Stratford-on-Avon District Local Development Framework

Sustainable Low-Carbon Buildings

Supplementary Planning Document

STRATFORD-ON-AVON DISTRICT COUNCIL

OCTOBER 2007

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A large print copy, electronic copy or more copies of this publication are available on request from Planning Services

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SUSTAINABLE LOW-CARBON BUILDINGS SUPPLEMENTARY PLANNING DOCUMENT

Front cover, middle photo: These newly built homes at Lighthorne Heath, in the Stratford-on-Avon District, are heated by Ground Source Heat pumps and are built to Ecohomes Very Good standard (Photo credit: South Warwickshire Housing Association).

PART A: REQUIREMENTS AND PROCEDURES

1. INTRODUCTION

1.1. Purpose of the SPD

1.1.1. Tackling climate change is a Government priority, and reducing the carbon emissions of new development has been identified as fundamental in achieving UK targets for carbon emission reduction[1]. The purpose of this Supplementary Planning Document (SPD) is to respond to the government's climate change agenda. It provides detailed guidance on how Stratford-on-Avon District Council will implement aspects of adopted policies in the Local Plan which require sustainable construction, particularly Policy DEV.8 which promotes energy conservation and the use of renewable energy in new development. It also highlights the need to provide sustainable drainage systems and water conservation measures. These will become increasingly important as climate change increases the incidence of extreme weather, both storms and flooding and periods of drought.

1.1.2. When buildings are constructed they will need to be fit to withstand predicted harsher climate conditions and to meet increasingly challenging Building Regulations. This SPD hopes to raise awareness of these issues so that good design can be achieved which takes all these considerations into account from the beginning.

1.1.3. This SPD focuses specifically on measures for new development associated with the layout, orientation, landscaping and design of new buildings, and the potential for providing some of the remaining energy needs through on-site renewable generation of energy. The SPD does not set out detailed technical requirements for the fabric and construction of the building. Instead it seeks to ensure that all applicants are aware of the Building Regulations standards to which they will be required to build at the expected time of construction.

1.1.4. The SPD sets out procedures which will be followed in determining planning applications which will:

- Ensure consideration of energy efficient design and layout, and sustainable drainage systems, at pre-application or early stage of all planning applications, and achieve good practice in all approved schemes;
- Ensure at pre-application or an early stage of all planning applications that applicants are aware of the increasing Building Regulations standards for energy efficiency and have considered how to meet or exceed them; and
- Ensure that at least 10 % of the predicted carbon dioxide emissions from energy use for all development over a set threshold size will be replaced by on-site renewable energy generation.
- Encourage sustainable good practice including climate resilient design, low-energy materials, adaptable design and the Code for Sustainable Homes.

[1] Draft PPS1 Planning and Climate change (CLG, 2006) p.10 section 2

1.2. Status of this SPD

1.2.1. This Supplementary Planning Document forms part of Stratford-on-Avon District Council's Local Development Framework.

1.2.2. A draft SPD was prepared with input from District Councillors on the Environmental Sustainability Panel, Local Agenda 21 and Local Strategic Partnership Environment members together with key council officers. The Planning Portfolio-holder approved the draft document as the basis for public consultation.

1.2.3. The document was published for public consultation for a six week period between 5th July and 16th August 2007. Over 1000 organisations, district councillors, and parish councils were notified by letter of the consultation.

1.2.4. The responses to the consultation were reported to Executive on 1st October 2007. A statement of consultation detailing the consultation carried out, comments received, and changes made in response, is available on the Council's website www.stratford.gov.uk or on request from the Planning policy team.

1.2.5. The SPD was adopted by Executive on 1st October 2007.

1.2.6. The procedures set out in this SPD will be applied to all planning applications received from 1st January 2008.

1.3. Policy background

1.3.1. The Government's objective is to cut the UK's carbon emissions by 60% by 2050 with real interim progress towards this by 2020. The Government has recently produced several draft documents setting out significant measures to tackle climate change through Planning and Building Control.

1.3.2. **Code for Sustainable Homes** (Dec 06). The Code covers all aspects of a sustainably built home, including energy, water, materials, and waste management. Properties can receive a rating from 1 to 6 stars, with the entry level of 1 star already higher than current conventional building standards. The Code is available now, and it will soon be compulsory for all new houses to be assessed against the Code and the information to be available for house buyers, although it will not be compulsory for houses to meet any level of the Code. From now on, all new homes built by Registered Social Landlords or others with Housing Corporation funding will have to comply with Level 3 of the Code.

1.3.3. **Building a Green Future: Towards Carbon Zero Development** (draft Dec 06) sets out the Government's ambition to achieve zero carbon emissions in all new housing development by 2016. This will be achieved by significantly increasing the energy efficiency and renewable energy standards required by Building Regulations. In 2010 Building Regulations will require all new homes to be 25% more energy efficient. The role of Planning in achieving zero carbon emissions is in encouraging the provision of low carbon and renewable sources of energy, and consideration of energy efficiency in design, layout and orientation.

1.3.4. **Planning Policy Statement: Planning and Climate Change, Supplement to PPS1** (draft Dec 06) requires local planning authorities to include strong new policies in their Local Development Framework to achieve reductions in carbon emissions. In particular local planning authorities should require a significant proportion of the energy needs of substantial new development to come from low-carbon renewable sources, from either on-site or local decentralised systems. They should expect applicants to use landform, layout, building orientation, landscaping, massing of buildings, and density to minimise energy consumption, including maximising cooling in the summer.

1.3.5. **Consultation on Site Waste Management Plans for the Construction Industry** (DEFRA April 2007) sets out intentions to make Site Waste Management Plans a statutory requirement for all construction projects valued over £250,000 from 2008.

1.3.6. The West Midlands Regional Energy Strategy (2004) sets a target for renewable energy to produce 5% of the region's use by 2010 and 10% by 2020. This is lower than national targets set in the **UK Climate Change Programme** (2006) because of the relative lack of opportunities for large scale renewable generation.

1.3.7. Warwickshire Climate Change Strategy; Thinking global, acting local (June 2006). Stratford District Council is one of the many public and private organisations who have committed to the Strategy's overarching aim 'To reduce greenhouse gas emissions in Warwickshire to at least the levels set out by National Government, 15-18% by 2010 and 60% by 2020 (against 1990 levels)'. An Energy Early Action is 'Through the planning system promote on-site renewable energy generation of at least 10% in all new developments'.

1.3.8. **Policy DEV.8 of the Stratford-on-Avon District Local Plan Review 2006** expects that the layout and design of new development will minimise the amount of energy resources consumed in its occupation and use by taking account the scope for:

a) orientating buildings to maximise the potential for natural daylight and passive solar heating and to minimise the impact of wind on heat loss;

b) incorporating features which utilise sources of renewable energy

c) adaptability of design of buildings so that alternative uses can be found for them as required;

d) using materials with reduced energy input, such as recycled products; and

e) utilising natural and built features which already exist on site.

1.3.9. **Policy DEV.7 of the Stratford-on-Avon District Local Plan Review 2006** expects all development proposals to incorporate sustainable drainage systems which provide for the disposal of surface water. The re-use and recycling of surface water and domestic waste water within the development will also be encouraged.

2. REQUIREMENTS FOR PLANNING APPLICATIONS

2.1.1. In order to ensure that the requirements within Policy DEV.8, DEV.7 and latest government guidance are implemented, planning permission will only be granted if the requirements below are met. A description of procedure at each stage of the planning process is set out in Section 3, and supporting factual information and detailed requirements to help applicants and planning officers is given in the following sections of this document.

