement

The sustainability statement need not necessarily be a long document provided that all of the topics covered in this guidance document are addressed. The sustainability statement should include the following matters:

- pollution and air quality
- building design and layout
- construction materials
- carbon emissions and energy efficiency (including an energy audit where required – see below)
- waste
- minimising water use
- flooding and surface water drainage
- adapting to climate change.

If the relevant information is present elsewhere in the application documents, for example in a design and access statement when one is required, this should be cross-referenced rather than repeated. Where an aspect is not considered to be relevant, this will need to be justified. In addition and where appropriate, other features of the proposed development that contribute to its sustainability should be referred to in the sustainability statement. These may include: the efficient use of resources and infrastructure (including land), biodiversity, transport, and social or economic benefits.

Precise details of some of the matters to be covered in the sustainability statement, for example construction materials, may not be known at the planning stage, particularly if an outline planning application is being submitted. In such cases the sustainability statement should consider how the guidance contained in this supplementary planning document can be taken into account in the detailed design of the proposed development. Where it is appropriate to do so, conditions may be used to ensure that features referred to in the sustainability statement are actually delivered as part of the development.

Energy Audit

The sustainability statement should also include an energy audit if a specified reduction of carbon emissions is to be demonstrated (for example, if it is a requirement of planning permission). The audit should assess likely energy demand from the development, consider the feasibility of techniques for reducing energy consumption, increasing energy efficiency and renewable energy technologies, and set out the extent to which they reduce carbon emissions. It should set out a comparison between the carbon emissions of a 'do nothing' approach ie simply meeting Building Regulations, and the proposed package of measures which aim to achieve the specified percentage reduction in carbon emissions.

Calculation of carbon emissions can be undertaken using either:

- i) the London Renewables Toolkit, or
 - ii) the Building Research Establishment's assessment tools Standard Assessment Procedure (SAP) or Simplified Building Energy Method (SBEM), or
 - iii) the *Code for Sustainable Homes* or the relevant Building Research Establishment Environmental Assessment Method (BREEAM) for non-residential buildings.
- i) The Greater London Authority's Renewables Toolkit will generally be used for larger developments. Using the standard tables available, calculate the predicted gas and electricity requirements for the building using the following method:
- 1) Estimate the predicted carbon emissions of the building using the energy efficiency guides as a baseline.
 - 2) Identify the kilowatt hours per annum per square metre and multiply by the square metreage of the development.
 - 3) Convert into kgCpa using current Building Regulation figures:
For gas: multiply the total kWhpa by 0.19
For electricity: multiply the total kWhpa by 0.43.
 - 4) Add the two carbon figures together and divide by 10. The resultant figure is the target for reduction to be achieved using renewables, low carbon or improving the thermal performance of the building.
- ii) Under the Building Regulations a developer will be required to assess the building's energy performance using the Building Research Establishment's assessment tools Standard Assessment Procedure (SAP) for residential buildings and Simplified Building Energy Method (SBEM) for non-residential buildings.

Using the SAP and SBEM tools, the designer can set out a comparison between the carbon emissions of a 'do nothing' approach i.e. just meeting Building Regulations, and an approach which aims to achieve at least a 10% reduction in carbon emissions below the normal requirement of the Building Regulations. This will result in two reports - one illustrating the 'do nothing' and the second one illustrating the improved thermal values and plant to achieve the minimum 10% saving.

To demonstrate the comparison in practice, carbon emissions are capped by setting a proposed dwelling emission rate (DER) or building emission rate (BER) for the design, measured in kgC/m²/year, which should be at least the specified percentage below the predicted target emission rate for the notional building design (TER) as required by Building Regulations. The DER / BER is calculated by:

1. Modelling a notional building with the same size, shape and use as the proposed building, with standard Building Regulation energy performance values (the TER).
2. Energy efficiency improvements and low or zero carbon energy source factors are then applied to the notional building to calculate the emissions reduction required from the notional building (the DER / BER).

Building Regulation Approved Document Part L gives guidance on calculations. Expert advice from suitably qualified practitioners may be required.

