

CARLISLE CITY COUNCIL

Report to:- Carlisle City Council

Date of Meeting:- 1st March 2011

Agenda Item No:-

Public

Title:-	DRAFT ENERGY EFFICIENCY SUPPLEMENTARY PLANNING DOCUMENT
Report of:-	Assistant Director Economic Development
Report reference:-	ED.10/11

Summary:- Executive considered the attached report (ED.05/11) on 14th February 2011. The report sets out the results of the public consultation on the draft Energy Efficiency Supplementary Planning Document (SPD), and the amendments to the SPD that were proposed in light of the responses received. It is intended that the SPD (appendix A) will form part of the Council's Local Development Framework and will provide further details in respect of the provisions of Local Plan policies CP5 Design and CP9 Development, Energy Conservation and Efficiency.

Environment and Economy Overview and Scrutiny Panel agreed that having considered the pre-consultation draft they would not wish to consider the report again and in light of this decision the resolution was made to refer the SPD to Council on 1st March with a recommendation for adoption.

Recommendation:-

That the Energy Efficiency SPD be adopted as part of the Council's Local Development Framework.

Contact Officer: Pauline Goodridge

Ext: 7182

Jane Meek

Assistant Director Economic Development

17 February 2011

Note: in compliance with section 100d of the Local Government (Access to Information) Act 1985 the report has been prepared in part from the following papers: Draft Energy Efficiency Supplementary Planning Document; Reports DS.10/10; ED.07/10; ED05/11



REPORT TO EXECUTIVE

PORTFOLIO AREA: ECONOMIC DEVELOPMENT

Date of Meeting: 14 February 2011

Public

Key Decision: Yes

Recorded in Forward Plan: Yes

Inside Policy Framework

Title: DRAFT ENERGY EFFICIENCY SUPPLEMENTARY PLANNING DOCUMENT

Report of: Assistant Director Economic Development

Report reference: ED.05/11

Summary: This report sets out the responses to the consultation on the draft Supplementary Planning Document (SPD). Included is a summary of the main consultation responses received and the proposed amendments to be made to the document as a result.

Recommendations:

- 1 This report is made available for consideration by the Environment and Economy Overview and Scrutiny Panel at its meeting on 24 February 2011.
- 2 A further report is brought to Executive for its meeting on 14 March 2011, to consider referring the Supplementary Planning Document to Council at its meeting on the 26 April 2011 for adoption.

Contact Officer: Pauline Goodridge

Ext: 7182

Note: In compliance with Section 100d of the Local Government (Access to Information) Act 1985 the report has been prepared from the following papers: Draft Energy Efficiency Supplementary Planning Document; Reports DS 10/10 and ED 07/10

1. BACKGROUND INFORMATION AND OPTIONS

- 1.1 The Energy Efficiency Supplementary Planning Document has been listed as a document for production in the published Local Development Scheme. This forms part of the Local Development Framework to guide development in the District. This SPD amplifies Council Planning policies.
- 1.2 The supplementary planning document expands on Carlisle District Local Plan Policy CP9 which refers to the production of a Supplementary Planning Document on Energy Efficiency and Conservation. The document also has regard to the Local Plan Policy CP5 Design listing nine key design principles against which all development proposals will be assessed.

2. CONSULTATION

- 2.1 Council approved the document for consultation and a six week consultation took place from 3 September 2010. Nearly forty comments were received from consultees. Some concerned the structure of the document; others concerned the content and omissions, and some commended the Council in producing a promotional and encouraging document. A summary of the consultation responses is attached in Appendix 1.
- 2.2 The comments have been considered and some amendments are necessary to give precision and to update the advice in the light of national developments.
- 2.3 No further consultation is planned.

3. FEEDBACK FROM CONSULTATION

- 3.1 The document was generally welcomed for the range of applications promoted.
- 3.2 A request was made for more local implemented examples such as for heat pumps and for greater detail on micro generation. This is difficult as heat pumps, for example, do not need planning permission and therefore there is less awareness of their implementation.
- 3.3 Suggestions were made for clarity of the text to be improved which have been taken up to make it more readable.

Note: In compliance with Section 100d of the Local Government (Access to Information) Act 1985 the report has been prepared from the following papers: Draft Energy Efficiency Supplementary Planning Document; Reports DS 10/10 and ED 07/10

- 3.4 A couple of respondents requested that the SPD should set thresholds and standards to be attained for different types of development; it is considered that this would be better tested through Core Strategy policies at a later date as advised in PPS1 which covers the General Principles of planning policy.

4 CONCLUSION

- 4.1 Finalising the document will support Local Plan policy CP9. Whilst energy efficiency is a fast developing subject in order for the guidance to have optimum use its adoption would assist in demonstrating the Council's intention to helping others address their impact on the environment.

5 RECOMMENDATIONS

- 1 This report is made available for consideration by the Environment and Economy Overview and Scrutiny Panel at its meeting on 24 February 2011.
- 2 To consider referring the Supplementary Planning Document to Council at its meeting on 26 April 2011 for adoption.

6 REASONS FOR RECOMMENDATIONS

- 5.1 To consider issues raised at the consultation stage and to be able to proceed towards adoption of the Supplementary Planning Document.

7 IMPLICATIONS

- Staffing/Resources – The work has been resourced from within the Local Plans and Conservation (Planning Policy) Section.
- Financial – There are no financial implications.
- Legal – The preparation of a Supplementary Planning Document will comply with the requirements of Planning legislation.
- Corporate – The supplementary planning document will contribute towards creating more sustainable communities.
- Risk Management – Without this SPD there may be a lack of clarity on the intention of policies in the Local Plan.

Note: In compliance with Section 100d of the Local Government (Access to Information) Act 1985 the report has been prepared from the following papers: Draft Energy Efficiency Supplementary Planning Document; Reports DS 10/10 and ED 07/10

- Environmental – The overall effect of the SPD once adopted will be to improve the local environment.
- Crime and Disorder – None.
- Impact on Customers – The SPD will provide additional guidance, thus improving the service to customers of the Planning Service.
- Equality and Diversity –

Impact assessments

Does the change have an impact on the following?

Equality Impact Screening	Impact Yes/No?	Is the impact positive or negative?
Does the policy/service impact on the following?		
Age	No	--
Disability	No	--
Race	No	--
Gender/ Transgender	No	--
Sexual Orientation	No	--
Religion or belief	No	--
Human Rights	No	--
Health inequalities	No	--
Rurality	No	--

If you consider there is either no impact or no negative impact, please give reasons:

The document is general in nature, offering advice which has an impact on the environment.

.....

If an equality Impact is necessary, please contact the P&P team.

Note: In compliance with Section 100d of the Local Government (Access to Information) Act 1985 the report has been prepared from the following papers: Draft Energy Efficiency Supplementary Planning Document; Reports DS 10/10 and ED 07/10



Energy Efficiency Representations

Respondent	RepNo	Support	Chapt	Page	Para	Details
	68	021				Producing a well informed up to date Energy Efficiency SPD will provide Development Management officers with a tool to enter early dialogue in relation to sustainability requirements. Advice could also be given in relation to what renewable energy applications would be suitable for different developments. The diagrams on pages 18 and 19 are considered particularly useful for this; the SPD also uses examples of existing schemes which help demonstrate the viability of renewable energy applications throughout the document.
Response:	Noted. The comments are welcomed.					
Proposed Change	None.					
	38	002				<p>The Appendix should include reference to PPS5 and the Practice Guide and the further information available from English Heritage on dealing with climate change and its mitigation in the historic environment. I suggest including the links below in the document to Climate Change and your Home and the advice on our HELM website, particularly that relating to traditional buildings.</p> <p>Http://www.climatechangeandyourhome.org.uk/live/ http://www.helm.org.uk/ http://www.helm.org.uk/upload/pdf/Biomass-Energy.pdf?1285662704 http://www.helm.org.uk/upload/pdf/ign_part1_buildingregs.pdf?1285662704 http://www.helm.org.uk/upload/pdf/Draughtproofing%20and%20secondary%20glazing_1994.pdf?1285662704 http://www.helm.org.uk/upload/pdf/89410-EnergyConservation1.pdf?1285662704 http://www.helm.org.uk/upload/pdf/Energy%20Savings_1994.pdf?1285662704 http://www.helm.org.uk/upload/pdf/69945-MicroWind1.pdf?1285662704 http://www.helm.org.uk/upload/pdf/Microgeneration.pdf?1285662704 http://www.helm.org.uk/upload/pdf/49357-SolarElectric.pdf?1285662704</p>
Response:	Agree					
Proposed Change	insert references in Appendices					
	38	003				The SPD sets out design considerations for site layout and orientation. Whilst traditional settlements were often built to take advantage of local micro-climatic conditions other influences were also at play and it will be important for new development to reflect local character and distinctiveness and not to slavishly adhere to the design considerations set out in the draft document where this might harm local character and distinctiveness.
Response:	Agree that there could be a reference to this factor in design. It is expanded on in the Council's draft SPD Achieving Well Designed Housing which is under revision.					
Proposed Change	Insert a reference to the need for locally distinct housing at the end of Para. 3.2 in a new paragraph.					

Respondent	RepNo	Support	Chapt	Page	Para	Details
	322	005				Due to the specific nature of the Trust's remit we are concerned with the protection and promotion of theatres and therefore anticipate policies relating to cultural facilities. Theatres can provide a valuable opportunity to demonstrate ways in which local people can act in their own homes to become more environmentally efficient and reduce carbon emissions, and help mitigate the effects of climate change. Many theatre developments are attaining BREEAM ratings that demonstrate their commitment to being more environmentally efficient. Some will be required to display Energy Performance Certificates and The Theatres Trust is encouraging new and existing theatres to aim to meet the ambitions of Local Authority and Government CO2 emissions targets.
Response:	Accepted; any new theatre development would be scrutinised for energy efficient features (Appendix 5).					
Proposed Change	No change					
	34	006				Throughout: Headers appear to spell efficiency incorrectly, ie with a double "i."
Response:	Noted.					
Proposed Change	Amend headers to pages.					
	70	017				The document would read more easily if it was structured according to the energy hierarchy in diagram 1 (p.8) with the first section about energy efficiency, the second about renewable applications and the third about sustainable construction.
Response:	Noted; this sounds sensible but this is virtually the present order.					
Proposed Change	No change.					
	70	018				The document includes sections on water conservation and waste minimisation as well as energy efficiency. Therefore it might be more appropriate to call it a 'Sustainable Construction' or 'Sustainable Design' SPD.
Response:	The title 'Sustainable Construction' is quite narrow and the document is more than this. The document is concerned with 'sustainable design' but it is felt that energy efficiency is a wider term to cover the remit.					
Proposed Change	No change.					
	38	001				We are pleased that the SPD highlights the special considerations which apply to listed buildings and conservation areas when planning for energy efficiency. The SPD could usefully use the term "heritage assets" and their setting which would cover both designated and non-designated heritage assets, PPS5 policies HE7, HE8, HE9 and HE10 would apply.
Response:	Agree; PPS5 was not published when the SPD was written. The policies quoted are general ones that would be picked up in the policies of a Core Strategy and/or General Development Management DPD.					
Proposed Change	Insert reference to heritage assets in para. 3.13, a definition of historic assets in the Glossary and a reference to PPS5 Planning for the Historic Environment in Appendix 2 Background Documents. Insert references to the HELM website in Appendix 8					