- All planning applications should show consideration of energy efficiency in their design, orientation and layout, and show consideration of low-energy materials, climate resilience, and adaptable design. An Energy Statement submitted with the application should explain how these considerations have been taken into account in the design of the scheme by answering the questions set out in the Applicant's checklist (Section 4).

- All planning applications for new development should show clearly how sustainable drainage systems and water conservation measures have been incorporated into the design of the scheme. Information on how these measures have been provided should be submitted in the Energy Statement, again by answering the questions set out in the Applicants' checklist (Section 4).

- The Council will expect all applications for development (new build, significant re-build, and conversion from agricultural to commercial or residential) of over 100m^2 non-residential floor area or 1 or more dwellings, to incorporate renewable energy production equipment to reduce the overall predicted carbon dioxide emissions by at least 10%. Submitted planning schemes must show how renewable energy has been incorporated into the scheme design, and submit supporting information in the Energy Statement explaining the contribution of on-site renewable energy to the energy consumption of the development.

- All planning applications for development comprising over 1000m^2 non-residential floorspace, or 10 or more dwellings, must submit information in the Energy Statement demonstrating in broad terms how the scheme will comply with the target carbon emission rate applicable through Building Regulations at the anticipated commencement date of the development. In particular applicants should explain the contribution to be secured though decentralised energy supply systems[2].

2.2. Background to requirements

2.2.1. Background to threshold for renewable energy requirement

2.2.2. Latest government guidance suggests that a requirement for a percentage of energy use to come from on-site renewable energy should be imposed on "substantial new development"[3]. Substantial new development is normally defined as "proposed new development with buildings, individually or in aggregate, with a total useful floor area over 1000m^2 or similar[4].

2.2.3. It is considered that there is justification in setting a lower threshold because of the unique characteristics of Stratford-on-Avon District:

- Unlike most regions, the West Midlands lacks the potential for wave or tidal power to contribute to meeting its target for 10% of the region's energy needs to be met from renewable energy by 2020. There

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[2] This is an EU requirement reflected in para 34 of draft PPS1 supplement; Planning and Climate Change (CLG, 2006).

[3] Draft PPS; Planning and Climate Change (CLG, 2006), Para 35 and associated footnote.

[4] Draft PPS; Planning and Climate Change (CLG, 2006), Annex E p.38.

therefore needs to be a greater focus on energy efficiency and small-scale generation.

- A comparatively high proportion of the District's new development comes from small-scale schemes, meaning a policy with a threshold of 10 dwellings could apply to as little as 50% of housing development in the district. This would reduce the impact of the policy significantly.
- Given the high-cost housing market, and the low requirement for housing numbers in the emerging Regional Spatial Strategy, it is very unlikely that any of the policy options would jeopardise the required supply of new housing in the district.

2.2.4. **Background to percentage for renewable requirement**

2.2.5. This SPD uses the basic percentage of 10% set out in latest government guidance. It is very likely that the percentage required will be increased through the Core Strategy which the District Council hopes to submit to the Secretary of State for approval in September 2008. In the meantime, if national and regional policy sets out an increase in the basic standard required, the Council's implementation will reflect this increase.

3. PROCEDURAL STEPS TO FOLLOW

3.1. Pre-application

3.1.1. Planning officers and technicians in pre-application discussions should:

- make sure potential applicants are aware of this SPD and in particular the requirements set out in Section 2 above;
- ensure that layouts and sitings are discussed and designed taking into account opportunities for sustainable drainage systems and water conservation measures (see Section 8);
- ensure that layouts and sitings are discussed and designed taking into account energy-efficiency good practice (see Section 9) and potential for use of renewables;
- highlight the fact that the energy requirements specified in the Building Regulations are increasing and that use of innovative design and technologies may soon be required in order to meet them (see Section 13);
- raise awareness of the sustainability and marketing benefits offered by decentralised energy systems such as Combined Heat and Power (see Section 12), by on-site renewable energy generation (see Section 11) and by building to nationally recognised standards such as the Code for Sustainable Homes (see Section 14); and
- highlight the need to design and build developments that are adaptable, resilient to the predicted effects of inevitable climate change (see Section 10), and use materials with reduced energy input.

3.2. Submission of applications:

3.2.1. The information listed in the Applicants' Checklist (Section 4) must be submitted with the application.

3.3. Determination of applications:

3.3.1. Planning permission will only be granted if the requirements in Section 2 are met satisfactorily.

3.3.2. Where the Energy Statement proposes to incorporate energy efficiency or sustainable drainage measures, there should be clear commitment to these within the submitted plans and information. In the case of outline planning applications, it may be necessary to include a condition on the outline permission to ensure that commitments to energy efficiency and sustainable drainage measures or principles are followed in the reserved matters scheme.

3.3.3. If applicable the permission will have a condition requiring the renewable energy technology to be installed and operational before occupation of the building, in accordance with the submitted details. (See model condition A, Section 7). A section 106 agreement may be used for very large schemes.

3.3.4. Permission will not normally be granted without a finalised scheme for sustainable drainage or renewable energy being in place unless it is demonstrated that there are benefits to taking this approach and it is demonstrated that a satisfactory scheme can be achieved. A condition is suggested for this situation in Section 7.

3.4. Monitoring

3.4.1. Building Control will check renewable energy installation and sustainable drainage systems in accordance with approved plans and planning conditions on site at completion stage, and pass observations onto the Planning Enforcement Team. Sustainable drainage is required by Building Regulations, and the Service will ensure that provision is in accordance with the approved plans.

3.4.2. Not all schemes are inspected by the District Council Building Control Service, particularly major schemes, and in this case the applicant should supply proof that the development has been completed in accordance with the approved plans and conditions for renewable energy and sustainable drainage prior to occupation.

4. APPLICANTS' CHECKLIST

The following information must be submitted with a planning application.

All planning applications which create a floor area:

- ☐ Scale plans showing the incorporation of a sustainable drainage system to provide for surface water run-off or a description of the scale, type and general locations of the measures which will be incorporated.
- ☐ An Energy Statement answering the questions set out in Section 4.1 below, as relevant to the scale of development. The level of detail required will depend on the size and significance of the proposed development.

Applications for development (new build, significant re-build, and conversion from agricultural to commercial or residential) of over 100m^2 non-residential floor area or 1 or more dwellings must submit in addition:

- ☐ A clear statement of what on-site renewable energy technology will be incorporated into the development to replace at least 10% of CO_2 emissions, including type of technology, size/ power of installation and location within the development.
- ☐ Scale plans showing the size and location of the renewable energy technology within the development will be required before permission is granted except in exceptional circumstances where it has been demonstrated that a satisfactory scheme can be achieved.
- ☐ Within the Energy Statement, the information required by Step 7 of Section 5 of this SPD.

4.1. Energy Statement

The Energy Statement should provide information to answer the following questions:

A. Sustainable Drainage System and Water Conservation (Section 8)

- ☐ How have you designed the layout of the development scheme to allow the use of sustainable drainage systems (porous paving and soakaways normally required for all schemes, and for larger schemes open space for swales, balance ponds etc)?
- ☐ What measures will the development include to encourage water conservation (water butts normally required for all dwellings, rainwater harvesting and greywater re-use especially where it is not possible to include SUDS)?