- iii) If the developer is intending to build a residential property to meet the standards set out in the *Code for Sustainable Homes*, then a code assessment that achieves Level 1* is likely to meet the current minimum requirements of the Council's policy. For non-residential buildings, a report prepared by a BREEAM licensed assessor demonstrating a minimum 10% reduction in carbon emissions below the current requirement of the Building Regulations is likely to be acceptable.

An example of a typical energy audit using the London Renewables Toolkit is provided at Appendix A to this document. To comply with the requirements of Policy CP26 the developer should provide a detailed statement/report, prepared by a qualified and government accredited/licensed energy assessor, to accompany the planning application which definitively demonstrates how the requirements will be met. It should be noted that this may have implications in terms of land use allocation, access, noise and other issues which will need to be addressed through supporting application documents.

Larger developments involving phased delivery of housing and non-residential development should definitively explain as part of the planning application any phased approach to the delivery of decentralised and renewable or low carbon energy provision. The Council's local validation list provides further guidance on which planning applications are affected. If you are in any doubt as to whether your development requires a report by a qualified or accredited/licensed assessor, or the contents of a statement please contact the Planning Services Unit.

Green tariff electricity supplied from the national grid is not counted towards the consideration of a scheme's ability to meet policy requirements. It should be borne in mind that the above information on energy audits only relates to energy use regulated by Building Regulations and ignores the substantial emissions that result from electrical appliances, lighting and cooking. Separate methods are needed to account for emissions from these sources, although this only becomes important when seeking to achieve the energy requirements associated with higher ratings of the *Code for Sustainable Homes*.

To ensure that the sustainability and energy measures proposed as part of development are carried out, planning permission will be subject to appropriate conditions. With the planning guidance now available and established policies, energy should be fundamental to any new development proposal. Sustainability statements and energy audits submitted with outline planning applications should set the context for detailed proposals at reserved matters stage. They should consider the range of approaches that may be employed and how they affect the scheme. Further detailed information will then be required to be submitted at a later stage.

In relation to energy audits, it will be necessary to submit a copy of the post-completion Energy Performance Certificate required by the Building Regulations, prepared by an accredited assessor to demonstrate the actual energy consumption / carbon emissions of a completed building. Whilst a number of organisations currently offer energy assessment services, to ensure the impartiality and quality of the assessment an Energy Performance Certificate can only be issued by an energy assessor who is both qualified by appropriate qualifications and a member of an accreditation scheme approved by the Secretary of State. Such assessors will have a *duty of due diligence* to provide impartial reports. Such accredited schemes include:

- The Chartered Institution of Building Services Engineers (CIBSE) accredited Low Carbon Consultant
- The Code for Sustainable Homes Assessors
- Licensed BREEAM Assessors.

To ensure that Energy Performance Certificates relate to buildings as actually constructed, the Council may check the submitted information against the drawings approved by the local authority building control service or other approved inspector.

Model planning conditions that the Council may use are attached as Appendix B to this document.

Further Information

- Information about the principles of sustainable development and how to work out the carbon emissions associated with energy use is contained in the Department for Environment, Food and Rural Affairs web site.
www.defra.gov.uk
- The Building Research Establishment offers guidance on a variety of energy conservation measures, Building Regulation requirements, SAP and SBEM.
www.bre.co.uk
- The Carbon Trust promotes low carbon technology and gives information on how to work out the carbon emissions associated with energy use.
www.thecarbontrust.co.uk
- The Building Regulations can be viewed on the Planning Portal web site
www.planningportal.gov.uk/england/professionals/en/1115313971412.html
- The London Renewables Toolkit *Integrating renewable energy into new developments: Toolkit for planners, developers and consultants, September 2004* gives advice on (amongst other things) calculating carbon emissions from a building (standard tables estimating energy use for different building types are given on pages 107 - 109).
www.london.gov.uk/mayor/environment/energy/docs/renewables_toolkit.pdf

APPENDIX A

ENERGY AUDIT EXAMPLE

The proposal consists of the installation of a vertical axis turbine within the car parking and loading area of the proposed development. This is illustrated on drawings 001 and 002.