Respondent	RepNo	Support	Chapt	Page	Para	Details
	68	020				It should be noted that Planning Policy Statement 1 states that “any policy relating to local requirements for decentralised energy supply to new development or for sustainable buildings should be set out in a DPD, not a supplementary planning document”. It should therefore be acknowledged that the SPD does not create new policy; rather an interpretation of existing Local Plan Policies CP8 and CP9.
Response:						Noted; this is stated in the Introduction paragraph 1.2. The document is intended to present options and to promote.
Proposed Change						No change.
		039				
Response:						
Proposed Change						
	68	022				The document does not make reference to the Cumbria Climate Change Commitment (2010) which the City Council has signed up to. This commits the City Council to reducing its own carbon emissions from their operations by 25%, but also in the context of LDF documents which includes SPDs, requires policies and targets that contribute to NI 186 for CO2 reduction in Cumbria from all development and supporting transport and energy infrastructure.
Response:						Reference is made to the commitment to the Nottingham Declaration (2007) which contains a climate change action commitment. There is a reference to NI 186 in para. 2.7
Proposed Change						Insert reference to the Cumbria Climate Change Action Plan in para. 2.7. which has led to the Commitment referred to in para. 2.7.
	68	023				The SPD does not set requirements for developments over a certain size/ threshold. It is considered that it would be useful, as is stated in the Local Plan paragraph 3.45 if the SPD did set requirements for developments over a certain size to achieve a specified proportion of their likely energy needs from renewable energy sources. This would assist in achieving the targets listed on page 7 of the SPD and towards achieving the Cumbria Climate Change Commitment (2010) and again allow the SPD to be a useful tool for Development Management officers.
Response:						Agree that requirements would be useful for developers and consideration is given to this suggestion as stated in para. 3.45.
Proposed Change						Add in a new design requirement for major developments to incorporate a minimum of 10% of predicted energy requirements from decentralised and renewable or low carbon sources.
	68	024				The SPD will need to be a flexible document and evolve as new legislation and requirements are produced. Once there is an adopted Core Strategy in place the SPD will need to be revised to support and give greater guidance to policies in the Core Strategy which specifically relate to energy efficiency.
Response:						Noted. This is a problem with such a rapidly evolving subject.
Proposed Change						No change at present. (A review of SPDs will be undertaken once any new policies are formulated through the LDF)

Respondent	RepNo	Support	Chapt	Page	Para	Details
68	029					It is considered that where the document makes reference to BREEAM standards it should be stated that developments will be as a minimum encouraged to be 'excellent' it is at this level that renewable energy is included in the criteria. It is also considered that it would be useful if the SPD made reference to the Building for Life criteria. The Building for Life criteria encourages sustainable development which in turn has a positive impact upon energy efficiency.
Response:		The SPD states that for large developments proposed schemes should meet the BREEAM ratings of 'very good' or 'excellent'. The suggested rating range suggested on Page 28 should be expanded to include 'outstanding' also, for completeness. It is felt that the inclusion of Building for Life criteria may confuse the reader; the BfL assessment is better used for large neighbourhood schemes. Some elements of BfL assessment criteria are included in the Appendix 5 Checklist for new applications.				
Proposed Change		Page 28 second line after 'excellent' add 'or outstanding'.				
68	019	S				On the whole the document is welcomed and support is given to the encouragement of energy efficiency. It is considered that the SPD will have a positive effect on reducing Carlisle's impact upon climate change. The SPD provides helpful guidance and advice on different types of design and applications which can make developments more energy efficient, and also in what situation, which type of design and application would be most suitable.
Response:		Noted and welcomed.				
Proposed Change		None.				
54	032	S	02	7 & 8		The Background section is well written, clearly setting out in non-emotive language the issues that need to be faced, the targets to be met and the specific need to address energy issues in respect of residential and commercial developments. The text is supported.
Response:		Support is welcomed.				
Proposed Change		No change.				

Respondent	RepNo	Support	Chapt	Page	Para	Details
34	007		02	07	2.3 - 2.4	<p>Incorrect reference to 60% reduction in emissions, sentence largely duplicated by 2.4 which confusingly refers to both “greenhouse gas emission reductions” and then “carbon dioxide emission reductions”. My suggested alternatives:</p> <p>2.3 The Climate Change Act 2008 set legally binding targets for greenhouse gas emissions of at least 34% by 2020 and 80% by 2050 against the 1990 baseline totals. Between 2003 and 2007 greenhouse gas emissions were falling at less than one per cent annually. Furthermore, reductions in emissions over the last two years are more likely to the recession rather than any real sign of progress in the rate of emission reduction.</p> <p>2.4 It is now well acknowledged that about half of the UK’s greenhouse gas emissions come from buildings, from constructing them in the first place, and from generating the energy which is used in buildings. The Government’s Committee on Climate Change has called for a 35% reduction in emissions from homes by 2022 compared with 2007.</p>
Response:		Agree that the clarity could be improved.				
Proposed Change		As suggested above. (para. 2.3) Delete last sentence of para. 2.4 to clarify and to avoid duplication.				
54	031		03			<p>Generally all good advice, but NB some duplication between para 3.6 and the fourth of the bullet points under 'Design Considerations' on page 10.</p> <p>Para 3.4: The statement in the first bullet point is a very important one and supported accordingly. The inefficiency of uncapped cavities was a significant finding of the research work associated with the Trust's major residential development in partnership with two Volume House Builders at Stamford Brook in Greater Manchester (a copy of the outcomes report 'Volume' is provided separately for information).</p>
Response:		<p>The box of bullet points is intended as a summary of points raised in the text.</p> <p>Welcome the support.</p>				
Proposed Change		No change.				
	025		03	12		<p>Support is given to the section on Wind Energy and the reference to the Cumbria Wind Energy SPD on page 12. However, it is considered that there is an opportunity for the SPD to promote and advise on community scale micro generation, e.g. wind turbines in schools, factory and office complexes.</p>
Response:		Agree that in theory this is desirable; the SPD does promote the various types of technologies, but the scales of applications vary so much that inevitably an SPD contains general advice. The Energy Saving Trust provides practical and technical advice, as do installers of such technologies.				
Proposed Change		No change.				
	015		03	20		<p>Figure 2: Maximum Transport Distances for Reclaimed Materials - It is not clear whether the distances quoted include the return journey.</p>
Response:		When materials are to be reclaimed they will only go to the point of re-use; therefore the distances are one-way journeys.				
Proposed Change		Insert under Figure 2 title, Page 20, 'one-way'				

Respondent	RepNo	Support	Chapt	Page	Para	Details
68	027		03	25		Design Considerations - states that 'the preparation of Work Travel Plans is encouraged by major employers'. It is considered that 'encouragement' alone will not lead to travel plans being implemented. The SPD should state that where necessary for new development there needs to be a planning condition to ensure travel plans are implemented. However, it is still important that existing major employers are encouraged to implement Travel Plans. Guidance on Travel Plans is listed in Policies T30 Transport Assessments and T31 Travel Plans of the Cumbria and Lake District Joint Structure Plan 2001-2016.
Response:		Agree that Travel Plans need to be implemented. The Planning Authority can impose planning conditions on major applications to require the submission of Travel Plans for approval. A separate condition can require a Section 106 Agreement for monies to be paid (usually to the County Council as Highway Authority) for the annual monitoring of the impact of the Plan in the short to medium term, often for five years. The problem is that employees need incentives to change their travel habits, though employers have been known to negotiate weekly travel tickets.				
Proposed Change		Add a reference to the requirement for Travel Plans for major developments onto Design considerations page 25.				
70	011		03	09	3.1	Should overhangs be discouraged given that they are likely to cast a permanent shadow preventing solar gain?
Response:		There has to be a balance between the need for shade and shelter, and the need to experience solar gain. The point is that overshadowing of buildings and ground around should be minimised.				
Proposed Change		No change.				
38	004		03	09	3.1 - 3.2	The SPD acknowledges listed buildings and conservation areas and it would be appropriate in this section (3.1, 3.2) to refer to the wider historic environment, local distinctiveness and sense of place and include the need for understanding of local character and context in the design process.
Response:		Agree; see previous response no. 003.				
Proposed Change		Insert new para. after 3.2				
54	033		03	12	3.12	The comment that "wind energy is currently the most developed of a number of renewable energy technologies" is true in terms of large scale turbine design for use in wind farms, including offshore arrays. In the context of this SPD and its emphasis on the energy efficiency of residential and commercial buildings it is probably less true - there have been issues with the effectiveness of small wind turbines on houses having regard, for example, to micro-climate issues. Whilst this is a technology that has potential at the local level, and indeed arguably should be encouraged, its effectiveness compared with solar and heat pump technologies at a small scale is not clearly demonstrated.
Response:		Agree with this view but the technology still should be promoted. The statement at the start of the 'Wind Energy' section could be qualified.				
Proposed Change		Add to the first sentence in para. 3.12 at the end: 'particularly when applied on a larger scale'.				

Respondent	RepNo	Support	Chapt	Page	Para	Details
54	034		03	13	3.13	The advice on heritage considerations might usefully contain a link/reference to English Heritage's work on Climate Change and the Historic Environment (2008).
Response:		Accepted				
Proposed Change		Add a reference to Appendix 7 after 'Changeworks' : 'Climate Change and the Historic Environment, English Heritage, 2008				
70	014		03	14	3.14	This should be titled 'Ground, water and air source heating and cooling'. Air Source Heat Pumps are becoming increasingly common so further explanation and a local case study would be useful on this application.
Response:		Noted.				
Proposed Change		Amend title preceding para. 3.14 and add a reference to the scheme at Talkin Tarn.				
	026		03	15	3.17	States that it is preferable for fuel for Biomass heating to be sourced within a 15 mile radius. It is considered that this figure is difficult to justify in the context of acceptable transport distances for recycled materials. This can be seen when compared to maximum transport distances for reclaimed materials in Figure 2, which all greatly exceed 15 miles.
Response:		Noted; this distance is only advisory.				
Proposed Change		No change.				
70	012		03	09	3.2	Linear streets may create opportunities for street scale wind turbines providing some visual interest as well as energy.
Response:		The principle is acknowledged but street-scale wind turbines may not be practical as the proximity of nearby buildings could well inhibit the functioning of turbine blades. This point is noted in para. 3.12. Agree that they could provide visual interest. Any turbines in such a situation would need to be located in positions that are well clear of buildings.				
Proposed Change		No change				

Respondent	RepNo	Support	Chapt	Page	Para	Details
54	035		03	20 - 21	3.24 - 3.2	<p>Whilst the Energy Hierarchy appears early on in the document this is the first more detailed consideration of reducing energy demand through energy conservation works - it is considered that advice on insulation in particular should be included at the start of the document. It is also the case that there are other more innovative construction methods possible, as exemplified by the National Trust's 'straw bale building' at St Catherine's near Windermere.</p> <p>www.strawfootprint.org</p> <p>www.nationaltrust.org.uk/main/w-global/w-localtoyou/w-northwest/w-news-projects-st_catherines_footprint.htm</p>
Response:		Advice on insulation is referenced later in the document because the document goes from the general to the particular. There are reservations about promoting straw bale building; there are difficulties in designing for the bales in high winds, they have a susceptibility to rot, there is a danger from flammability (the St Catherine's building has had a chimney fire in November 2010) and the bales have a high space requirement.				
Proposed Change		No action.				
54	036	S	03	22 - 22	3.27 - 3.3	The attention given to water issues, especially minimisation of use, recycling and utilising SUDs systems is supported. A number of these techniques have been used by the Trust, including as part of the Stamford Brook development (see volume document also sent).
Response:		Noted.				
Proposed Change		No change.				
70	016		03	22	3.34	The paragraph on hydropower would be more suitable in the section on applications. Reference should also be made to the biodiversity impact implications of hydro power and the statutory requirements of consulting with the Environment Agency and Natural England.
Response:		Agree that the para. is out of sequence.				
Proposed Change		Move section on Hydropower to end of 3.20				
54	037	S	03	23 - 24	3.35 - 3.4	The energy issues associated with waste are significant and it is therefore appropriate to incorporate this section on waste into the SPD. The specific comments on recycling waste are particularly appropriate.
Response:		Noted.				
Proposed Change		No change.				
54	038	S	03	25 - 26	3.35 - 3.4	As with waste issues it is similarly the case that the impact of transport on energy requirements, and therefore potentially on emissions, is a significant consideration. The approach to the location of new development and the promotion of non-car modes of transport is appropriate.
Response:		Noted.				
Proposed Change		No change.				

