



Supplementary Guidance

Topic: Low and Zero Carbon
Buildings

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Introduction

The purpose of this supplementary guidance is to provide the methodology for developers to demonstrate compliance with Aberdeen Local Development Plan policy **R7**, which requires all new buildings to install low and zero carbon generating technology.

Background

Climate change, energy insecurity and rising fuel poverty are key challenges for Scotland now and in the foreseeable future.

The Climate Change (Scotland) Act 2009 received Royal Assent on August 4, 2009. The Act sets in statute the Government Economic Strategy target to reduce Scotland's emissions of greenhouse gases by 80 per cent by 2050. This covers the basket of six greenhouse gases recognised by the United Nations Framework Convention on Climate Change and includes Scotland's share of emissions from international aviation and international shipping.

More than 40% of Scotland's carbon dioxide emissions, a major cause of climate change, come from the energy we use to heat, light and run our buildings.¹ In Aberdeen City housing makes up 31% of the City's carbon footprint, which is 3.98 tonnes CO₂ per capita. The Aberdeen City and Shire Structure Plan provides significant housing and employment allowance: 36,000 homes and 175 hectares of employment land to 2030. The housing allocations, once built, would result in an increase in the housing stock by 33%.

Requiring new buildings to meet more stringent energy standards will lessen their environmental impact, make them more affordable to heat, lessen our dependence on imported energy and support a domestic market for low and zero carbon generating technologies. Implementation of Policy **R7** Low and Zero Carbon Buildings would thereby contribute to sustainable economic growth.

Policy **R7** does not duplicate these standards, but requires developments to meet a proportion of the mandatory CO₂ emission reduction through the use of low and zero carbon generating technologies. In most cases, this will mean that the energy assessment information required to satisfy the buildings standards' energy requirements will be required at planning stage, not afterwards.

¹ <http://www.sbsa.gov.uk/sullivanreport.htm>

Legal Requirement

Section 72 of the Climate Change (Scotland) Act 2009 requires Local Planning Authorities to “include policies requiring all developments in the local development plan area to be designed so as to ensure that all new buildings avoid a specified and rising proportion of the projected greenhouse gas emissions from their use, calculated on the basis of the approved design and plans for the specific development, through the installation and operation of low and zero carbon generating technologies.” In February 2010, Scottish Planning Policy reiterated the above requirement.

The Development Plan Context

Section 25 of the Town and Country Planning (Scotland) Act 1997 requires decisions on planning applications to be made in accordance with the development plan, unless material considerations indicate otherwise. Upon adoption of the Aberdeen Local Development Plan in 2012, the Development Plan for Aberdeen will comprise the Aberdeen City and Shire Structure Plan (2009), the Aberdeen Local Development Plan and associated Supplementary Guidance.

Structure Plan targets require:

- All new buildings to be carbon neutral by 2016
- The city region’s electricity needs to be met from renewable sources by 2020.

Local Development Plan policy

Policy **R7**, below, sets a requirement for all new buildings to incorporate low and zero carbon generating technologies to reduce the predicted carbon dioxide emissions by at least 15%. This policy is hereafter referred to in this Supplementary Guidance as ‘the policy’.

R7 - Low and Zero Carbon Buildings

All new buildings, in meeting building regulations energy requirements, must install low and zero carbon generating technology (LZCGT) to reduce the predicted carbon dioxide emissions by at least 15% below 2007 building standards. This percentage requirement will be increased as specified in Supplementary Guidance.

This requirement does not apply to:

- *Alterations and extensions to buildings;*
- *Change of use or conversion of buildings;*
- *Ancillary buildings that are stand-alone having an area less than 50 square metres;*
- *Buildings, which will not be heated or cooled, other than by heating provided solely for the purpose of frost protection; or*
- *Limited life buildings which have an intended life of less than 2 years.*

Compliance with this requirement will be demonstrated by the submission of a low carbon development statement. Further guidance is contained in Supplementary Guidance.

Increasing the Proportion of Low and Zero Carbon Generating Technologies

The Sullivan report made recommendations about the most effective way to increase standards, through the building standards. It recommends that there are staged energy improvements beyond the 2007 building standards: 30% by 2010; 60% by 2013 and net zero carbon by 2016/17. This has been identified as the most appropriate method to reach net zero carbon buildings by 2016 if practical. Therefore, the planning requirements for low and zero carbon generating technologies are to be a part of the required saving, and will help to promote the development of renewable technologies, which as the CO₂ targets are increased will become essential. The present economic context has led to delays in implementing the increases and it is important that this policy reflects any changes to the planned increases.