B. Site layout and building design (Section 9)

- ☐ How does the proposed site layout include the potential for passive solar gain (e.g. orientating buildings with a main façade within 30° of south, avoiding over shadowing of south elevation of buildings, locating taller buildings to the north of occupied buildings)?
- ☐ How have you designed the layout to use landform and landscape to provide shelter and shade?
- ☐ How have you designed buildings and their internal layout of uses to maximise the capture and use of passive solar energy (e.g. more glazing on southern elevation, thermal massing, atrium in deep-plan buildings, locating living rooms on sunnier south side and heat generating equipment/ kitchens on the cooler north side)?
- ☐ How have you designed-in measures to prevent excess solar gain in summer (e.g. external shading, natural ventilation, secure ventilation for night cooling, high thermal mass)?

C. Renewable Energy (Sections 5, 6 and 11)

- ☐ How have you explored ways to generate renewable energy on site as part of the development (e.g. biomass boiler, solar thermal panels, a ground source heat pump)?

- ☐ For development of over 100m^2 or of 1 or more dwellings:
  - o Have you provided a clear statement of how you will replace 10% of the carbon emissions of the new development with on-site renewable energy?
  - o Please also provide the following information (see Section 5 for explanation):
  - - Summary of development scheme (number and type of dwellings, or floor area for each type of use).
  - - Figure for predicted CO_2 emissions in kg/year from the development's energy uses showing the source of figures used to calculate this. If you chose to calculate the emissions using SAP/ SBEM modelling then brief details of this need to be given.
  - - Statement of the target figure of CO_2 emissions to be replaced by renewable energy (i.e. 10% of predicted CO_2 emissions).
  - - Specialist estimates or quotes to demonstrate that the proposed scheme of renewable energy will replace at least 10% of the CO_2 emissions predicted for the development.
- ☐ For development of 1000m^2 or 10 or more dwellings:
  - o Are you intending to use Combined Heat and Power to provide for the energy requirements of the development (see Section 12)?
  - o Please explain how you reached this decision.

D. Building Regulations (Section 13)

- ☐ Have you considered how the development will be designed to meet the increasingly challenging energy performance standards required by Building Regulations?
- ☐ For development of over 1000m^2, or 10 or more dwellings:
  - o What standards do you expect the development to need to meet to achieve the Building Regulations at anticipated time of commencement and, in broad terms, how will the development meet them?

E. Building for the future (Section 10)

- ☐ What measures have you taken to make sure the development will be resilient to predicted future climate conditions (e.g. hotter summers, wetter winters, more storms and flooding, increased risk of soil subsidence)?
- ☐ How does the scheme show consideration of the need to use materials with a reduced energy input (e.g. considering the re-use of existing buildings on-site materials, recycled materials, or through reference to BRE Green Guide)?
- ☐ How does the scheme show consideration of the need to design buildings which will be adaptable in future in terms of their use and the future incorporation of energy saving technologies (in the case of dwellings this should involve reference to the Lifetime Homes Standard)?
- ☐ For all new homes:
  - o Which level of the Code for Sustainable Homes will the dwellings meet? (Section 14)

5. PROVIDING 10% ON-SITE RENEWABLE ENERGY – STANDARD METHOD FOR APPLICANTS

The Council will expect all development (new build, significant re-build, and conversion from agricultural to commercial or residential) of over 100m^2 non-residential floor area, or 1 or more dwellings, to incorporate renewable energy production equipment to reduce the overall predicted carbon dioxide emissions by at least 10%.

This means that applications will need to be submitted with information about what renewable energy technologies will be installed, and about how that will achieve the required reduction in emissions. The steps below are intended to guide applicants through the process of deciding upon a scheme of renewable energy which will meet the requirement.

The tables of emissions guidelines will be revised if suitable data can be sourced which is considered to be more up-to-date, reliable and useful. Consideration is also being given to the production of a detailed toolkit of benchmark data to aid applicants and officers.

Summary of steps for developers

If development is at least 100m^2, or 1 or more dwellings:

Step 1) Design layout and buildings using best practice in energy efficiency and passive solar design, and consider potential to use Combined Heat and Power technology

Step 2) Calculate predicted site CO_2 emissions (kg per year)

Step 3) Assess feasibility of using the different energy technologies for the site. If necessary adapt design to allow use of technology

Step 4) Calculate CO_2 saving potential (kg per year) for feasible renewable energy solutions

Step 5) Calculate CO_2 savings of renewable energy options as percentage of predicted CO_2 emissions

Step 6) Choose and design a package of renewable energy solutions that will deliver at least 10% of predicted CO_2 emissions

Step 7) Submit a clear statement of what on-site renewable energy provision is being proposed, the design of the system, and a report of the above steps taken to reach this decision in an Energy Statement.

Step 1) Design layout and buildings using best practice in energy efficiency and passive solar design and consider potential to use Combined Heat and Power technology

Such measures can significantly reduce the energy requirements of a development, which in turn reduces the amount of renewable energy production required. See Section 9 on energy efficient and passive solar design and Section 12 on Combined Heat and Power.

Step 2) Calculate predicted site CO_2 emissions (kg per year)

The predicted emissions should include the energy requirement for space and water heating and lighting (i.e. the energy uses included within SAP and SBEM methodologies) from all structures and private infrastructure (e.g. external lighting) within the development site.

Predicted CO_2 emissions can be calculated in different ways:

- Using Standard Assessment Procedure (SAP)/ Simplified Building Energy Model (SBEM)[5] CO_2 data.
- Using sample and benchmark data provided below in Tables 1 and 2.
- If the development type is not covered below, reference could be made to other sources of benchmark data such as the London Renewables Toolkit Table 6, section 4.3.3.

Table 1: Carbon dioxide emissions for example dwellings.

Property type used for sample SAP calculation	**Total floor area (m^2)**	**CO_2 emissions from water and space heating and lighting each year (kg CO_2)**
Ground floor 2-bed flat	58	**1,340**
Middle floor 2-bed flat	58	**1,160**
Top floor 2-bed flat	58	**1,310**
Mid-terraced 3 bed house	71	**1,460**
End-terraced 3-bed house	71	**1,640**
Semi-detached 3-bed house	86	**1,850**
Small detached 3-bed house	102	**2,430**
Large 4-bed detached house	175	**3,350**

SAP testing was applied to a sample of dwellings built recently in the district and designed to pass 2006 Part L Building Regulations. The sample specifications used can be supplied on request.

Table 2: Benchmark carbon dioxide emissions for non-domestic development.

Type of development	**Kg of CO_2 produced each year per m^2 of floor area.**
Retail units	**79**
Standard offices	**73**
Industrial units	**62**
School	**35**
Sports centre/ health centre	**135**

Figures sourced from the London Renewables Toolkit benchmark emission data (Tables 4.12.2 to 4.12.13).

[5] Commissioned by ODPM and developed by BRE, SBEM automates the national calculation methodology for non-domestic buildings. Its use is required by the 2006 Part L Building Regulations.

Benchmark data can be out-of-date, as it is often based on existing buildings built to less rigorous 2002 Part L Building Regulations. It is therefore often in the interests of the developer to use SAP/ SBEM CO_2 data in order to predict emissions in this process. Also, you may like to consider how using best practice for energy efficient passive solar design, or CHP heating, has reduced the predicted CO_2 emissions for your scheme.

Where SAP/ SBEM data is not available and benchmark data is available in energy form only (i.e. kWh electricity or delivered gas) the developer will need to apply CO_2 conversion factors.