Respondent	RepNo	Support	Chapt	Page	Para	Details
34	008		03	25	3.42	<p>The scheme has monies from the Lottery Fund (£975,000) and is due to be completed by 2013. It will provide safer routes for cyclists and improve health by encouraging physical activity and by giving easier access to green areas.</p> <p>Comment: I would like to point out that it's not just about providing safer routes for a "user group" but sustainable transport opportunities for everyone. My alternative therefore for the second sentence: It will provide safer routes for walking and cycling and improve health by encouraging physical activity, and by providing improved access to green spaces.</p>
Response:		Accepted.				
Proposed Change		Amend the relevant sentence of para. 3.42.				
68	028		03	25	3.42	<p>Explains that the Sustrans Connect2 cycle project (2008) for Carlisle incorporates two major schemes, a new crossing of the River Eden and a link from Currock to the Caldew Riverside Path. The scheme has now been revised and does not include a new crossing of the River Eden. This is because the costs of the scheme have risen to £5m, which in the present financial climate is not viable for the City Council to contribute to. The scheme has now been scaled down to a cost of £3.19m. It is considered that the most up to date position should be detailed in the SPD.</p>
Response:		Noted that the scheme has been revised. The most up to date position (2008 scheme) was described when the document was under preparation.				
Proposed Change		Amend by adding new para. 3.43 Page 25 to state the latest position.				
34	009		04	27	4.1	<p>First line should read:</p> <p>The Climate Change Act set targets for reducing greenhouse gas emissions: 34% by 2020, rising to 80% by 2050.</p>
Response:		Noted.				
Proposed Change		Amend para. 4.1 first sentence.				
68	030		Appen dix 1	29		<p>Refers to policy CP8 on Renewable Energy, which refers to 9 criteria which proposed developments have to satisfy. It would be useful if the criteria were also listed in the appendix.</p>
Response:		The SPD aims to be a positive document promoting energy efficiency in new developments. It is felt that if the lengthy criteria are listed they could be a constraint on consideration of renewable energy. The primary source of the Policy is quoted including its Page in the document.				
Proposed Change		No change.				

Respondent	RepNo	Support	Chapt	Page	Para	Details
34	010		Appendix 9	43		Carbon Footprint, in my experience it is specifically about carbon dioxide, not greenhouse gases generally. My alternative therefore: Carbon Footprint – A measure of the amount of carbon dioxide that individuals, businesses and organisations release into the atmosphere as a result of their actions over a given period of time. This includes the carbon dioxide released whilst manufacturing and transporting the food and goods consumed, to demolish, construct heat, power buildings and appliances.
Response:		Agree.				
Proposed Change		Amend final sentence of definition in Appendix 9.				
70	013		Appendix 9	45		Glossary entry needed for the term 'thermal chimney' (referred to Page 10 para 3.7)
Response:		Agree.				
Proposed Change		Add 'thermal chimney' definition to the Glossary.				

Appendix A

Energy Efficiency Supplementary Planning Document



ENERGY EFFICIENCY

Supplementary Planning Document

March 2011



CARLISLE
CITY COUNCIL



www.carlisle.gov.uk

local development framework

This document is part of the Local Development Framework, produced by the Planning Services of Carlisle City Council. If you would like this document in another format, for example large print, braille, audio tape or another language, please contact:

Planning Services
Carlisle City Council
Civic Centre
Carlisle
Cumbria
CA3 8QG
email: lpc@carlisle.gov.uk
Tel: **01228 817193**

Contents

1. Introduction	5
2. Background	7
3. Design and Applications	9
4. Energy Standards	27

Appendices:

Appendix 1 Policy Background	29
Appendix 2 Background Legislation and Documents	31
Appendix 3 Code for Sustainable Homes	32
Appendix 4 BREEAM Assessment Of Buildings	33
Appendix 5 Energy Efficiency / Sustainable Building Checklist	34
Appendix 6 Examples of Energy Efficiency Good Practice In the District	37
Appendix 7 References	41
Appendix 8 Sources of Further Information	42
Appendix 9 Glossary	44

1 Introduction

Role and Purpose of the document

1.1 This document is known as a supplementary planning document (SPD). It provides guidance on how new development especially housing, in Carlisle District should be designed, built and assessed so that it has a positive impact on the environment. It gives guidance on the choice of energy efficiency measures in the design of buildings. The minimum standards for major developments are outlined.

1.2 This SPD does not create new policy but provides detailed guidance to support Policy CP9 Development, Energy Conservation and Efficiency of the Carlisle District Local Plan 2001-2016 and Policy CP8 Renewable Energy of the Plan. This SPD is referred to in paragraph 3.48. The SPD will be a material consideration in helping the Council make decisions about planning applications.

1.3 This SPD was adopted by Carlisle City Council on

Appendix 1 lists the planning policies that this SPD is providing guidance on as well as other relevant policy guidance.

2 Background

2.1 Changes are taking place to our climate and human activities are contributing to it. Climate change will have a direct effect on the supply and demand for energy; increasing summer temperatures will add to the demand for cooling and the impacts of extreme weather events may affect electricity generation and the supply and provision of gas.

2.2 The causes of climate change are several but one primary reason is that gases emitted into the atmosphere are rising significantly in part at least because of human influences. This means that more radiation is reflected back to the earth which in turn warms it further. An analogy is made with a greenhouse; greenhouse gas concentrations in the atmosphere are rising well above pre-industrial levels. Carbon dioxide is the main greenhouse gas. Of Cumbrian greenhouse gas emissions 75% is carbon dioxide, 17% is methane and 6% is nitrous oxide. Methane is produced by the agricultural sector and from the decomposition of waste.

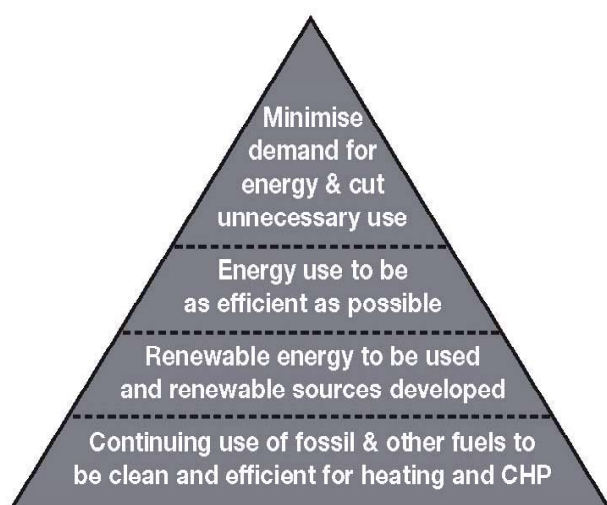
2.3 The Climate Change Act 2008 sets legally binding targets for greenhouse emissions of at least 34% by 2020 and 80% by 2050 against the 1990 baseline totals. Between 2003 and 2007 greenhouse gas emissions were falling at less than one per cent annually. Furthermore, reductions in emissions since 2008, are the result of the recession rather

than any sign of real progress in the rate of emission reduction.

2.4 It is now well acknowledged that about half of the UK's greenhouse gas emissions come from buildings, from constructing buildings and from generating the energy which is used in buildings. The Government's Committee on Climate Change has called for a 35% reduction in emissions from homes by 2022 compared with 2007.

2.5 Progressive improvements to both existing and new homes are now urgently needed in order to minimise any possible further increases in carbon emissions. It is vital to consider sustainability and the energy efficiency of the built stock, therefore, at the outset of any project. An appropriate design and suitable building materials can effectively improve energy efficiency and reduce energy demand for heating, lighting and cooling.

2.6 The diagram from the North West Sustainable Energy Strategy summarises the principles of energy use and saving energy. There is recognition that the reduction and efficient use of energy alone is insufficient to affect climate change. In parallel there is a need to make energy used secure by increasing the energy supply mix and cleaner by emitting as little carbon as possible.

Diagram 1 The Energy Hierarchy

Source: NW Sustainable Energy Strategy <http://www.climatechangenorthwest.co.uk>

in and encouraging low carbon sources of energy and to championing action on climate change. The Carlisle Community Plan includes targets for reducing carbon emissions which are requirements of the National Indicator 186 on per capita reduction in CO₂ emissions in a local authority area.

2.7 The government believes that it is just as important that new commercial development addresses the challenges posed by climate change and to achieve substantial reductions in carbon emissions over the next decade. Part of this objective will be achieved through the delivery of improvements in energy efficiency.

2.8 The City Council in January 2007 signed the Nottingham Declaration on Climate Change¹ and has developed a Climate Change Strategy. The Strategy has two aims: to lead by example on tackling climate change and to work in partnership with actions. This has led the City Council to agree the Cumbria Climate Change Action Plan 2009-2014 and the Climate Change Commitment which ties the Council to investigating

¹ The Declaration was launched in Nottingham in 2000 with the intention of persuading local councils and their partner organisations to plendge to systematically address the causes of climate change and to prepare communities for its impacts.

3 Design and Applications

Site Layout and Orientation

3.1 A site's layout and the orientation of buildings in relation to the sun and the prevailing wind direction can have a direct impact on the demand for heating in winter and cooling requirements in summer.

Design considerations

- Arrange as many roads as possible along an east to west alignment; on north south roads detached units provide greater flexibility for maximising solar gain
- Orientate buildings to face south or with the longest face within 30 degrees of south to maximise solar gain during the winter
- South easterly orientation is preferable to south westerly as this maximises early morning solar gains
- If an overhang is proposed locate it on the south side of a building to provide summer shade
- Avoid buildings that cast shadows over south elevations: locate taller buildings to the north of the site and shorter buildings to the south
- Allow 21 metres between 2 storey properties to allow good solar access all year

Building Design and Layout

3.2 The preceding advice could result in a linear layout but an appropriate design solution may be to integrate a broad range of building styles with varying eave and ridge heights. A linear street may cause wind channelling which can increase wind speeds. A varied layout with curving streets and mews courtyards can help to prevent wind disturbance and provide some natural shelter. New development should also reflect local character and this distinctiveness of the locality, shown in design cues or features. A scheme needs to respect its context and, to some extent, reflect the massing, scale and detail of nearby buildings.

Design consideration

- Use the natural topography

3.3 Opportunities should be taken to set new buildings into existing groups and settlements and to locate at the foot of slopes which may give some shelter and protection. Integrating buildings around existing topography and building groups can help to soften the appearance of a new development by providing a degree of screening.

3.4 Landscaping through trees and shrubs can be designed as part of the development, to soften it in the

environment and to provide summer shade. Native planting should be used wherever possible. Deciduous trees provide shade in summer without compromising light and solar heat in winter.

- Reduce exposed external walls by building terraces, apartment or office blocks and, to a lesser extent, semi-detached houses. To ensure that heat passes horizontally between properties the cavity between properties should be capped in order to prevent heat rising vertically and escaping from the top of cavities.
- Maximise sunlight and daylight.