The site is located in an elevated part of the Borough which lends itself to wind energy creation. Wind speeds are thought to be in the region of 7 metres per second. The table below sets out how the requirements of Policy CP26 have been calculated. The figures and methodology are taken from the London Renewables Toolkit.

Development: B1 industrial manufacturing building 565 sq m in area

Predicted carbon emissions for B1 manufacturing building (Kwh/m ² /year)	Gas – 175 Electricity – 43
Kilowatt hours x square metre of building	175 x 465sq m = 81375 (G) 43 x 465sq m = 19995 (E)
Convert into kg/ C/pa Gas (x 0.19) Electricity (x 0.43)	(G) 15461 (E) 8598
TOTAL	24059
10% total	2405 kg/ C/pa
Reduction method: 1 x vertical axis turbine each averaging 8000 Kwh per year	5000 kg/ C/pa
TOTAL carbon saving	20.7%

APPENDIX B

MODEL PLANNING CONDITIONS

Energy Audit – Outline Applications

(1 - 49 dwellings or 500 - 999 square metres non-residential development)

Prior to or concurrently with the submission of any reserved matters application an energy audit shall be submitted to and approved in writing by the Local Planning Authority. The energy audit shall include:

- An assessment of the predicted carbon emissions of the development once occupied.
- A review of alternative methods for reducing the predicted carbon emissions of the development by a minimum 10% once occupied and their anticipated effectiveness of those measures in meeting that objective.
- Proposals for measuring the effectiveness of the favoured methods as proposed for reducing the predicted carbon emissions of the development by a minimum 10% once occupied.
- A reasoned statement of how the layout, orientation, design and materials used in the construction of the development will affect the consumption and use of energy.

The development shall be carried out in accordance with the proposals of the approved energy audit.

Reason: To ensure an energy efficient and sustainable development in accordance with Policy ENG1 of the East of England Plan, Policy CP26 of the Bedford Core Strategy & Rural Issues Plan, Policy BE8 of the Bedford Borough Local Plan 2002 and Bedford Borough Council's adopted *Climate Change and Pollution* supplementary planning document.

Energy Audit – Outline Applications

(50+ dwellings or 1000+ square metres non-residential development)

Prior to or concurrently with the submission of any reserved matters application an energy audit shall be submitted to and approved in writing by the Local Planning Authority. The energy audit shall include:

- An assessment of the predicted energy consumption of the development once occupied.
- A review of alternative methods for reducing the predicted carbon emissions of the development by a minimum 10% once occupied (by measures which shall include the supply of at least 10% of predicted energy consumption from decentralised and renewable or low-carbon energy sources) and the anticipated effectiveness of those measures in meeting that objective.
- Proposals for measuring the effectiveness of the favoured methods for achieving the supply of at least 10% of energy consumption from decentralised and renewable or low-carbon energy sources once occupied.
- A reasoned statement of how the layout, orientation, design and materials used in the construction of the development will affect the consumption and use of energy.

The development shall be carried out in accordance with the proposals of the approved energy audit.

Reason: To ensure an energy efficient and sustainable development in accordance with Policy ENG1 of the East of England Plan, Policy CP26 of the Bedford Core Strategy & Rural Issues Plan, Policy BE8 of the Bedford Borough Local Plan 2002 and Bedford Borough Council's adopted *Climate Change and Pollution* supplementary planning document.

Energy Audit – Full Applications

(1 - 49 dwellings or 500 - 999 square metres non-residential development)

The development shall not be commenced until an energy audit has been submitted to and approved in writing by the Local Planning Authority. The energy audit shall include:

- An assessment of the predicted carbon emissions of the development once occupied.
- A review of alternative methods for reducing the predicted carbon emissions of the development by a minimum 10% once occupied and the anticipated effectiveness of those measures in meeting that objective.
- Proposals for measuring the effectiveness of the favoured methods as proposed for reducing the predicted carbon emissions of the development by a minimum 10% once occupied.
- A reasoned statement of how the layout, orientation, design and materials used in the construction of the development can affect the consumption and use of energy.

The development shall be carried out in accordance with the proposals of the approved energy audit.