Table 3: Fuel conversion factors.

Fuel Type	**Kg CO_2 produced per kWh**[6]
Grid electricity	0.523[7]
Natural gas	0.185
Oil	0.251
Coal	0.329
LPG	0.214

Figures sourced from appendices to 'Guidelines to DEFRA's GHG conversion factors for company reporting' (DEFRA, June 2007).

Step 3) Assess feasibility of using the different energy technologies for the site (and if necessary adapt design to allow use of technology)

The key renewable energy technologies which could be considered are described in Section 11. The London Renewables Toolkit provides very useful guidance including more detailed descriptions of each technology (toolkit sections 3.3 – 3.11), flowcharts to assess suitability (toolkit section 4.1), and ideas for which technologies are most suited to certain types of development (toolkit section 4.2).

You may need to consider adapting the design of the development to allow for the incorporation of some forms of renewable energy.

The table below is intended to give some idea of the output and costs of various technologies to aid initial discussions. Installing renewable energy in new build is more cost-effective than retrofitting, particularly as it can reduce the sizing of other heating and lighting infrastructure. Developers may find sizing a system to meet the whole heating or energy requirement for a development will reduce costs by removing the need for a parallel conventional system.

[6] Figures sourced from appendices to 'Guidelines to DEFRA's GHG conversion factors for company reporting' (DEFRA, June 2007).

[7] DEFRA rolling average figure for last 5 years for which data is available (2001-2005) given in 'Guidelines to DEFRA's GHG conversion factors'.

***Table 4: Indicative CO2 savings and costs from renewable technologies**.*

Renewable energy type	Size of system	Kg CO_2 replaced each year by this system	Cost of this system (£).
Solar hotwater heating	4m2	230[8]	2,000 – 5,000
Solar PV	2 KW	680	9,000–18,000
Wind turbine	2.5 KW	1,800	11,000– 2,400
Ground Source Heat Pumps	To meet 100% space heating and hot water.	580	4,500–14,000
Biomass boiler	To meet 100% space heating and hot water.	1,300	4,000–12,000

Figures sourced from 'Meeting the 10% requirement' (Energy Saving Trust, revised Sept 2006).

Step 4) Calculate CO_2 saving potential (kg per year) for feasible renewable energy solutions

For major developments, this stage should be done by a specialist in renewable energy, as the system's design, siting and output will depend on the individual situation. A list of installers and products certified under the UK Microgeneration Certification Scheme is available at www.lowcarbonbuildings.org.uk.

Once a renewable energy system has been sized and designed by a qualified expert, heat or electricity data will be available. This can be converted into CO_2 savings by multiplying the KWh output by the relevant CO_2 conversion factor for the fuel being replaced.

Developers may also want to calculate the approximate cost of each type of system to aid in their decision.

Step 5) Calculate CO_2 savings of renewable energy options as percentage of predicted CO_2 emissions

The percentage of site CO_2 savings delivered by renewable energy is calculated using the formula below:

$$\text{Site } CO_2 \text{ reduction } (\%) = \frac{CO_2 \text{ savings delivered by the renewable energy system (kg/yr)}}{\text{Predicted site } CO_2 \text{ emissions (calculated in Step 2) (kg/yr)}} \times 100$$

Step 6) Choose and design a package of renewable energy solutions that will deliver at least 10% of predicted CO_2 emissions

The information revealed in the previous steps should allow developers to choose their preferred renewable energy solution, maybe focussing on one technology or using a mix of several.

[8] Assumes mains gas is used for water heating. Savings will be higher when offsetting electricity or other fuels.

A qualified expert should design and size a system for the development. If necessary the design and layout of the development scheme should be adapted to work successfully with the technology.

Step 7) Submit a clear statement of what on-site renewable energy provision is being proposed to replace at least 10% of CO_2 emissions, and an explanation of the decision in the Energy Statement.

Submit the following information with your application:

- Clear statement of what on-site renewable energy technology will be incorporated into the development to replace at least 10% of CO_2 emissions, including type of technology, size/ power of installation and location within the development.
- Where possible, clear scale plans showing the size and location of the renewable energy technology and an indication of the appearance of the product if it will be visible from outside the building e.g. photograph of similar model or suppliers' publicity material. This will be particularly important in sensitive areas such as the Cotswolds Area of Outstanding Natural Beauty or conservation areas.
- The following information within the Energy Statement:
    - Summary of development scheme (number and type of dwellings, or floor area of each type of use).
    - Figure for predicted CO_2 emissions in kg/year from the development's energy uses showing the source of figures used to calculate this (see information in Step 2). If you chose to calculate the emissions using SAP/ SBEM modelling then brief details of this need to be given.
    - Statement of the target figure of CO_2 emissions to be replaced by renewable energy (i.e. 10% of predicted CO_2 emissions).
    - Specialist estimates or quotes to demonstrate that the proposed scheme of renewable energy will replace at least 10% of the CO_2 emissions predicted for the development.

5.1. Further guidance

www.lowcarbonbuildings.org.uk is a government run website with a range of relevant information. The microgeneration technology section includes a list of installers and products certified under the UK Microgeneration Certification Scheme.

London Renewables Toolkit (Greater London Authority, 2004) Section 3.3-11 gives detailed descriptions of each technology, Section 4.1 has flowcharts to assess suitability and Section 4.2 gives ideas for which technology is most suited to certain types of development.

See also Section 11 of this SPD.

6. PROVIDING 10% ON-SITE RENEWABLE ENERGY - CHECKLIST FOR PLANNING OFFICERS

- ☐ Check that the application includes a definite commitment to install a scheme of renewable energy provision.
- ☐ Check that the renewable energy scheme will be suitable
  - in terms of functioning effectively by a simple check against the design considerations in Section 11 of this SPD; and
  - in amenity terms by considering it against the criteria set out in Policy PR.6 of the Local Plan. Again Section 11 design considerations and further guidance may provide support.
- ☐ Check the predicted carbon emissions from the development cover all sources of energy use.
- ☐ Compare the predicted emissions figure given against benchmark data provided in Tables 1 and 2 above to see if they are of a similar magnitude. If SBEM/ SAP data is used they may be lower, and if energy efficiency good practice is being used in the design they may be significantly lower.
- ☐ Check if the predicted output of the proposed renewable energy scheme is of a similar magnitude to average figures in Table 4 above.
- ☐ Check that the predicted output will replace 10% of the predicted carbon emissions (both measured in kg CO_2 per year).
- ☐ Request any further information needed to satisfy the checks above, for example the appearance of the proposed technology. It is unlikely to be necessary to see further working and calculations unless the proposal claims to be unable to supply 10% of predicted energy on-site.
- ☐ Where there is a commitment to a satisfactory scheme of on-site renewable energy, the permission should include a condition to ensure this is installed and functioning prior to occupation of the building. Sample conditions are given in Section 7.
- ☐ Permission should not normally be granted without a finalised scheme in place, unless there are good reasons for this and the applicant has demonstrated that a renewable energy scheme can feasibly be achieved.

7. MODEL CONDITIONS FOR PLANNING PERMISSION

Any development of 1 or more dwellings, or $100m^2$ + of other development, is expected to provide a minimum of 10% of the predicted total energy requirements of the development from on-site renewable sources.

Full planning permission should not normally be granted for this scale of development unless the information required in Step 7 of Section 5 has been submitted. This is because it is normally more difficult and expensive, and sometimes impossible, to incorporate renewables late in the design process.