3.5 North facing walls should incorporate minimal glazed areas to prevent unnecessary heat loss in winter.

- Habitable rooms used for living and working should be positioned on the south side of buildings; kitchens are better positioned on the north side to avoid excessive heat gain. Living rooms, lounges and main bedrooms should be located on the south side of buildings whilst non-habitable rooms such as halls, bathrooms and utility rooms should be located on the northern side of buildings and have smaller windows to reduce heat loss.

3.6 Setting buildings into the ground will give protection. Green roofs planted with suitable plants may reduce storm water run-off, increase sound proofing, filter water and increase biodiversity. Low-angled or flat roofs are ideal for this treatment.

Design considerations

- Reduce exposure of buildings to the environment
- Reduce wind disturbance
- Design-in natural ventilation

3.7 Features such as opening windows, achieving cross ventilation with openings on opposite walls and the provision of central thermal chimneys will assist in the provision of cooling in summer.

Design considerations

- As a general rule windows on dwellings should be around 15% of a room's floor area for adequate daylighting.
- Avoid over-sized windows (i.e. more than 50% of the overall facade) if excessive heat gain or loss is to be avoided
- Use neutral solar control glass to minimise solar heat gain in the summer whilst maximising natural daylight
- Use green roofs to benefit biodiversity, to reduce storm water runoff, to reduce heat loss from buildings and to remove pollutants from the air. Grass, sedum mats and mosses tend to be most appropriate.
- Use energy efficient heating systems and lighting

Under Part L of the Building Regulations residential developers are required to install condensing boilers. The efficiency of these boilers can be increased by installing heat controls that allow temperatures to be controlled in different parts of buildings. Energy efficient light fittings take low energy light bulbs and use a ballast or transformer fitted into the base of the light fittings. These control the supply of electricity to the bulb and lead to significant reductions in amounts of electricity used.

- Make the most of the sun to generate electricity.

Applications

Solar power

3.8 Solar energy can be used to produce electricity, heat water or for space heating and emits no climate change gases. The technology will work on cloudy days and does not require strong sunlight.

3.9 Solar water heating systems require a heat collector that is an absorption device usually covered in plastic or glass that can be roof or wall mounted. The heated liquid (usually water with antifreeze) is passed through a coil in a hot water storage cylinder. The water in the cylinder can be supplied directly, or raised to a higher temperature by a boiler or electric immersion heater.

- For optimum performance, panels should be located on a direction between southeast and southwest, on unshaded roofs on a pitch of 30 to 40 degrees. The collector contains fluid which is piped to a pre-heat tank, which is in turn is connected to a household hot water tank. A collector of 2 to 5 sq. metres in size is adequate for a typical domestic application. A system should provide

50 to 60% of annual domestic hot water requirements with most of the energy capture taking place between May and September. The evacuated tube collector is the most efficient type. Collectors can be mounted on the ground on free-standing support structures but can be visually intrusive.



▲ Modest sized solar thermal collector panels on a house off Windsor Way, Carlisle



▲ Solar panels at Watts Yard, Carlisle.

3.10 “Active solar cells” (photovoltaics - PV) are used for electricity generation for appliances and lighting. These devices generate electricity directly from daylight and sunlight. Cells can be retrofitted to roofs as glass-fronted panels, preferably on a roof pitch of 20 to 40 degrees on a southeast to southwest facing roof, or they can be incorporated into a new building as solar roof tiles. PV tiles can be used on the roof glass of conservatories. They can also be fitted into walls of houses as solar shingles or solar glass laminates to provide additional energy to the electrical system. It is important that no structures such as chimneys or dormer windows should cast shadows on an array. Any surplus electricity at times of peak energy production may be sold back to the supplier and exported to the grid. Shadows from buildings and trees will affect the efficiency of a PV array. In situations where it is not desirable to have arrays fixed to a roof or if a roof is not suitable an alternative is to locate them away from the property on an outbuilding or on the ground on a frame.

PV systems operate silently, require little maintenance and can last up to 25 years. Over a year a 1m² panel can produce 800 kWh of energy.

- A PV cell should be mounted on a roof or wall-mounted within 90 degrees of south; a 30 degree angle provides optimum solar collection
- PV cells can be mounted on flat roofs on a 30 degree angled frame to achieve maximum orientation and effectiveness
- The visual impact of a PV array can be reduced by concealing behind a parapet wall or on an outbuilding
- Periodic cleaning of cells is required or output may be reduced by as much as 10%

3.11 Installing solar panels on houses does not generally require planning permission. However, permitted development rights do not necessarily apply in conservation areas or in World Heritage Sites. The installation of a PV array on a building listed for its special architectural merit or historic interest or on another building in its curtilage will require listed building consent.

Wind Energy

3.12 Wind energy is currently the most developed of a number of renewable energy technologies particularly when applied on a larger scale. Wind energy can be used to generate electricity but including wind turbines on buildings can present design challenges and may cause problems such as noise and vibration for neighbouring properties.

3.13 Most wind turbines will only work at wind speeds above 4 metres/second and must be positioned to face the prevailing wind, usually south-west. Building mounted micro turbines perform best when mounted on the gable end of buildings on a short pole, positioned above the ridgeline and preferably sited in remote, exposed rural locations. They are attached to poles which are fixed in place by wall brackets. An assessment needs to be made of the structural strength of a building before installation to ensure the weight, 15 to 30 kilograms, can be borne and to ensure capability to stand the force of a 50 metre/second gust over a 10 minutes period. It is not advisable to attach them to chimney stacks as they are not constructed to take such structural loads.

Free standing turbines perform better than building mounted ones. However free standing turbines in built up areas do not perform particularly well due to insufficient wind resources, as buildings and trees may provide shields and screening from direct winds. The greatest potential for wind energy is to be found in the Solway estuary, in the North Pennine uplands west of Kielder Forest and in parts of the M6 corridor².

Design Considerations

- The recommended position for a micro turbine is above a roof ridge at a minimum height of 1.5 metres
- Turbines will only be viable where wind speeds exceed 6m/second as wind speeds below this would not generate enough power to justify the cost involved

3.14 The majority of microgeneration proposals in the historic environment and sensitive locations, require planning permission. This is because heritage assets have significance for society which justifies conservation and protection for future generations. The factors to consider when assessing the acceptability of energy developments in the setting of historic sites are visual dominance, scale, intervisibility, interruption to vistas and sight-lines, movement distraction, noise and light effects.



▲ Six Vestas turbines (7.92MW) have operated at Great Orton former airfield since 2000/01



▲ 15 m high, 5kW wind turbine at a south Carlisle primary school powers an air source heat pump for the hall and helps to cut electricity bills

² Cumbria Wind Energy Supplementary Planning Document

Ground, air and water source heating and cooling

3.15 A heat pump and coiled piping extract heat from the ground, air or water and transfer it to a heating distribution system such as under floor heating using an electric pump.

- The circuit of underground pipes contains a liquid which absorbs low-grade ground heat from near-surface soil which then provides a heat source for a heat pump located in a property. The system acts as an 'energy amplifier' but requires sufficient open land for horizontal trenches or adequate ground for vertical boreholes. Normally the loop of pipes is laid flat or coiled in trenches two metres deep. A licence from the Environment Agency may be required. There is no impact on the landscape as long as the boreholes or trenches are properly backfilled and tamped down.
- Maintenance needs are minimal.
- Planning permission is not required for ground source heat pumps.
- Can provide 50% of hot water and 100% of space heating needs.

3.16 One example of a water source heat pump system is the use of pond mats in Talkin Tarn to generate heat for the Alex Boat House.

Biomass heating and biomass combined heat and power (CHP)

3.17 Biomass is defined as a mass of combustible material of organic origin in any volume of material. Biofuels fall into two main categories:

- Wood fuel including forest products, energy crops and short rotation coppice

which are produced in woodpellets, wood chips and logs

- Non wood fuel including animal waste, industrial and biodegradable municipal products from food processing and high energy crops e.g. rape, sugar cane, maize



▲ The loops of plastic pipe containing antifreeze solution are being buried in trenches and lead to the house underfloor area. ▼



Figure 1: Biomass Comparisons: Woodchip and Pellets

Fuel	Boiler Price	Fuel Price	Storage	Ease of Feed	Efficiency
Woodchip	More expensive	Cheaper	More space needed (around four times as much)	More difficult	Less efficient
Pellets	Cheaper	More expensive	Less space needed	Easier	More efficient

3.18 Biomass heating systems burn organic matter such as wood chips or agricultural residues to generate heat for space heating and hot water production. The most commonly used energy crops for this purpose are Willow, Poplar and Miscanthus (Elephant grass). These are thirsty crops which have a high water requirement and may cause localised lowering of the water table. The Government has suggested that 1 million hectares of land may be available for non-food crop production including energy crops.

3.19 The issues which need to be considered with the use of biomass include the availability of storage space for fuel, access to storage, the convenient location of the boiler and the availability of local fuel supplies, preferably within a 15 miles radius. The CO₂ emitted on combustion is balanced by the CO₂ captured in the fuel's growth. Deliveries to biomass stations are very frequent; for example a 10 MW plant would require around 20 deliveries a day by 38 tonne lorry. Delivery traffic should avoid historic settlements with narrow streets and fragile buildings and bridges. A domestic system may require fortnightly deliveries.



▲ Existing farm buildings at Low Sizergh Barn, Kendal, were modified to house the 90kw biomass boiler in 2008 together with the woodchip store. ▼



Source: www.wbardenbiomass.com/lowsizergh.html

3.20 Planning Policy Statement 22: Renewable Energy advises that care needs to be taken in siting biomass power stations to avoid impairing the settings of historic sites, sites of international importance such as World Heritage Sites and designated landscapes. Similarly, energy crop plantations have the potential to harm the visual amenity of the wider landscape.

3.21 CHP schemes, usually designed for the heating of districts or areas, can run on a number of fuel types such as gas or diesel fuel. The primary product is electricity. They are capable of achieving 70% to 90% efficiency and are particularly suitable for buildings which have a simultaneous demand for hot water and electricity such as swimming pools, leisure centres, offices and larger new housing schemes. The technology of CHP is developing rapidly and it is possible to use bio-diesel from vegetable sources as a fuel source. The University of Cumbria Newton Rigg campus is now successfully using biodiesel from oilseed and is researching the use of eucalypts as a test crop for biomass. The diesel produced is used to power farm vehicles and some minibuses. Some 8000 litres was produced in 2009.

- Biomass CHP is suitable for schemes where there is a high demand for heat most of the year such as in hospitals, leisure centres, hotels and some industrial premises
- A local, reliable fuel source is necessary
- Ample storage space for fuel is necessary together with access to the boiler for loading
- Biomass boilers need frequent cleaning and maintenance
- A flue needs to project above the roofline.
- A flue requires planning permission if it exceeds one metre above the highest part of the roof.

Sunpipes

3.22 The designers of buildings with large roof areas and the necessity for an even distribution of light might consider the use of sunpipes fitted into the roofs, together with mirrors and prismatic reflectors. These devices help to reflect and enlarge available light, augmenting artificial light and sun and thus reduce electricity use.

Hydro Power

3.34 Domestic hydropower systems are known as 'micro' hydro systems and are below 100 kilowatts in capacity. A hydro turbine works in the same way as a wind turbine, generating electricity as it rotates, with water rather than air driving the turbine. Some water is diverted out of the river or stream upstream of the turbine and channelled past the turbine, forcing it to turn and generate electricity. A recent study³ drew the conclusion that a substantial number of existing weirs and dams could provide hydro power with little additional ecological effect on rivers. There are points on the River Caldew such as at Holme Head in Denton Holme which offer potential for hydro power schemes

3 The Scope for Renewable Energy in Cumbria, Cumbria Vision

Design considerations

- Hydro power requires the source to be relatively close to where the power will be used, or to a suitable grid connection
- Hydro systems are long lasting with minimum lifespans of over 50 years
- Turbines may have visual impact and produce some noise; the problem can be resolved by putting a turbine into an outbuilding.