Reason: To ensure an energy efficient and sustainable development in accordance with Policy ENG1 of the East of England Plan, Policy CP26 of the Bedford Core Strategy & Rural Issues Plan, Policy BE8 of the Bedford Borough Local Plan 2002 and Bedford Borough Council's adopted *Climate Change and Pollution* supplementary planning document.

Energy Audit – Full Applications

(50+ dwellings or 1000+ square metres non-residential development)

The development shall not be commenced until an energy audit has been submitted to and approved in writing by the Local Planning Authority. The energy audit shall include:

- An assessment of the predicted energy consumption of the development once occupied.
- A review of alternative methods for reducing the predicted carbon emissions of the development by a minimum 10% once occupied (by measures which shall include the supply of at least 10% of predicted energy consumption from decentralised and renewable or low-carbon energy sources) and their anticipated effectiveness of those measures in meeting that objective.
- Proposals for measuring the effectiveness of the favoured methods for achieving the supply of at least 10% of energy consumption from decentralised and renewable or low-carbon energy sources once occupied.
- A reasoned statement of how the layout, orientation, design and materials used in the construction of the development can affect the consumption and use of energy.

The development shall be carried out in accordance with the proposals of the approved energy audit.

Reason: To ensure an energy efficient and sustainable development in accordance with Policy ENG1 of the East of England Plan, Policy CP26 of the Bedford Core Strategy & Rural Issues Plan, Policy BE8 of the Bedford Borough Local Plan 2002 and Bedford Borough Council's adopted *Climate Change and Pollution* supplementary planning document.

Energy Statement

(all dwellings or 500+ -square metres non-residential development)

Prior to the occupation of any buildings, an energy statement shall be submitted to and approved in writing by the Local Planning Authority. The energy statement shall include:

- An assessment of the actual effect on carbon emissions of the measures previously agreed as part of the energy audit.
- Offer observations of how and why any measures previously approved within that energy audit have failed to meet or have exceeded expectations and including proposals to make good any shortcomings.
- A statement of how the layout, orientation, design and materials used in the construction of the development have actually been influenced by the energy audit.

Reason: To ensure an energy efficient and sustainable development in accordance with Policy ENG1 of the East of England Plan, Policy CP26 of the Bedford Core Strategy & Rural Issues Plan, Policy BE8 of the Bedford Borough Local Plan 2002 and Bedford Borough Council's adopted *Climate Change and Pollution* supplementary planning document.

APPENDIX C

REFUSE ARRANGEMENTS IN NEW HOUSING

Advice to developers, architects and designers on best practice when designing refuse and recycling facilities for new residential development



A well designed communal bin store on the frontage of a residential development



A simple, neat and commercially available "Three Wheelie" front garden store for an individual household

As Waste Collection Authority, Bedford Borough Council requires each householder to manage and take responsibility for their own domestic refuse and sorting of their recycling at source. It is important that future residents can do this easily, conveniently and in a way that does not adversely affect the residential environment of any new dwelling, its near neighbours or the area as a whole. The principle of ensuring that all new dwellings are provided with adequate storage for solid wastes has been incorporated into the Building Regulations. Bedford Borough Council has powers under Section 46 of the Environmental Protection Act 1990 to stipulate the level of storage for refuse and recyclables that should be provided to serve each new dwelling in the Borough. The planning policies of the development plan in relation to waste are material considerations in the decision to be made about any planning application for new homes within the Borough.

This Appendix supplements the Building Regulations and outlines those functional requirements of the Council as Waste Collection Authority.

Ease of Use and Ease of Collection

The Council's contractors will only collect refuse containers from a point immediately adjacent to a public highway where the collection vehicle can safely pause while loading. The Council's contractors will not enter a private road unless a prior legal agreement has been entered into which indemnifies the Council against structural or other damage from manoeuvring the large and usually heavy laden vehicle (typically 32 tonnes GVW). If the proposed road is to be adopted as a public highway then access for vehicles will be straightforward, provided that there is adequate turning space. Refuse collection vehicles should be able to turn safely even when the highway turning area is being misused for the parking of residents' or visitors' cars. This may involve a vehicle turning area of more than minimum dimensions. Any archway above the carriageway must safely accommodate refuse vehicles which are 11.8 metres long; 2.53 metres wide and 4 metres high.