However, where it has been demonstrated that renewable energy can feasibly be achieved, then condition (B) can be used for full planning permissions. Condition (B) is also likely to be appropriate for most outline planning permissions, as the details of energy use and the potential for renewables will not normally be fully quantifiable at the outline stage.

(A) Where all required information submitted

The design features, systems and equipment detailed in the application documentation and supporting information shall be fully implemented in accordance with the approved plans and particulars prior to the development first being brought into use, or alternatively in accordance with a phasing scheme which has been agreed in writing by the Local Planning Authority, and shall thereafter be retained in place and maintained in working order at all times unless otherwise agreed in writing with the Local Planning Authority.

Reason *To provide energy from on-site renewable sources replacing a minimum of 10% of the predicted carbon dioxide emissions from the total energy requirements of the development and to ensure that the development is in compliance with Policy DEV.8 of the Stratford-on-Avon District Local Plan 2006 and Supplementary Planning Document on Sustainable Low-Carbon Buildings, all in the interest of sustainability.*

(B) Where finalised plans not submitted

The development hereby permitted shall not be commenced until a scheme for the provision of energy from on-site renewable sources sufficient to replace a minimum of 10% of the predicted carbon dioxide emissions from the total energy requirements of the development has been submitted to and approved in writing by the Local Planning Authority. The design features, systems and equipment that comprise the approved scheme shall be fully implemented in accordance with the approved plans and particulars prior to the development first being brought into use, or alternatively in accordance with a phasing scheme which has been agreed in writing by the Local Planning Authority, and shall thereafter be retained in place and in working order at all times unless otherwise agreed in writing with the Local Planning Authority.

Reason *To provide energy from on-site renewable sources replacing a minimum of 10% of the predicted carbon dioxide emissions from the total energy requirements of the development and to ensure that the development is in compliance with Policy DEV.8 of the Stratford-on-Avon District Local Plan 2006 and Supplementary Planning Document on Sustainable Low-Carbon Buildings, all in the interest of sustainability.*

PART B: TECHNICAL GUIDANCE

8. SUSTAINABLE URBAN DRAINAGE SYSTEMS (SUDS) AND WATER CONSERVATION

8.1. Introduction

Sustainable urban drainage and water conservation measures should be incorporated wherever possible in all developments. Sustainable drainage techniques reduce the amount of run-off water that has be dealt with by the sewer system. The measures are designed to prevent water pollution and control run-off water at source by replicating natural methods of drainage and filtration. Water conservation methods aim to reduce the amount of treated water a development will use by re-using water for several tasks, gathering rain water for some tasks, and using water-efficient appliances.

Policy DEV.7 of the adopted Stratford District Local Plan expects all development proposals to incorporate sustainable drainage systems to provide for the disposal of surface water. The re-use and recycling of surface water and domestic water within the development is also encouraged.

Since 2002, Part 'H' of the Building Regulations requires that, in order of priority, rainwater run-off should discharge into one of the following:

a) **An adequate soakaway or some other adequate infiltration system or, where that is not reasonably practical;**
b) **A watercourse, or, where that is not reasonably practical;**
c) **A sewer.**

This means that it is critical to consider drainage techniques from the very beginning of designing a scheme, from site evaluation and layout design through to the detailed design stages. SUDS techniques are cost-effective and can be applied to a wide range of schemes from small developments through to major residential, leisure, commercial and industrial operations.

8.2. Choosing the right techniques

How, and to what extent, a scheme for sustainable drainage can be achieved will depend on factors including location of site, space available, size and type of scheme and soil types.

Local suitability

The volume of site attenuation now required is sufficient to cope with a 120 year storm standard. This is about what was experienced in Stratford-on-Avon District in 1998.

There are large pockets of favourable ground for infiltration drainage, mainly around Bidford, Stratford and Wellesbourne, and many other smaller ones. However, the prevailing ground conditions in most areas of our District are not conducive to large-scale infiltration drainage, comprising Mercia Mudstone and Lias clay.

Soakaways, drains, and ponds or swales can damage the architectural integrity of some listed buildings so in sensitive locations their impact will need to be assessed and where necessary mitigated.

Scale of development

Small schemes: from a single dwelling scale, schemes should include a water butt and soakaway, and all paving and hard surfacing should be porous wherever possible. Ground conditions in this district will almost always allow for infiltration drainage through a soakaway at a single dwelling/ 100m^2 development scale.

Larger schemes: major development will require a more comprehensive SUDS scheme with a system of different linked measures. There is considerable scope for SUDS measures to be incorporated with areas of open space, landscaping and leisure amenity space. Large scale ponds and wetlands are appropriate for sites above 5.0 ha.

There may be sites where it is not possible to provide a full sustainable drainage system, for example on space-constrained brownfield sites. In this case greater emphasis will be placed on the need to incorporate water conservation measures. Schemes without scope for infiltration drainage will also need to provide attenuation of run-off into the sewers. This is normally achieved through underground tanking or storm cells.

8.3. Sustainable Drainage Techniques

Soakaways: These are used to dispose of stormwater from buildings and paved areas. They are typically circular pits with a 'honeycomb' arrangement of bricks which allow water to permeate through them and efficiently infiltrate into adjacent soil.

Porous pavements: Using surfaces such as permeable (no fines) concrete blocks, crushed stone or gravel or porous asphalt for paved areas, especially parking areas, can greatly reduce the need for surface-water drains and off-site sewers.

Depending on the ground conditions the water may be arranged to infiltrate directly into the subsoil or be stored underground in a crushed stone layer or a draintank before soaking slowly into the ground.

Swales and basins: These are dry channels and ponds of all sizes which provide temporary storage for stormwater, reduce peak flows to receiving waters and help to filter out pollutants, as well as aiding water infiltration directly into the ground.

Filter drains: These are stone-filled trenches with a perforated pipe running through them. They slow down water movement and provide some filtration and infiltration of water.

Balance ponds and wetlands: Where there is space to include ponds and small wetland areas, drainage from filter drains, piped systems or swales can be fed into them. This can help greatly in dealing with water during storm conditions, reducing the risk of flooding. Such areas also remove solids, and the algae and plants of wetlands can provide a particularly good level of filtering and nutrients removal. Larger ponds and wetlands have the potential to recycle 'grey' water and if well designed can significantly increase the biodiversity of the site.

Green roofs: Covering the roof of a building with vegetation and soil or a growing medium can reduce the peak flow and total volume of run-off from the roof and improve water quality. In addition they can improve insulation and increase the lifespan of the roof.

Water conservation

Water butts: Rainwater from downpipes should supply water to a butt, allowing the collected rainwater to be used for gardening and outdoor use.

Rainwater harvesting: More advanced rainwater harvesting systems can provide water supply for a range of domestic uses including laundry and toilet flushing. Extensive studies in Germany (where over 50,000 systems are installed each year) have found that rainwater, once filtered, is suitable for such use without disinfection.

Greywater re-use: Systems to collect, cleanse and re-use greywater can operate on a single dwelling scale or on a development-wide scale, Greywater from baths, showers and hand basins is usually clean enough for flushing the toilet with only basic disinfection or microbiological treatment.

Run-off attenuation

Storm cells and underground tanks: these should not be considered as a Sustainable Drainage technique as they result in discharge to sewers or a watercourse. They should only be used where site conditions will not allow for infiltration drainage. They reduce the risk of flooding by temporarily storing stormwater in large underground reservoirs, and discharging at a slowed rate into the sewers through a small outlet pipe.