▲ The new turbine house (right) for a Kaplan 100kW hydropower turbine which uses water from the River Bela, Heron Corn Mill, Beetham, South Cumbria.



◀ The erection of a technology/science block (2010) at Trinity School, Carlisle provided the opportunity to design in the features of natural ventilation/night cooling stacks, solar collectors and a rainwater harvesting system(below) which gives an instant read out of energy production at the school. ▶

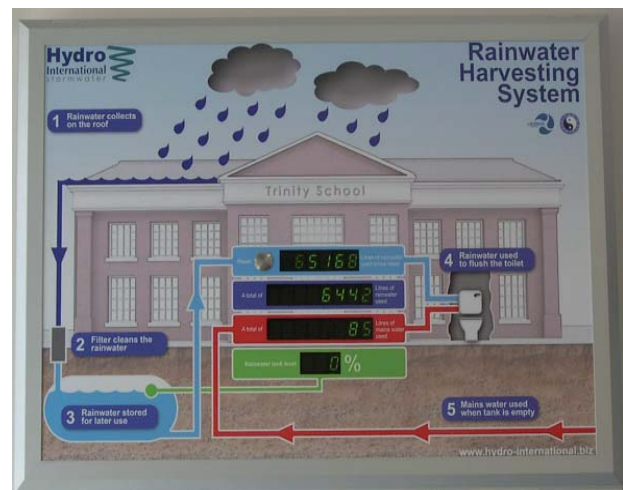
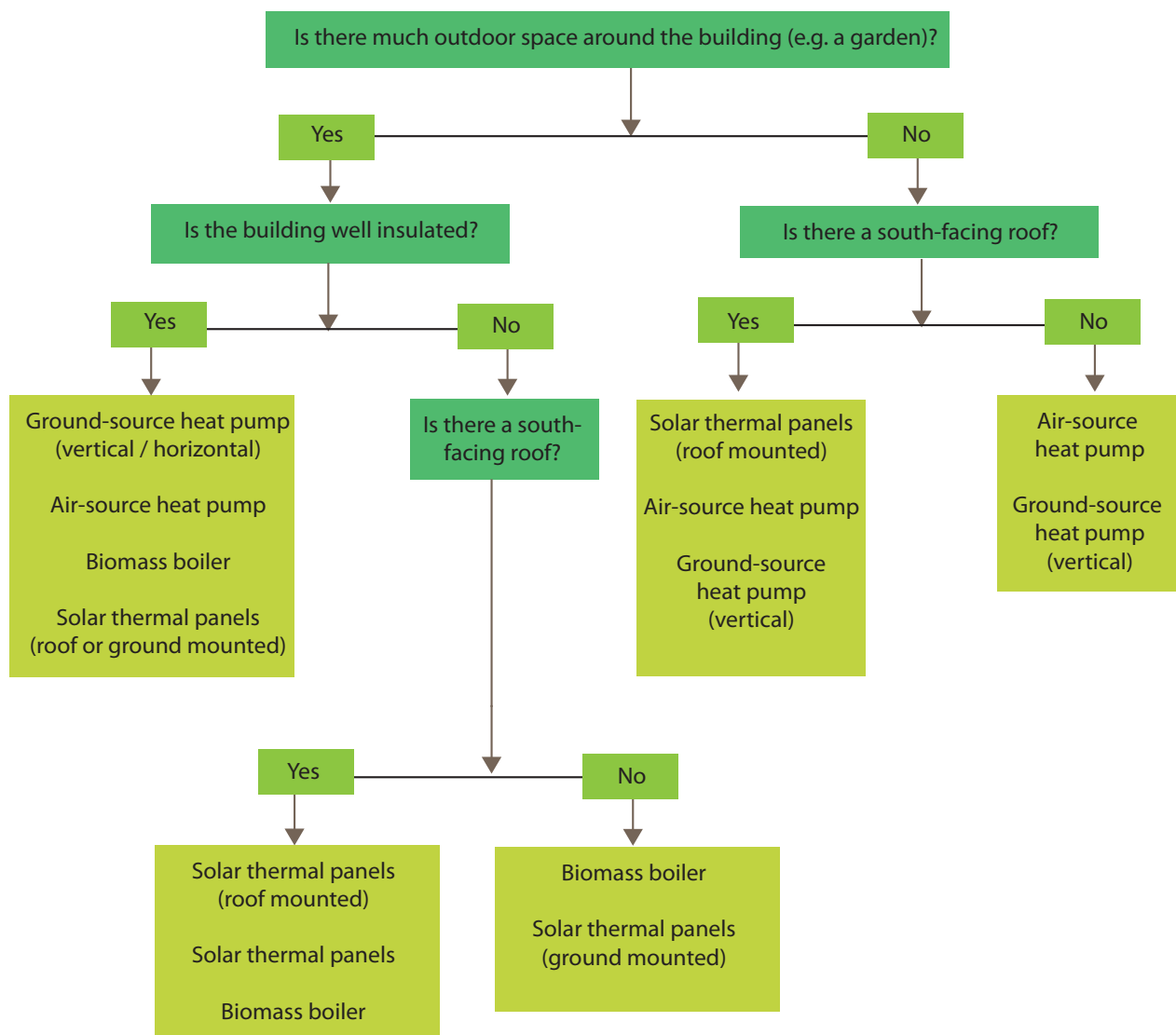
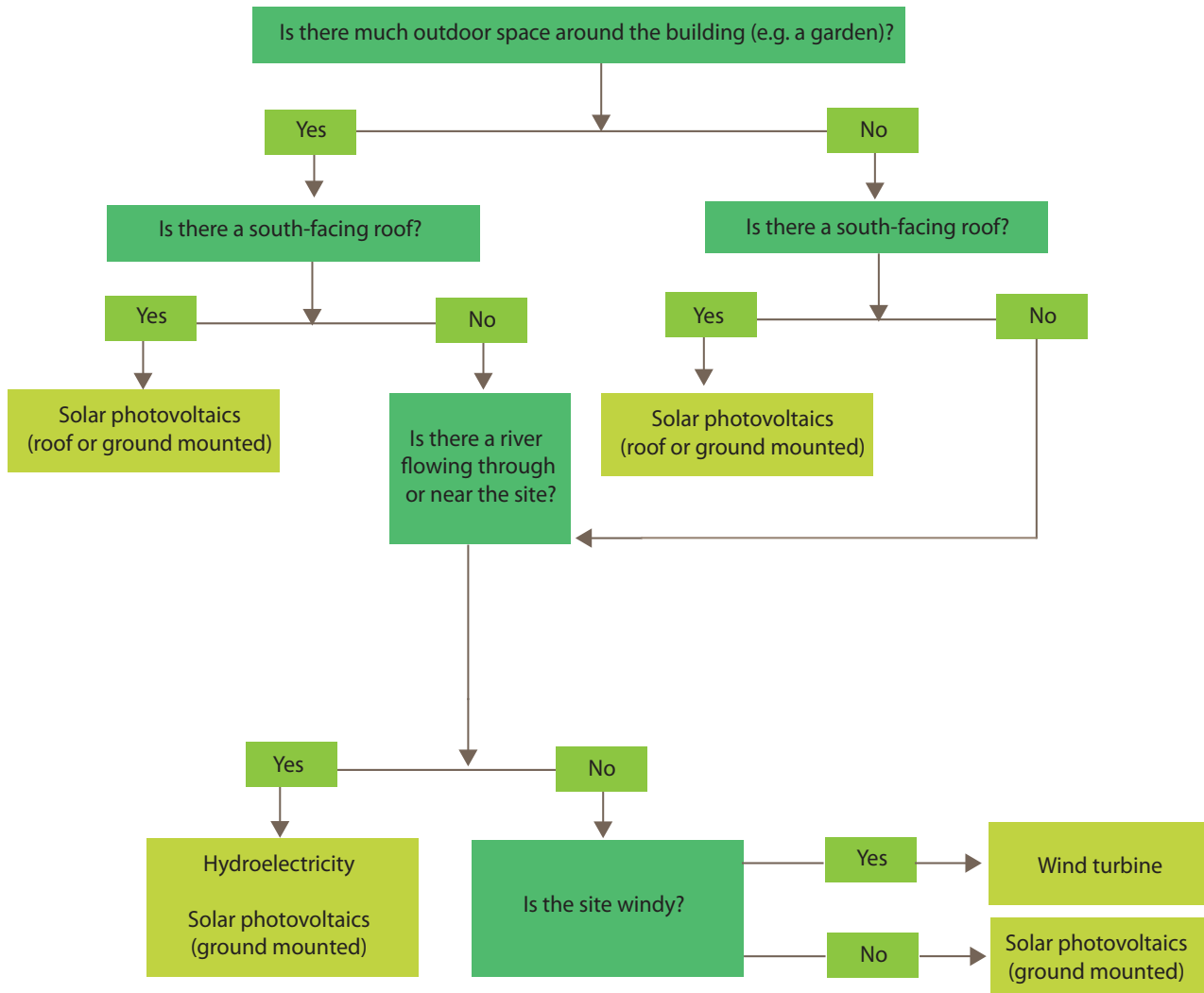


Diagram 2: Heating decision tree

Source: The Green Guide for Historic Buildings: How to improve the environmental performance of listed and historic buildings, pp.53.

Diagram 3: Electricity decision tree

Source: The Green Guide for Historic Buildings: How to improve the environmental performance of listed and historic buildings, pp.73.

Construction-

Sustainable Materials in Construction

3.21 The manufacture and transport of construction materials releases about 10% of the UK carbon dioxide emissions. The majority of construction waste goes to landfill sites, the greatest quantities are concrete, bricks and aggregate, followed by metals.

Figure 2 : Maximum transport distances for reclaimed materials (one way)

Material	Distance (miles)
Reclaimed tile	100
Recycled aggregates	150
Reclaimed brick	250
Reclaimed slate	300
Reclaimed timber	1,000
Reclaimed steel products	2,500

Source: WRAP (Waste and Resources Action Programme) Reclaimed Building Products Guide and BRE Green Guide to Specification

3.22 The energy used to construct buildings and run buildings can be reduced by using recovered materials that have been recycled and reclaimed. Low impact materials include earth, straw cork and hemp.

WRAP has demonstrated that 12.5% of the materials' value in a construction project can be recycled in nature.

3.23 The use of sustainable timber which maintains biodiversity, productivity and ecological processes is recommended. The Forest Stewardship Council's "tick tree" logo is used on product labels

to indicate certified timber and forest products produced from well-managed forests. Timber windows are much more environmentally friendly than uPVC windows.

- Local supplies of stone, brick and clay tiles that reduce the travel distances needed to bring supplies in to a development site.
- Use energy efficient windows and doors

3.24 The use of construction materials such as brick, concrete and stone which can store heat will reduce heat loss and release heat slowly. The Building Research Establishment has produced a Green Guide to Housing Specification which assesses the environmental performance of over 1200 specifications for six generic building types and components over a 60 year life-cycle.

- Use high thermal mass materials.

Heat is lost in buildings through the roof, walls, floors and windows. Part L of the Building Regulations sets out the minimum levels of insulation required in new buildings.

- Insulate buildings

3.25 Where possible, insulation made from recycled or natural sources such as sheep's wool should be used.

3.26 In Conservation Areas care should be taken to ensure that traditional details are observed and retained where possible. Original building fabric is considered important to the cultural value of a historic building and it may be more energy efficient to repair rather than to install new windows. It is generally difficult to introduce new materials without

altering the character of a building. Most uPVC double-glazed windows do not replicate the traditional pattern, scale and proportions of traditional timber windows. The uPVC manufacturing process also produces toxic by-products and the material is very difficult to recycle; it does not biodegrade when it becomes waste.