Refuse storage serving dwellings on any private road should be located conveniently within the private curtilage of each dwelling - but with a separate and safe bin collection point or 'area' allocated for use on collection days next to the nearest public highway. Collection points should not be more than 10 metres from a suitable stopping place for the refuse collection vehicle. That allocated collection point should be clear of the footway or any pedestrian route to and from any dwelling.

For the safety and convenience of residents when placing refuse containers ready for collection, a hard surfaced pathway from the refuse store to the safe collection point should be at least 1.2 metres wide and as near level as possible. If larger 'Eurobins' are to be used then there should be a dropped kerb at the highway edge to allow their easy movement. Steps or other hazards to ease of movement should be avoided.

Storage and collection if using a communal bin store



Individual or communal bins should never be stored more than 30 metres from the dwelling which they serve (excluding stairs or lifts in flatted developments). Any individual or communal bin store should be not more than 25 metres from the safe collection point mentioned above. In many cases a legal agreement will be required to allow access to private roads in order to meet this standard.

Although individual residents are able to place smaller wheeled bins ready for collection, no reliance should be placed on individual householders to move the larger 'Eurobins' generally used in communal bin stores.

Amount of Bin Storage to Provide

Any self contained dwelling that does not rely on a communal bin store should provide an allocated space to store three x 240 litre "wheelie" bins as follows:

- 240 litres of refuse bin capacity – black bin
- 240 litres of compost bin capacity – green bin
- 240 litres of recyclables bin capacity – orange bin.

This will occupy a discretely located space of about 0.8 x 2.1 metres. Ideally further space should be available to meet any future requirements for storage of separated recyclables. Individual dwellings should store bins externally but away from the visible public domain such as in the rear garden, but with easy access to the highway edge.

Whenever possible, new homes that have a garden should also be provided with physical capacity for self-composting and advice should be provided to householders on how best to compost their household and garden wastes.

Where it is not practical to provide separate bins for each household, for example in blocks of flats, provision may be made communally for shared 'Eurobins' to accommodate both waste and recyclables. The volume of bin storage should be calculated at the rate of 240 litres of storage for refuse and a further 240 litres of storage of recyclables for each dwelling proposed. Larger bins having a volume of 1100 litres will occupy a space of about 1.1 x 1.4 metres - plus space for residents to access them and to allow easy removal and replacement after collection. Bins for refuse and bins for recyclables should be clearly and visibly distinguished. Larger wheeled Eurobins must be stored near to a safe highway collection point and with no reliance on householders to move such heavier containers ready for collection.

Location, Construction and Appearance

In flatted development refuse stores are best integrated into the ground floor of the building where they are easily accessible to residents, outside the external door, but without leaving the building and where they are likely to be better managed by users. Bins will only be collected from a collection point near the highway edge (but clear of any footway), and the selection of bin size and the route to and from a collection area at the highway edge should allow for safety and ease of use.

Individual dwellings with access to ground level should ideally be provided with storage located away from the public realm or street scene. Bins can then be placed at a designated collection point on collection days. A safe and designated area should always be incorporated into the design for the placing of residents' bins which is clear of any footway or carriageway. Alternatively, attractive bin storage might be integrated into the frontage of the development in those locations where it is appropriate to do so. (See the two illustrations on the first page of this Appendix and also the requirement of Regulation H6; paragraph 1.17 of the Building Regulations Approved Document.)

If the placing of bins for collection involves moving them through a garage or other outbuilding, then subsequent alterations which prevent easy bin placement on collection days might involve bins being permanently placed in the front garden. The fact that bins might become an unsightly addition to the street scene could make such alterations unacceptable. (See Section 23(3) and 23(4) of the Building Act 1984.)

The design of refuse storage facilities can have an adverse impact on the character of existing buildings, streets and spaces. This is particularly the case in conservation areas and near listed buildings. For this reason purpose-built external bin enclosures need careful design as an integral part of the residential environment as a whole. Designers should never add them merely as an afterthought. They and the activity associated with them should be at a neighbourly distance from the habitable windows of any nearby dwelling and should not form the foreground view from any dwelling, including pre-existing dwellings nearby. Communal bin stores should be of durable construction with roof, external materials, scale and location to complement the proposed development and the street or neighbourhood as a whole. Apart from their appearance within a street, bins should not be visible from the upper part of any nearby buildings, so communal bin stores should generally have a roof. They should be well ventilated and secure, preferably in shade if not provided with a roof and with a paved floor and drainage to facilitate periodic cleansing. Doors should incorporate self closures to prevent access by foraging animals and small children.