8.4. Further guidance

'SUDS - A guide for developers' (Environment Agency, March 2003).
'SUDS – An introduction' (Environment Agency & SEPA)
This and other guidance is available at www.environment-agency.gov.uk.

CIRIA: C697 SUDS Manual (2006)
CIRIA: C698 Site Handbook for the Construction of SUDS (2006)
CIRIA: C522 SUDS – Design Manual for England and Wales (2000)
Further information, and the above documents to purchase, is available at www.ciria.org.uk/suds

The Stratford District Council Flood Prevention Officer can be contacted to discuss a development site.

9. SITE LAYOUT AND BUILDING DESIGN FOR ENERGY EFFICIENCY AND PASSIVE SOLAR GAIN

9.1. Introduction

This section looks at how layout and design can make the most of sunlight, shelter and natural ventilation to create buildings that are naturally comfortable for their occupants, reducing the need for artificial heating, lighting and cooling.

Passive solar design exploits the free heat and light energy provided by sunlight entering buildings through windows, and uses air movement for ventilation. This can be extremely effective when combined with heavy construction materials which heat up and cool down slowly, good insulation, and sufficient measures to prevent excessive solar gain in summer.

To fully take advantage of these opportunities requires thinking about factors like sun orientation and potential shading by landscaping or other buildings, when first designing the layout of a site and the design and layout of buildings. This is why we need to make sure the possibilities are thought about at the earliest stages of planning a development.

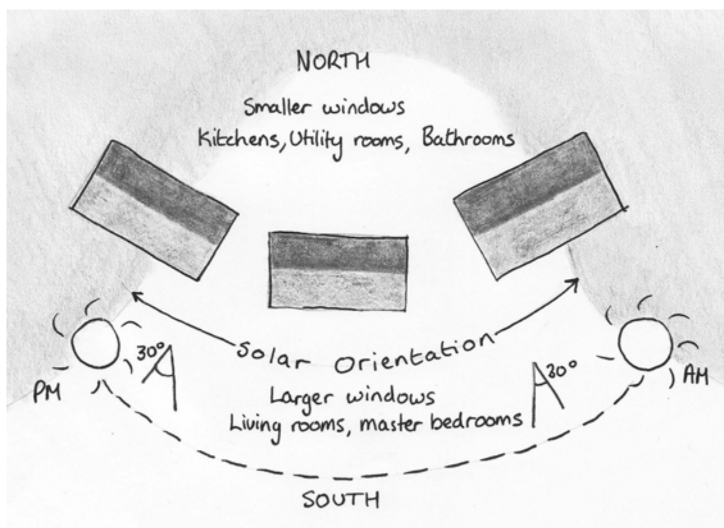
This section gives guidance on how schemes can incorporate the principles of energy efficient and passive solar design. It is not intended as prescriptive requirements, instead applicants should demonstrate in their Energy Statement how the principles have been taken into account alongside other factors of good design.

Benefits of passive solar design:

- By applying simple layout and building design principles, savings of up to 10% on fuel costs can be made[9].
- Passive solar developments need cost no more than 'conventional' developments.
- Good layout and design results in natural comfortable houses that are attractive to buyers.
- Passive solar design is not dependant on technology and has no ongoing cost implications.
- Designing a building to take advantage of local conditions produces locally distinctive buildings. In previous centuries, traditional buildings were often designed with similar principles in mind.

9.2. Site layout principles

Careful orientation is vital for passive solar energy gains. The elevation of each building with the largest proportion of glazing should be orientated within 30° of south (solar orientation) with a smaller proportion of glazing on the north elevation.



Inevitably, road layout will largely dictate the arrangement of buildings on a new development, with east-west roads enabling the optimal orientation of buildings for passive solar gain. However, it is not essential for buildings to be orientated due south as variations of up to 30° either way can be used.

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[9] Energy Saving Trust, 'Passive solar estate layout', Table 1: Typical savings from passive solar design.

Over shading by other buildings should be minimised. On a flat site this could be achieved by locating taller buildings to the north of a site, or to the south of road junctions, open spaces or car parks. Putting higher density and taller buildings to the north can also help to shelter the site from the coldest north winds in winter. Layout should also be informed by the existing contours and landform of the site to make the most of opportunities for shelter and sunlight.

Deep-plan buildings, e.g. offices, tend to be highly energy dependent, with the middle of the building needing electric lighting and mechanical ventilation throughout the day. Large buildings should be designed to give all occupants access to natural light and ventilation, either by a more complex form, or with courtyards, light-wells or atria which introduce light and air deep into the building.

9.3. Landscape

Trees that will grow to overshadow buildings should be deciduous so that they allow sunlight to pass through the bare branches in winter yet provide shading in summer.

Existing and new planting can be used to provide shelter, and to provide shading in summer for amenity areas and car parking.

Shelterbelts, made up of mixed species, can be located to the north of development, or where they will give shelter from the prevailing wind. They should be distanced 3-4 times their mature height from south-facing elevations.

Green space also reduces storm water run-off and helps lower the risk of urban flooding.

9.4. Cooling and preventing excessive solar gain

With predicted increases in summer temperatures, building design will need to ensure there is adequate cooling to prevent uncomfortable internal temperatures. The following are therefore very important measures to provide:

Natural ventilation. At its simplest this takes the form of windows which can be opened by adjustable amounts. Positioning opening windows or air vents on opposite walls draws fresh air through the building.

Night cooling. Providing ventilation that is secure enough to be left open at night is a very effective way to bring down the temperature of a building. This could take the form of windows with a secure open position, or air vents in the wall. Night cooling works best if the building has a high thermal mass which can cool overnight and then restart the process of absorbing heat over the next day.

Adequate external shading on the south-facing windows. External shading from adjustable awnings and shutters, or permanent sun louvres, can block out sun when it is high in the sky in summer, but still allow sun in when it is lower in the sky in winter or early and late in the day. South facing windows actually make this form of shading more effective. Internal shading, e.g. blinds, is less effective for reducing excessive heat gains.

Green space and shading. In urban areas, green spaces provide some respite in extreme heat. Planting can provide shade for amenity areas and car parking in summer.

9.5. Building Design Principles

Passive solar energy houses need not be significantly different in construction or appearance to conventional housing. If it is possible to achieve good solar orientation (see layout guidance above), the following measures should be included.

Glazing:

A rule of thumb is to have a conventional amount of glazing but to locate 70% of the glazing on the south elevation.

If windows are too large, heat loss may outweigh solar gain, and occupants' desire for privacy is likely to lead to installation of net curtains or blinds which block out the solar gains.

There should be less glazing on the northern elevation, although a window area of at least 15% of the floor area of each room is recommended.

Internal layout:

Locate well-used rooms requiring warmth and light on the southern side. In a house this will probably be the main living rooms and largest bedrooms.

Locate less well-used rooms, uses requiring heat generating appliances, and rooms that should be cool, on the north side of the building. In a dwelling this could be the kitchen, bathroom, utility room and garage. In a commercial development this could be storage areas, or the location of working machinery which will generate heat as a by-product.

Thermal mass:

Solid heavy walls and floors absorb heat slowly in warm conditions, and give it out slowly again when it is cooler. Traditional stone walls or stone flagged floors provide a valuable thermal mass.

Insulation:

Well insulated walls and roofs make the most of the heat gained through passive solar design.