Water Conservation

3.27 Water is a finite resource. The United Kingdom is currently one of the top three most 'water stressed' countries in Europe. This means that it has less water available per head than almost other EU country. Personal water use has increased by 50% over the last 40 years and is now in the region of 150 litres per person per day.⁴

3.28 Water for domestic use is purified to very high standards using chemicals and energy, yet one-third of this water is just for flushing the toilet and another third for washing clothes.

Rainwater Harvesting

3.29 Rainwater storage systems harvest or collect rainwater for irrigation, garden watering, toilet flushing or car washing. The cost of a system is recovered in 10 to 15 years. This rainwater would otherwise have been lost through evaporation or into the ground. An inexpensive, common form of rainwater storage is a garden water butt which can often be conveniently located on rear elevations.

Grey water use

3.30 Grey water recycling systems reuse waste water from baths, showers, washing machines and hand wash basins and can save around 50% on mains water

consumption. They can be incorporated in both existing and new properties for uses not requiring drinking water standard such as the watering of gardens and landscaped areas and toilet flushing. Greywater requires filtration and chemical or biological treatment prior to reuse. The Code for Sustainable Homes (Appendix 3) sets minimum standards for sustainable water use at each level.

- Grey water storage systems should be located in roof spaces or underground so that they do not affect the exterior of a building or streetscene.
- It is best to avoid setting up a system which will re-use water from kitchen sinks, washing machines and dishwashers as they collect grease and oil which is difficult to filter
- Bath and shower water can be collected, cleaned and reused to flush toilets; cleaned water is stored in a cistern behind the toilet. This reduces water use by up to 30%.
- Greywater should not be stored for more than a day or two before use or bacteria will build up.

Water saving devices

- Install a water butt.
- Install low flush and dual flush toilets

Newer toilets have smaller cisterns and therefore use less water. Dual flush toilets use 6 litres and 4 litres or 4 litres and 2 litres of water., compared to up to 13 litres of water in one flush in older cisterns.

- Install low water use appliances

4 Ofwat

Low water use domestic white goods appliances can use significantly less water and energy.

- Install low flow spray taps or sensor-operated taps
- Install showers not baths

3.31 Showers generally use less than half the amount of water needed for a bath.

- Control intermittent supplies
- Cut the amount of mains water being used for cooling, cleaning or washing finished articles, workspaces or vehicles by regulating the amount of water and not using a tap or hose which might be left running.
- Install water meters.
- Install landscaping which uses drought-resistant plants and water-retaining mulches.

3.32 Waste water from buildings causes environmental damage by running off hard surfaces and entering drainage systems which may be full to capacity during storm periods. This situation may increase the risk of flooding to people and properties. The following system may alleviate the risks of flooding.:

Sustainable Urban Drainage Systems

3.33 Sustainable urban drainage systems (SUDS) aim to manage water run off by slowing down run off or by storing surface water. They aim also to improve the quality of water by treating or immobilising pollutants. They may be appropriate in new development where existing sewerage systems are close to full capacity. There are four general systems of control:

1. Permeable surfaces and filter drains which allow rainwater and run off to infiltrate into permeable material below ground and provide storage. Porous paving can be made from crushed stone or gravel, grasscrete, permeable concrete blocks or porous asphalt
2. Infiltration devices to allow water to soak into the ground such as trenches and basins. Basins allow temporary storage for storm water and stone-filled trenches act as reservoirs from which water may filtrate gradually into the ground.
3. Filter strips, filter or French drains, green roofs and swales which are vegetated features. Filter strips may handle storm water to a designated discharge point via a perforated pipe, allowing excess water to filtrate gradually into the ground.
4. Detention basins and retention ponds to hold excess water after downpours and permit controlled discharge.

SUDS should be designed into development from the outset and can make a positive contribution to the landscape around a development

3.35 The Solway Firth estuary is currently under consideration for a possible barrage site; the Solway Energy Gateway is proposing a 2 kilometre barrage between Bowness-on-Solway and Annan with 300 MW capacity.

Waste and Recycling

3.36 Policy CP14 of the District Local Plan 2001-2016 requires major development proposals to be accompanied by a waste audit providing information on the type and volume of waste likely to be generated both during construction and in subsequent use of the development, and the options for its management.

Overview of Technologies

Figure 2: System Overview of Microgeneration Technologies

	Solar water heating	Biomass	Heat pumps	Wind	Hydro	PV
Hot water	✓	✓	✓	✓*	✓*	✓*
Space heating		✓	✓	✓*	✓*	✓*
Electricity				✓	✓	✓
Predictability	Moderate	Excellent	Excellent	Poor	Good	Moderate
Correlation with heating demand **	Moderate	Good	Good	Good	Good	Poor
Lifespan	25 years	15 years	20 years	20 years	50 years	25 years
Cost	Modest	Modest	Moderate	Moderate	Expensive	Expensive

* Only where water and space heating systems are electric

** Heating demand is higher in winter

Figure 3: The Waste Management Hierarchy

Reduction	Waste prevention Waste minimisation	Best environmental option
Re-use	On-site re-use Off site re-use	
Recycling & Composting	On site recycling Off site recycling	
Energy Recovery	Energy can be generated from waste	
Disposal	Landfilling: duty of care	Worst environmental option

3.37 Adequate space should be provided for all waste facilities including general waste, recyclable waste and compostable waste, although the latter is usually the responsibility of individual householders. Parking should not obstruct access to the facilities. Prominently sited bins can detract from the appearance of areas and waste storage facilities should be designed to integrate into developments and appropriately screened.

- Road widths and turning heads should be able to accommodate waste collection vehicles
- Before demolition of a building developers should conduct an appraisal of materials that can be recovered using the Institute of Civil Engineers Demolition Protocol. Demolition wastes can be re-used for lower quality fill uses. e.g as a concrete aggregate or for access roads and footpaths. WRAP (Waste and Resources Action Programme) has established the validity of setting a requirement for recycled content of 12% of the materials' value in house building construction projects.

3.38 Minimising waste is of importance as space at landfills diminishes and increasing amounts of waste are discarded. Schemes to process animal or plant waste matter such as farm slurry, sewage sludge and municipal solid waste are encouraged, for example, through anaerobic digestion or composting. Anaerobic digestion process produces gas with a high methane content which can be captured and burned to produce heat, electricity or both. Fibre byproducts can be used as a soil conditioner and liquid produced can be used as liquid fertiliser.

- Sites used for the treatment of anaerobic waste should have easy access to the main road network, preferably close to the waste source
- Brownfield sites should be used where possible.

Sustainable Travel

3.39 The Government has a key sustainability objective ⁵ to ensure that jobs, shops, leisure facilities and services are accessible by public transport, walking and cycling.

⁵ Planning Policy Statement 13: Transport

Local Authorities are encouraged to give accessibility to development sites and areas a very high priority, ensuring that they offer safe, easy access by a range of transport modes and not exclusively by car. This ensures that efficiency in energy use is encouraged.

3.40 The Carlisle Area summary for the County Council's Local Transport Plan 2 for 2005/06-2011/12 states that 78% of the population is able to access (within 800 metres) an hourly or better bus service during weekdays, although this figures drops to 71% for evening services. The Plan points out that the cycle route network is discontinuous which is recognised in the Council's Movement Strategy and Cycling Development Action Plan. The Petteril Valley cycleway scheme linking residential areas with commercial areas including the City Centre is being implemented over a period of several years from 2008. Section 106 money was obtained from a housing development on a site at Brisco Meadows which has made a contribution towards the cost of the scheme. Cycle routes will provide safer routes for walkers and cyclists and contribute towards the improvement of health by encouraging physical activity and by providing improved access to green spaces.

Design considerations

- Ensure the efficient use of land by seeking, where possible, a mix of uses.
- Employment sites and uses with high travel demands such as retail, offices, commercial leisure, hospitals and conference facilities should be in locations that are highly accessible by public transport, reducing the need to travel by car.
- The Transport Strategy encouraged for Ecotowns suggests that every home should be no more than 400 metres from a bus stop and no more than 400 metres from local shops, schools and medical facilities.
- New employment generators must provide cycle facilities and where possible improve links to existing cycling infrastructure.
- Brampton and Longtown cycle networks need definition and encouragement will be given to cycle and pedestrian links which will implement these networks.
- The preparation of Work Travel Plans is encouraged by major employers and required for all major developments.
- Development proposals of the following sizes will require Travel Plans:
 1. Retail and indoor leisure facilities of 1,000 m² or more

**Design considerations
cont'd**

2. Industrial development over 5,000 m² and warehousing/ distribution developments in excess of 10,000 m²

3. Office, education and health services development over 2,500 m²

4. New and expanded school facilities

4 Energy Standards

Putting energy efficiency into practice

4.1 The Climate Change Act set targets for reducing greenhouse gas emissions, as itemised in paragraph 2.3. Currently 40 to 50% of our carbon (a primary greenhouse gas) emissions are from energy use in buildings. Although new homes make up less than one per cent of the stock per year it is estimated that by 2050 as much as a third of the housing stock could be built between now and then. The government has set a target for all new development to be zero carbon by 2016. It is essential therefore that new buildings should be designed and built to higher standards.

4.2 Since October 2008, energy performance certificates have been required for every new building, including those rented out or sold. The certificate gives a rating on a scale 'A' to 'G' (least efficient). Accredited energy assessors provide reports suggesting improvements to make buildings more energy efficient.

4.3 The Planning and Energy Act 2008 enabled local planning authorities to set requirements for energy use and energy efficiency in local development plans as follows:

- A proportion of energy used in development in the area to be energy from renewable sources in the locality of the development;
- A proportion of energy used in

development in the area to be low carbon energy from sources in the locality of the development;

- Development in the area to comply with energy efficiency standards that exceed the energy requirements of Building Regulations.

Renewable Energy in new developments

4.4 The Building Regulations set minimum acceptable standards. Reducing the need for energy and increasing efficiency will be the vital first step to achieving carbon reduction as the resources that energy production are based on, such as oil and gas, become scarcer or cease to be supplied.

4.5 Given the areas of woodland and forest in the east of the District wood fuel is a suitable fuel source. Energy from waves, solar, wind and ground source heat pumps can make significant contributions to increasing power from low carbon energy sources.

4.6 Whilst district combined heat and power schemes may be suitable for large new urban extensions decentralised schemes are suitable for rural areas where connections to the gas or electricity grid may not be possible or viable. Many renewable energy technologies are suitable for small-scale schemes and such schemes help communities to engage in and discuss energy issues.

4.7 Where infrastructure is available a development might connect to a decentralised, renewable or low carbon energy supply.

4.8 For developments above the 1,000m² threshold proposed schemes should be assessed by a BREEAM (Buildings Research Establishment Environmental Assessment Method) Buildings rating at the design stage and post construction to achieve a rating of 'very good' or 'excellent' or 'outstanding'. Information supporting major applications should include reference to energy efficient design in the Design and Access Statement. This is referenced in the validation guidance notes for applications for planning permission.

4.9 The Energy Efficiency/Sustainable Building Checklist (Appendix 5) will monitor energy efficient features of designs during the application validation process.

Design Considerations

- All development equal to or exceeding 1,000m² should seek to obtain 10% or more of predicted energy requirements from decentralised and renewable or low carbon sources.

Appendix 1 Policy Background

Policy Background

Carlisle District Local Plan 2001-2016

Policy CP8 Renewable Energy

Proposals for renewable energy will be favourably considered provided that all of the following criteria are satisfied: 9 criteria are listed.