The size of enclosure should provide space for the required number of individual wheeled bins or larger Eurobins, plus space for them to be easily accessed by residents and routinely manoeuvred to and from the safe collection point.

The Council will provide 240 litre wheeled bins but developers are responsible for providing any of the larger Eurobins, clearly marked and labelled for refuse or recyclables, when those are proposed as an alternative.

Management of Bin Stores

Communal refuse stores or external enclosures have the potential to become unsightly and a nuisance if they are not adequately managed. Many residential developments have a management company for maintenance of communal areas and grounds. The *Code for Sustainable Homes* has a mandatory requirement that a private contractor must be appointed. It is important that where an individual household is not responsible for managing its own bin storage then some organisation or known individual has responsibility for routinely maintaining and cleansing communal refuse facilities and, for example, placing the appropriate bins out for collection each week. Careless misuse of a bin store may well constitute 'fly tipping' which is an offence.

If kept reasonably clean like any other part of the home, then refuse and recycling bins should not present any hazard to health or amenity. Individual households and their neighbours should be able to sort and manage their own refuse and recyclables in a safe, secure and convenient way. Communal bin stores introduce additional management issues in how that is to be achieved. Designers and developers are responsible for overcoming those issues in a way which is convincing to the local planning authority and which will persuade future householders to follow best practice in maximising the reduction, recycling and management of their own refuse.

Annotated and detailed drawings submitted for planning permission should clearly show what arrangements are to be made for bin storage, collection points and bin collection in any new residential development.

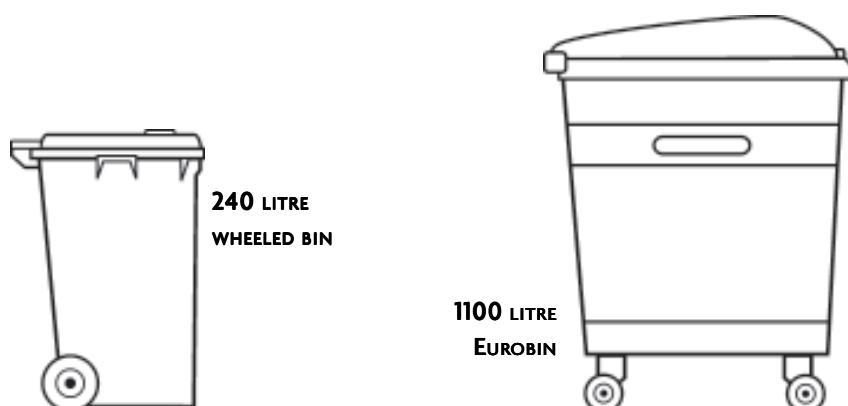
Checklist for Designers and Developers

- Have you calculated the correct amount of refuse and recyclables capacity for each household in the development?
- Will households be responsible for their own wheeled bins or will there be communal bins clearly marked for refuse and recyclables?
- On a day to day basis, will bins be located conveniently for householders to use but out of sight from the public realm and the street scene?
- Where will bins be placed on collection days and will that obstruct any entrance paths, public footways or highways?
- Who will place them out on collection days and return them after emptying?
- Who will be responsible for cleansing and maintenance of any communal bin store? How will future residents know who to complain to?
- Finally, are you going to explain to new residents about local refuse and recycling arrangements as part of any sales “Welcome Pack”? *How will they know how to make best use of refuse and recycling facilities unless somebody tells them?*

Size of Refuse Containers

240 LITRE WHEELED BIN - 590 mm wide x 740 mm deep x 1070 mm high (1800 mm high with lid open)

1100 LITRE EUROBIN - 1380 mm wide x 1090 mm deep x 1470 mm high (2700 mm high - lid open)



Contacts

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