9.6. Further guidance

'Reducing overheating – a designers guide' (Energy Saving Trust, 2005)

'Planning for passive solar design' (BRECSU and DTI, 1997)

'Passive solar estate layout' (Energy Saving Trust, 1997 reprinted 2006)

'A designers' guide to environmentally smart buildings' (Carbon Trust, 2000)

'Site Layout and Building Design' from Woking Borough Council's Climate Neutral development; a good practice guide.

For historic buildings see 'Building Regulations and historic buildings' (English Heritage, 2004) available at www.helm.org.uk

10. CLIMATE RESILIENT BUILDINGS

10.1. The future scenario

Even if global carbon emissions are dramatically reduced, changes to the climate can already be witnessed, and further changes are predicted.

The UK Climate Change Impacts Programme (UKCIP) has made a set of predictions about the likely impacts of climate change using computer modelling based on scientific climate research[10]. The UKCIP02 model predicts that, if we continue to discharge large amounts of greenhouse gases, by 2050 in the West Midlands:

- Annual mean temperatures could rise by up to 2.5ºC, with summer temperatures increasing by more and winter temperatures by less.
- The number of very hot summer days is expected to increase.
- Warwickshire and the south east of the region are expected to warm up more than Shropshire and the north of the region
- Winter rainfall could increase by up to 20%
- Summer rainfall could decrease by up to 30%
- Soil moisture could fall by up to 35%
- There will be a higher risk of extreme weather events such as storms, floods and droughts.

Rising fuel prices and increased concerns over energy supply security issues are also expected.

10.2. Taking action

It is therefore vital that all developments are built to be suitable for this changing future. Many of the measures set out elsewhere in this SPD will help to make buildings better adapted to the predicted future conditions. Developers are strongly encouraged to consider how best they can future-proof their developments.

Predicted future problem	**Suggested measures for new buildings**
Increased average temperatures and frequency of heat waves	Greater demand for natural ventilation and cooling in buildings, and shaded green space in urban environments.
Higher winter rainfall leading to localised and general flooding.	Greater importance of sustainable drainage systems which can reduce run-off and store stormwater to be dispersed slowly after the event. Awareness that flooding has recently occurred in the district outside traditionally identified flood risk areas.
Lower summer rainfall and increased frequency of drought periods.	Greater importance of water conservation measures to reduce

[10] UKCIP www.ukcip.org.uk

	demand on water supply and also reduce discomfort for occupants during periods of water restriction.
Significant reduction in soil moisture levels leading to shrinkage of soils, particularly clays, causing subsidence. Erratic rainfall also increases risk of subsidence.	Need to design buildings and chose sites taking subsidence risk into account.
Milder, wetter winters could lead to damp buildings and growth of mould.	Need to design well-ventilated and damp-proofed buildings.
Increase in storms and gales	Need for robustly constructed buildings.
Increase in storms may lead to increased risk of damage to energy supply infrastructure. There may also be fuel supply security concerns.	Increasing importance and value to occupants of on-site potential to generate energy, e.g. through renewable energy installations.
Rising fuel prices	Increasing importance and value to occupants of energy efficient developments.

10.3. Further guidance

The UK Climate Change Impacts Programme www.ukcip.org.uk

'The potential impact of climate change in the West Midlands; technical report' (Entec UK Ltd for Sustainability West Midlands, Dec 2003) available at http://data.ukcip.org.uk/resources/publications/documents/West_Mids_tech.pdf

11. TYPES OF RENEWABLE ENERGY

There are a number of renewable energy technologies which are typically suitable for integration with buildings. The most effective technology or combination of technologies will depend on factors including site features, building orientation and the likely scale and pattern of energy use of the development. Policy PR.6 in the Local Plan provides an indication of the external impacts of the technology which also need to be considered when designing an appropriate scheme, including visual impact on areas with a sensitive character and disturbance to neighbouring properties.

Biomass heating can either be stoves or boilers that use biomass (organic matter of recent origin) instead of traditional fossil fuels such as oil and gas. This is a renewable energy source if the biomass, often wood, comes from a sustainable source e.g. waste wood, or replenished managed supplies. The CO_2 released when energy is generated from biomass is balanced by that absorbed during the fuel's production.

Design considerations:

- Fuel storage and handling space with access for delivery is needed and should be "designed in" at the earliest stages.
- Where individual boilers are proposed the system will need to be managed by the occupants unless a maintenance contract is entered into.

Biomass combined heat and power (CHP). A CHP plant is an installation where there is simultaneous generation of usable heat and electricity in a single process, increasing the output efficiency. Biomass must be used as a fuel to class this as a renewable energy source, however the Council will consider lowering the proportion of renewable energy required when a development will be powered by a CHP system because of the significant carbon savings they achieve.

Design considerations:

- Communal systems are suitable for larger developments and community schemes e.g. housing associations, schemes with manager/ caretakers on site.
- Can prevent need to pipe gas around high rise buildings (safety and cost issue).

Ground source heating uses underground pipes and boreholes to absorb heat from the ground, which is then upgraded to a useful temperature and used to provide space heating and to pre-heat domestic hot water. The system requires electricity to run it, but generates a very efficient return for heating.

Design considerations:

- Ground source heat pumps require a large outdoor space for the burial of coils/ pipes.
- Where there is insufficient space a vertical borehole system could be explored. A license may be required to drill.
- The required excavation may be inappropriate in areas of particular archaeological sensitivity.

Ground sourced cooling. As the temperature of the ground remains fairly constant, and in summer is well below peak air temperatures, a system working on the same principle as a ground source heat pump can be used to replace conventional cooling in offices and other non-domestic buildings.

Design considerations:

- Buildings should be designed to provide natural ventilation and passive cooling measures which negate the need for energy-hungry mechanical cooling, unless there is significant site specific justification.
- If additional cooling is considered essential, ground source pump or heat-fired absorption cooling should be installed rather than conventional air conditioning.
- Renewable-energy powered cooling will not normally be considered to count towards the percentage of on-site generation required unless the District Council is satisfied that mechanical cooling is essential.
- The required excavation may be inappropriate in areas of particular archaeological sensitivity.

Solar heating systems use solar energy to heat water. The systems use solar collectors (either flat plate or excavated tube) usually placed on the roof of a building, to pre-heat water that will be used in sinks, showers, and other hot water appliances. They do not usually provide enough energy for space heating.

Design considerations:

- The building should have a year round hot water demand.
- Collector should face between south east and south west at an elevation of between 10 and 60 degrees.
- The collector should not be shaded, for example by trees or other buildings.
- System requires a hot water storage cylinder within the building.

Solar power panels (photovoltaics or PVs) use sunlight to create an electric current, which can be used to power building services or can be exported to the grid.

Design considerations:

- The panels can be fitted to buildings in a variety of ways, such as bolt-on panels, solar power roof tiles, cladding and atria glass, or mounted on frames on the ground.
- Panels should face between south-east and south west and not be shaded.

Wind turbines extract energy from the wind using a rotor consisting of 2 or 3 blades, and convert it to grid electricity. Standalone wind turbines have been available for many years, and more recently a number of roof mounted turbines have come onto the market. There is a huge range of size and output for turbines. In some cases a single standalone turbine can serve several buildings and may be more efficient than several smaller turbines.