1. there is no unacceptable visual impact on the immediate and wider landscape and townscape;
2. there is no adverse impact on biodiversity;
3. any new structures would be sensitively incorporated into the surrounding landscape/ townscape and/or habitat and respect the local landscape character;
4. measures are taken to mitigate any noise, smell or other nuisance or pollutants likely to affect nearby occupiers, amenities and/or neighbouring land uses;
5. any waste arising as a result of the development is minimised and dealt with using a suitable means of disposal;
6. there would be no unacceptable levels of harm to features designated as of local national or international importance;
7. adequate provision can be made for access and parking and the potential impact on the road network;
8. there would be no unacceptable conflict with any existing recreational facilities or routes;

9. there would be no unacceptable cumulative effects when proposals are considered together with any extant planning approvals or other existing renewable energy developments.

Policy CP9 Development, Energy Conservation and Efficiency

Development proposals should take into account the need for energy conservation and efficiency in their design, layout and choice of materials. The principles shall be introduced in the early stages of the design process in order to consider the orientation of buildings to maximise solar gain coupled with high levels of insulation to reduce heating costs. The efficient and effective use of land, including the reuse of existing buildings and the use of environmentally sustainable materials should also be encouraged. Landscaping schemes also may be used to shelter buildings in exposed positions to reduce heat loss.

These elements will contribute to the energy efficiency of a new development. Developers should also consider the possible incorporation of photovoltaic cells, active solar panels and other small-scale sources of renewable energy. Consideration should be given to recycled materials, waste minimisation and recycling measures within the design. Designers will be encouraged to include systems for collecting roof water to enable its re-use.

Policy CP10 Sustainable Drainage Systems

Development proposals should incorporate Sustainable Drainage Systems in situations where two conditions apply:

1. The development will generate an increase in surface water run-off; and
2. The rate of surface water run-off is likely to create or exacerbate flooding problems.

Policy CP14 Waste Minimisation and the Recycling of Waste

Major development proposals must include details of facilities for the storage, collection and recycling of waste produced on-site to show that the principles of sustainable waste management are being applied.

Appendix 2 Background Legislation and Documents

Home Energy Conservation Act 1995

The Climate Change and Sustainable Energy Act 2006; The Climate Change Act 2008

Planning Policy Statement 1: Delivering Sustainable Development and the Supplement : Planning and Climate Change (2007), ODPM, 2005

Planning Policy Statement 5: Planning for the Historic Environment, DCLG, 2010.

Planning Policy Statement 10: Planning for Sustainable Waste Management, ODPM, 2005

Planning Policy Statement 13: Transport, ODPM, 2011

Planning Policy Statement 22 and the Supplement: Planning for Renewable Energy, ODPM, 2004

The UK Renewable Energy Strategy 2009

The UK Low Carbon Transition Plan (2009), Department of Energy and Climate Change

Cumbria Climate Change Strategy and Action Plan 2009-2014

Cumbria Local Transport Plan 2 2006/7-2011/12

Carlisle City Council Carbon Management Programme Carbon Management Plan 2008/9-2012/13

Carlisle Environmental Policy Statement

Appendix 3

Code for Sustainable Homes

⁶Summary of Environmental Categories and Issues For Assessment

Categories	Issue
Energy and CO₂ Emissions	Dwelling emission rate (M); Building fabric: at least 3 of the 5 key elements of roof, external walls, internal walls, floors and windows specified to achieve a Building Research Establishment Green Guide rating ; Drying space; Energy-labelled white goods; External lighting; Low or zero carbon technologies; Cycle storage;
Water	Indoor water use (M); water use for levels 3 and 4 – maximum 105 litres per day; water use for levels 5 and 6 – maximum 80 litres per day. External water use;
Surface Water Run-off	Management of surface water runoff from developments (M) Flood risk
Waste	Storage of non-recyclable waste and recyclable household waste (M); composting;
Pollution	NOX emissions;
Ecology	Ecological value of site; Ecological enhancement; Protection of ecological features; Change in ecological value of site;

(M) denotes issues with mandatory elements

The Code is an environmental impact rating system for housing and was introduced as a voluntary standard in England in 2007; whilst it is closely linked to the Building Regulations minimum standards for Code compliance have been set above the requirements of Building Regulations. From May 2008 all new houses are required to be rated on the Code by awarding stars, 1 to 6, based on performance against the sustainability categories. 36% of the Code assessment is solely related to energy. The code is compulsory for all public sector-funded schemes. The Code Level 3 is mandatory in 2010 under the Building Regulations and Code Level 4 thermal standards are set to be part of the Building Regulations by 2013. All new homes will have to be zero carbon under the CSH by 2016.

⁶ Department for Communities and Local Government

Appendix 4

BREEAM

Assessment Of Buildings

The assessment process was created in 1990 initially in two versions: for housing and offices.⁷

It is updated regularly in line with the Building Regulations.

All versions look at and assess the same broad range of environmental impacts:

- Management
- Health and Wellbeing
- Energy
- Transport
- Water use
- Materials and Waste
- Landuse and ecology
- Pollution

There are a set of environmental weightings including benchmarks for CO₂ emissions; credits are awarded in each area to produce an overall score.

Buildings are rated on a final score and given a certificate:

PASS, GOOD, VERY GOOD, EXCELLENT, OUTSTANDING

Excellent and outstanding rated buildings include renewable energy features.

7

www.breeam.org.uk

Appendix 5 Energy Efficiency / Sustainable Building Checklist

Sustainability Topic	Sustainability Issue	Questions relating to Issues	Yes/ No	Details: (or Design and Access Statement if required)
Land and Building Reuse	Land reuse Building reuse/ refurbishment	1. Will the development be wholly on Brownfield land? 2 Has the building reuse been referred to in the Design and Access Statement ?		
Sustainable Layout and Design	Efficient Layout and Design	3 Has the development been designed to optimise the management of energy from the sun ? 4 Has the development been designed to maximise natural daylighting ? 5 How will the design of the building reduce the use of energy ? (e.g. insulation measures)		
Renewable Energy	Energy Efficiency and Reduction	6 To off-set the energy total needs of the development, do the proposals include any of the following technologies ? If so please give details: - Solar water heating systems - Solar photovoltaic tiles - Generation from biomass or biofuels		

		<ul style="list-style-type: none"> - Wind power - Combined heat and power- Other energy saving technology 		
Sustainable Materials	Sustainable, Recycled Materials	<p>Ground/air/water source heat pumps</p> <p>7 Will the materials used be from sustainable sources ?</p> <p>8 Will recycled building materials be used ? Please specify.</p> <p>9 Will the materials used have a low environmental impact rating e.g. under the BRE Green Guide ?</p>		
Waste Management	Waste Minimisation	<p>10 Is sufficient storage space made for the storage and recycling of waste ?</p> <p>11 If non-residential development, will a waste minimisation and management plan be developed ?</p> <p>12 Will the site be registered with the Considerate Constructors' Scheme ?</p>		
Water Use and Water Conservation	Water Efficiency	<p>13 What water saving devices will be included ? Please specify.</p> <p>14 What provision is there for rainwater harvesting / grey water recycling ?</p> <p>15 Are Sustainable Urban Drainage Systems (SUDS) or other water attenuation measures proposed ? Please specify.</p>		(Drainage Assessment If required)

Flood Mitigation	Flood Risk	16 Is the development in a known flood zone ? If so give details of the Sequential Test and Exception Test.		
Travel	Transport Efficiency And Energy Reduction	17 Can the development be easily accessed by modes of transport other than the private car? 18 Has provision been made for secure cycle parking?		Travel Plan or Transport Assessment
Biodiversity	Protection and enhancement of wildlife habitats and natural features	19 Has the design of the development used opportunities for retaining, protecting and enhancing wildlife habitats and natural features ?		

Appendix 6 Examples of Energy Efficiency Good Practice In the District

Reference: <http://www.climatechangenorthwest.co.uk>

<http://www.sbnw.co.uk/>

TALKIN TARN COUNTRY PARK

Region: Cumbria



Location: Brampton

More info: Talkin Tarn Country Park

Refurbishment of the site in 2006 used green technologies extensively. An innovative water source heat pump recovery system was installed to heat the Alexander boathouse.

A new timber cabin educational facility and public toilets include a rainwater

harvesting system. Under-floor heating and primary hot water is generated using an air source heat pump; and sun tubes supplement lighting.

Solar pv panels to the new warden's facility and workshop roof provide electricity.

All the buildings feature thermafleece insulation, 'K' glass double glazing, low energy lighting and motion sensors.

In October 2007 the project was shortlisted for a Public Servant Sustainability Award.

TWO CASTLES HOUSING ASSOCIATION: ECO-HOMES AT BURGH-BY-SANDS



Region: Cumbria

Location: Burgh-by-Sands

More info: Two Castles Housing Association: eco-homes at Burgh-by-Sands

This is a greenfield scheme mix of affordable properties for rent and sale.

The scheme was constructed using the Kingspan TEK building system utilising

structural insulated panel technology (SIPs). The panels consist of two layers of board with foam insulation inside and they are used to build the entire shell of each house – the internal and external walls, the floors, and the roof. The system is delivered to site ready for erection; and the brickwork exterior is then constructed.

The houses' low U-values, their excellent air-tightness, the A-rated condensing boilers, and the dedicated low-energy lighting combined to earn a 'very good' Building Research Establishment rating.



HESPIN WOOD LANDFILL GAS OPERATION

Region: Cumbria

Location: Hespin Wood near Carlisle

More info:

Hespin Wood landfill gas operation

Methane gas is a by-product of the decay

and decomposition that occurs in landfill sites. At one time methane was regarded as a waste by-product. Then climate change science brought to our attention the harmful effects of methane - that it is >20 times more effective than carbon dioxide in trapping heat in the atmosphere - escaping from landfill sites.

Modern landfill sites can be designed in such a way as to capture the methane and make good use of it in generating electricity.

At Hespin Wood the captured methane drives a 1.3 Megawatt turbine, producing enough electricity to power 1,000+ homes.

LOW LUCKENS ORGANIC RESOURCE CENTRE



Region: Cumbria

Location: Roweltown, Carlisle

More info:

Low Luckens Organic Resource Centre

Low Luckens aims to:

- To promote sustainable farming, local healthy food and countryside;

- To provide opportunities for learning on the land to people of all ages and abilities.

Organic farming and renewable energy have a lot in common. Both shun intensive production systems in favour of sustainability. Both challenge the notion that such systems must be large scale, centralised and environmentally damaging. There are many renewable technologies, but at Low Luckens wind and solar energy have been found to suit the requirements best. The Centre is maintained (open seven days) as a place which anyone can use for information.

Further details: <http://www.lowluckensfarm.co.uk/>

BRAMPTON ECOHOUSE

Reference: http://www.sustainablehomes.co.uk/case_studies/brampton2.htm



Scheme Summary

The scheme comprises a detached 3 bed demonstration EcoHouse. This was built to offer practical experience of energy efficient and environmentally sustainable construction. It has been awarded an Excellent EcoHomes rating. Completed 2000.

The EcoHouse was developed in partnership with Brampton Rural

Housing Society, Carlisle City Council and local architects, John Bodger and Stephen Crichton. The aim of the project was to design and build a house with significant environmental benefits, that was acceptable and affordable to residents, and easily replicated by small to medium scale builders or on a large scale.

An initial green specification was formulated, but proved too expensive. This specification was very green and it was recognised that compromise was necessary to achieve the project aims. The final specification was radically modified to include features that give the greatest environmental benefit for the least cost.

The project also aimed to raise environmental awareness within the building industry. Seminars and site visits were held during the design and construction phases of development.