Design Considerations:

- Wind turbines need to be carefully sited where there is sufficient average wind speed, and not too much turbulence.
- Roof mounted turbines should normally be at least 4 metres above the roof line. The building must be designed to avoid the force of wind against the turbine causing structural damage.
- Noise, vibration and visual impact should be considered.

Hydroelectric turbines uses the movement energy in water as it falls from a height to turn the turbines and convert it to grid electricity. It is currently the most efficient of the renewable energy technologies. Larger schemes can require significant (and expensive) civil engineering, but once the systems are installed they can be relatively unobtrusive, require minimum attention and may last many decades if well-maintained.

Design Considerations:

- This technology is, of course, dependant on a suitable nearby site. It generally works best on rivers or streams where there is a drop (or head) of 1.5 metres or more across the turbine.
- The most suitable sites tend to be old mills or weirs where much of the water management required is already in place.
- A key issue is to maintain the river’s ecology by restricting the proportion of the total flow diverted through the turbine.

11.1. Further guidance

www.lowcarbonbuildings.org.uk is a government run website with a range of relevant information. The microgeneration technology section includes a list of installers and products certified under the UK Microgeneration Certification Scheme.

London Renewables Toolkit (Greater London Authority, 2004) Section 3.3-11 gives detailed descriptions of each technology, Section 4.1 has flowcharts to assess suitability and Section 4.2 gives ideas for which technology is most suited to certain types of development.

Cotswolds Area of Outstanding Natural Beauty has produced an informative Position Statement and Renewable Energy factsheets for developments in or near the AONB. See www.cotswoldsaonb.org.uk Publications page.

12. COMBINED HEAT AND POWER (CHP) UNITS

12.1. Introduction

Combined heat and power (CHP) units generate electricity through an engine and capture the by-product, combustion heat, for use in heating and hot water systems. They can reach 85% efficiencies as opposed to 30% from traditional electricity generation where the heat is wasted.

12.2. When to use

CHP systems work best where there is a year-round demand for heating or hot water. They work well on a community scale where mixed uses are connected to a shared heating system, and in large developments such as schools, leisure centres, and hospitals. It is also possible to use micro-CHP units in individual buildings.

Unless biofuel is used to power the unit, CHP is not a renewable source of energy. It can however reduce the amount of fuel required to power a development significantly. Where a development has committed to using a full and effective CHP system the Council will consider reducing the requirement for the proportion of renewable energy to be generated on site to reflect this.

12.3. Policies

EU Energy Performance of Buildings Directive 2003 requires, among other things, that for major development formal consideration must be given to alternative systems of heating before construction starts. The legislation came into effect in the UK in April 06.

Latest government draft guidance sets out that "Applicants for planning permission for substantial new development should through their Design and Access Statement … explain the contribution to be secured though decentralised energy supply systems."[11]

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[11] PPS: Planning and Climate Change Supplement to PPS1 draft Dec 06, p.21 para 34

Stratford District Council will therefore require all applications for schemes of over 1000m^2 or 10 dwellings to submit information in the Energy Statement stating how CHP will be used in the development and reasons for this decision.

12.4. Further guidance

Combined Heat and Power Association: www.chpa.co.uk

13. BUILDING REGULATIONS

13.1. Introduction

All development that involves construction work will be subject to the Building Regulations so there is little point in granting planning permission for schemes that will not be able to achieve Building Regulation standards.

The standards required are increasingly challenging. Part L of the Building Regulations relates to energy use in, and CO_2 production from, buildings. Under Part L all buildings must meet a Target Energy Rating which is determined by the fuel used and the volume of the building. Adapting and adding to a building design at the last minute in order to satisfy the Building Regulations is much less efficient in terms of cost, time and energy performance than designing with this in mind from the start.

The 2006 edition of Approved Document L increased energy efficiency standards by 20% over the 2002 edition. It is still possible to comply with Part L using conventional heating and insulation systems but careful attention to detail is required to ensure that energy-inefficient areas of the design are eliminated.

The energy/ carbon production performance standards required are very likely to increase significantly in the near future. Draft national policy[12] has suggested a timetable for future increasing requirements for dwellings standards linked to the energy/ carbon section of the Code for Sustainable Homes:

Date	**2010**	**2013**	**2016**
Energy/ carbon improvement for homes as compared to Part L (Building Regulations 2006)	25%	44%	Zero carbon
Equivalent energy/carbon standard in the Code	Code level 3	Code level 4	Code level 6

Draft government policy emphasises the need to be aware of the Building Regulation requirements all the way though the development process:

"Applicants for planning permission for substantial new development should through their Design and Access Statement demonstrate in broad terms how the proposed development will comply with the target carbon emission rate applicable

[12] Building a Greener Future: Towards zero carbon development; consultation draft (Communities and local government, Dec 06), p.14

though Building Regulations *(at the anticipated commencement date of the proposed development)*."[13]

Stratford District Council will therefore require all applications for schemes of over 1000m^2 or 10 dwellings to submit information on what standards they expect to need to meet to achieve the Building Regulations and how they will meet them.

13.2. Further guidance

'Building Regulations Part L; Conservation of fuel and power' (Communities and Local Government, 2006) is available at www.planningportal.gov.uk > Professional User > Building Regulations > Technical Guidance > Approved documents

'Code for Sustainable Homes; A step change in sustainable home building practice' (Communities and Local Government, December 06)

Stratford District Council Building Control team may be able to offer further advice. They can be contacted at buildingcontrol@stratford-dc.gov.uk.

14. CODE FOR SUSTAINABLE HOMES

The Code has been prepared by the government as a single national standard to guide industry in the design and construction of sustainable homes. It covers a wide range of issues including energy/ carbon, water, materials, surface water run-off waste, pollution, health and well-being, management and ecology. Assessment against the Code is likely to become mandatory in the future. The Code already offers a tool for home builders to demonstrate the sustainability performance of their homes, and to differentiate themselves from their competitors.

The measures set out in this SPD can help to achieve higher ratings from the Code, but the scope of the Code goes beyond this SPD. It looks at details such as the energy-efficiency of fitted kitchen appliances, provision of recycling space, embodied energy of building materials and provision of bike storage space.

The Code will complement the system of Energy Performance Certificates which is being introduced in 2007. All new homes will be required to have an Energy Performance Certificate providing key information about the energy efficiency/ carbon performance of the home. Energy assessment under the Code will use the same calculation methodology.

It is very likely that in future the energy/ carbon standards of Building Regulations will be based upon the energy section of the Code for Sustainable Homes (see Section 14).

From 2008 all affordable housing will be built to Level 3 of the Code because the Housing Corporation requires this as a minimum level to receive grant funding.

The Council will strongly encourage developers to aim for a level of the Code when designing new homes.

Benefits of using the Code include:

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[13] Draft PPS1 Planning and Climate change (CLG, 2006), p.21 para 34

- It provides a clear checklist of issues to consider when aiming to build sustainable housing.
- The national status of the Code and its links to the Energy Performance Certificate will allow the higher performance of the dwellings to be easily communicated to customers
- There is a growing market demand for homes that offer reduced environmental impact, lower running costs and features that enhance heath and well-being.

14.1. Further guidance

'Code for Sustainable Homes; A step change in sustainable home building practice' (Communities and Local government, December 06)

'Code for Sustainable Homes; Technical Guide (Communities and Local Government, March 07)

Both are available to download at www.planningportal.gov.uk > Professional User > Building Regulations > Code for Sustainable Homes.

If you find the text in this document difficult to read
we can supply it in a format better suited to your needs.

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