Environmental Features

Consideration was given to two different construction techniques: high thermal mass brick and block work; and low thermal mass timber frame. Timber frame was chosen, using a timber 'I' beam system with a breathing wall. The panels were insulated on site with blown cellulose (recycled newspaper). The possibility of using 'I' beams to construct the roof, and provide additional useable space was rejected on budget grounds.

To remove the use of uPVC, softwood windows were used, with low emissivity double glazing. Rainwater goods are galvanised steel. The high level of insulation and airtightness reduce significantly the need for conventional heating. However, it was considered that in terms of acceptability, residents would perceive the need for a heating source. In response to this a small gas fired central heating system is installed.

Ventilation is provided by low energy conventional extractor fans to the kitchen and bathroom.

Both rainwater recycling and solar panels were considered. Payback periods were too long and alternative solutions provide more cost effective environmental savings. Low flow taps and shower head are fitted, along with low flush 6 litre WCs to help conserve water. Rainwater from the roof is collected in water butts for use in the garden, offering the option for residents to save more water. Low energy light fittings using CFLs are used throughout.

The building is part clad with reclaimed bricks, with upper levels being clad in low maintenance, sustainable timber (larch). The roof is covered in reclaimed Welsh slate.

Costs

The house cost around £68,500, plus fees. Although this appears to be relatively expensive, it is largely due to the house being:

- A prototype; and
- An individual detached house

If the house design was to be repeated on a larger scale, or incorporated into a terraced design, considerable cost savings could be made.

The process has shown that simple is best. The greatest environmental savings can be made in the building's basic structure, rather than the services or technology. It was quickly learnt that the initial house was over designed for its purpose (Mark 1). In trying to make every aspect as green as possible some features and systems that were inherently expensive, were built in. A re-think resulted in a more practical solution.

It is the first building to achieve an Excellent EcoHomes rating. Ironically the changes made between the expensive Mark 1 design and the house built did not affect the EcoHomes rating, but it did ensure the house was more affordable and easily replicable. The problems of perceived difficulty should not be underestimated. Although building techniques are simple, builders' unfamiliarity with them raised time and cost concerns. This led to builders either not tendering or loading the costs.

Sustainable does not mean just choosing the right materials and designing for low energy use. To be genuinely sustainable the design of the house needs to be affordable and attractive to people who normally don't consider environmental matters important. It also has to make business sense as well as 'green' sense. In the end it was felt that the house design is viable in a business sense, as well as offering very significant energy savings and environmental benefits.

Appendix 7 References

Defra, Adapting to climate change, 2009

Department for Communities and Local Government, Code for Sustainable Homes and Technical Guide, 2008

Department for Communities and Local Government, Cost Analysis of the Code for Sustainable Homes: Final Report, 2008

Sustainable Development Commission, Wind Power in the UK, 2005

London Climate Change Partnership, Adapting to climate change: a checklist for development, 2005

TCPA & CHPA, Community Energy: Urban Planning for a Low Carbon Future, 2008

TCPA, Climate change adaptation by design, 2007

TCPA, Biodiversity by Design, 2004

Energy Saving Trust, Meeting the 10 per cent target for renewable energy in housing – a guide for developers and planners, CE190, 2006

The Beacons Low Emission Strategies Group, Low Emission Strategies, 2008

North West Regional Assembly, Delivering Sustainable Housing in the North West, 2008

Changeworks, Energy Heritage: a guide to improving energy efficiency in traditional and historic homes, 2008

Climate Change and Historic Environment, English Heritage, 2008.

Cumbria Strategic Partnership, Cumbria Climate Change Action Plan 2009-2014, 2009

Cumbria Vision, The scope for renewable energy in Cumbria, 2010

Defra, Climate Change: The UK Programme, 2006

DTI, Meeting the energy challenge: a white paper on energy, 2007

DTI, Photovoltaics in buildings: guide to the installation of PV systems, 2006

DTI, Photovoltaics in buildings: a design guide, 1999

Intergovernmental Panel on Climate Change, Climate Change 2007

Committee on Climate Change, Building a low-carbon economy, 2008
Planning Advisory Service, Using supplementary planning documents to address climate change locally, May 2010

The Prince's Regeneration Trust, The Green Guide for Historic Buildings, 2010

Appendix 8 Sources of Further Information

Brampton Ecohouse	www.brampton-ecohouse.org.uk
British Hydropower Association	www.british-hydro.org
British Wind Energy Association	www.bwea.com
Building for Life	www.buildingforlife.org
Building Research Establishment (bre)	www.bre.co.uk Tel. 0161 295 5076
Centre for Alternative Technology	www.cat.org.uk
Climate Change	www.climatechangeandyourhome.org.uk
Combined Heat & Power Association	www.chpa.co.uk Tel. 0207 828 4077
Commission for Architecture and the Built Environment (CABE)	www.cabe.org.uk
Cumbria Community Energy Trust	www.cumbriavision.co.uk Tel. 01768 861316
Cumbria Woodlands	www.cumbriawoodlands.co.uk Tel. 01539 822140
Energy Efficiency Partnership for Homes	www.eeph.org.uk Tel. 0207 222 0101
Energy Saving Trust Advice Centre	www.energysavingtrust.org.uk Tel. (freephone) 0800 512 012
Green Book Live (BRE)	www.greenbooklive.com
Heritage information	www.helm.org.uk
Microgeneration technology and installer database	
Green Building Store	www.greenbuildingstore.co.uk Tel. 01484 461705

Green Guide to Housing Specification
Ground Source Heat Pump Association

www.bre.co.uk/greenguide

www.gshp.org.uk

Tel. 01908 665555

Living roofs: Green and brown roofs

www.livingroofs.org

Low Carbon Buildings Programme

www.lowcarbonbuildings.org.uk

Microgeneration funding

Tel. 0800 915 0990

National Energy Foundation

www.nef.org.uk

Tel. 01908 665555

NWDA – NW Rural Carbon Challenge Fund

www.envirolinknorthwest.co.uk

Tel. 01925 813200

Renewable Energy Association

www.r-e-a.net Tel. 0207 925 3570

Solway Energy Gateway

www.solwayenergygateway.co.uk

Sustainable Brampton

www.sustainablebrampton.org

Sustrans Sustainable Transport

www.sustrans.org.uk

Tel. 0845 113 00 65

Town and Country Planning Association

www.tcpa.org.uk

UK Green Building Council

www.ukgbc.org

UK Heat Pump Network

www.heatpumpnet.org.uk

Tel. 0800 685794

UK Solar Energy Society

www.uk-ises.org

Tel. 07760 163559

Appendix 9 Glossary

Anaerobic Digestion – The biological treatment of biodegradable organic waste within a vessel in the absence of oxygen, using microbial activity to breakdown waste in a controlled environment.

Biofuel - Organic matter such as forestry/agricultural residues or purpose grown crops that can be used to produce energy.

Biomass – Biomass or wood burning systems use pelleted or chipped wood as fuel. Wood burning stoves and boilers are 80 - 90% efficient.

BREEAM – The Building Research Establishment Environmental Assessment Method is an industry measure of energy and environmental performance of commercial buildings.

Building Regulations (Part L) – The part of the Building Regulations that covers the conservation of energy and power within buildings.

Carbon Footprint – A measure of the amount of greenhouse gases (measured in terms of carbon dioxide) that individuals, businesses and organisations release into the atmosphere as a result of their actions over a given period of time. This includes the carbon dioxide released whilst manufacturing and transporting the food and goods consumed, to demolish, construct, heat and power building and appliances, and to move around from place to place.

Carbon sinks - Atmospheric carbon in the form of carbon dioxide is captured and stored in living (trees and other green vegetation) or non-living reservoirs (soil, geological formations, oceans, wood products). Land uses which absorb and store carbon over long periods of time ('carbon sinks') may help to offset carbon dioxide emissions, at least in the short to medium term.

CHP (Combined heat and power) - The simultaneous generation of usable heat and power (usually electricity) in a single process, reducing heat that would be wasted to the atmosphere, rivers or seas.

Code for Sustainable Homes - A government-produced standard for measuring the impact of new development on the environment, prepared specifically for housing.

Decentralised energy supply - Energy supply from local renewable and local low-carbon sources usually on a relatively small scale; denotes a diverse range of technologies.

Emissions - The release of greenhouse gases into the atmosphere; carbon dioxide is the main greenhouse gas in the UK.

Energy efficiency – making the best or most efficient use of energy in order to achieve a given output of goods/services or comfort and convenience.

Green roof – A roof of a building which is partially or completely covered with plants.

Greenhouse gases – Atmospheric gases such as carbon dioxide, methane, chlorofluorocarbons (CFCs) that function like a ‘greenhouse’ by trapping some of the sun’s energy that reaches the earth, preventing it from being reflected back out of the earth’s atmosphere, and therefore warming the earth’s climate.

Geothermal energy – Refers to the natural heat energy created deep inside the earth. Natural processes transfer this heat to close to the surface where it can be tapped for heating or cooling or to generate electricity.

Grey water – Water that has already been used once. If treated, it can be collected and reused again for uses that do not require water that is of drinking standard.

Ground source heat pump – A heat pump that removes heat from the earth or groundwater in cold weather and transfers it to a building through an underground piping system. The process can be reversed in hot weather to transfer heat into the ground.

Heritage assets - Elements of the historic environment features including buildings, parks and gardens, standing, buried, submerged remains, areas, sites and landscapes which all have meaning for society.

Low carbon development – A development that achieves a high level of reduction in carbon emissions from energy efficiency measures and renewable energy use on site.

Low carbon energy- technologies that produce energy with low carbon emissions compared with energy produced by standard fossil fuel generation. Combined heat and power boilers and ground source heat pumps, for example, considerably reduce the amount of energy needed in order to produce heating or electricity.

Microclimate – Refers to differences in temperature, humidity and the level of light that can occur on a very small scale as a result of the characteristics of a site or area.

Micro generation - The generation of heat and power on a small scale by individuals, small businesses and communities to meet their own needs.

Mitigation – Taking action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.

National Indicator - A standard measure prescribed by central government as a means of judging performance.

Passive design – The use of solar energy and natural processes to control heating and cooling of buildings. It can refer to the way buildings can be built and designed to function efficiently on their own through simple choices on the type of material and fittings used, and building layout.

Passive ventilation system- Takes advantage of the natural passage of air without the need for high energy consuming equipment.

Photovoltaic (PV) Cell –

Converts solar energy into electricity. Interconnected cells are encapsulated into a sealed module that produces a voltage.

Renewable energy - Energy flows that occur naturally in the environment: from wind, the fall of water, the movement of oceans, the sun and biomass.

Standard Assessment Procedure (SAP) -

A government procedure used to generate the energy rating of dwellings on a scale from 0 to 120, based on the calculated annual energy requirement for space and water heating.

Sustainable timber - Timber which is harvested to ensure no ecological damage to other species and which is replaced.

Sustainable drainage systems (SUDS) -

Are designed to improve the rate and manner of absorption by water of hard and soft surfaces by more natural ways. SUDS are an alternative to traditional ways of managing runoff from buildings and hardstandings. Using a combination of techniques such as swales, green roofs, permeable paving, rainwater harvesting, detention basins, wetlands and ponds.

Thermal chimney or solar chimney

- A means of improving the natural ventilation of buildings by using convection of air heated by passive solar energy. i.e. A vertical shaft utilising solar energy to enhance natural stack ventilation through a building.

Thermal mass – A natural property that enables building materials to absorb, store, and later release heat. Materials with a high thermal mass are energy efficient.

Zero carbon development –

A development which has zero net carbon emissions. These developments are highly energy efficient and generate their own power from renewable sources. They export surplus electricity to the grid and import from the grid when their renewable are producing enough to meet demand.