As the building standards energy requirements are increased there will be an increasing need to incorporate a larger proportion of low and zero carbon generating technologies. Therefore, as building standards are increased the proportion of savings to be met through low and zero carbon generating technologies is always to be at least half the total saving. The applicable rate will be half of the prevailing Energy Requirements at the point in time at which the application was granted consent. The CO₂ reduction through low and zero carbon generating technologies will not be increased ahead of the changes in the Building Standards Energy Requirements and Table 1 below sets out the indicative requirements.

Table 1: Indicative % Reduction Achieved Through Low and Zero Carbon Generating Technologies Above 2007 Baseline

Year	% reduction	Planned Building Standards Energy Requirements
2010	15%	30%
2014	30%	60%
2016	50%	100%

Low and Zero Carbon Generating Technologies and the Masterplanning Process

Larger developments that have a mix of both housing and business or include large energy users such as schools and swimming pools will provide a continued heat demand throughout the whole day. For this type of development the use of decentralised and local renewable or low carbon sources of heat and power becomes more viable, and for combined heat and power plants this continued heat demand will ensure continued electricity generation. There are a number of larger mixed use allocations in the Local Development Plan and this provides an opportunity to make use of these technologies to achieve greater CO₂ savings.

During the process of preparing masterplans for larger mixed use developments developers will be required to carry out a feasibility study of the potential for renewable and low-carbon energy solutions across the site, for example, the potential to make use of decentralised combined heat and power using a renewable fuel source such as woodchip. This may result in an opportunity to make greater CO₂ savings than required by Policy R7. In terms

of residential developments this should cover developments of 500 units or more that include other uses than solely housing.

For sites where a decentralised energy scheme is commercially viable, and it is the preferred option, it will be important to consider the build programme and at which stage in the development the energy scheme will become viable. It will not always be feasible to implement the full decentralised energy scheme, using renewable fuel, designed to serve the whole development for the first phase of development because the projected heat load will not exist to support the plant. In the case that development will, once complete, make use of a decentralised heating or combined heat and power plant and it has been calculated that on completion of the development there will be additional CO₂ savings above those required by policy R7, flexibility in the application of policy should be applied to the earlier phases that make use of temporary sources of heat. For example, installing a temporary small scale gas powered decentralised energy plant in advance of providing a larger scale biomass powered decentralised energy plant.

Designing for Reduced Energy Demand

Good, careful design at the outset will minimise the total energy demand for the lifetime of a development. Design considerations for a development as a whole and for the individual buildings will help to increase the efficiency of energy use. Well sited developments, orientation and design are not always included in the calculation methodologies used for building regulations. However, use of passive energy efficiency measures should be incorporated into all development to help reduce the energy demand of new buildings in addition to the buildings standards energy requirements.

Eligible Low and Zero Carbon Generating Technologies

The equipment may be attached to the building or within the site boundary as shown on the planning application. This allows for the low and zero carbon generating technologies to benefit more than one building and being sited to maximise energy gain.

The technologies eligible to meet the requirements of the policy are set out in Table 2 below.

Table 2: Eligible Zero and Low Carbon Generating Technologies

Biomass	Solar power	Air source heat pumps
Fuel cells	Photovoltaics	Combined heat and power
Micro-hydro	Ground source heat pumps	Heat exchange recovery systems
Micro-wind	Water source heat pumps	Geothermal
Solar Thermal	Passive flue gas heat recovery devices	

Demonstrating Compliance with Policy

Applicants should consider how to meet the requirements of this guidance at an early stage of planning. It will be the responsibility of applicants to provide the necessary technical calculations in support of planning applications to demonstrate how the proposed development will satisfy the requirements of this guidance.

The policy target is specific to CO₂ emissions from the **energy performance**². The assessment approach in this guidance therefore relates directly to this. In order to demonstrate the appropriate reduction in CO₂ emissions as a result of low and zero carbon generating technologies the Standard Assessment Procedure Energy Rating (SAP) is required for dwellings and the Simplified Building Energy Model (SBEM) for all other developments. Table 3 below sets out a summary of the stages in the calculation to demonstrate compliance with this policy.

Table 3: Summary of Calculations and Process

1.	The appropriate software program (SAP/SBEM) is used to calculate the 2007 Building Regulations CO ₂ Emissions Standard. This will provide a Target Emissions Rate (TER), which is the predicted CO ₂ emissions for a building of the specified size. Note: it is important for the purposes of this calculation that it is the 2007 TER that is used.
2.	The appropriate software program (SAP/SBEM) is used to calculate the actual emissions rate for the proposed development, which includes the low and zero carbon generating equipment. This is the Dwelling or Building Emissions Rate (DER/BER), which is the predicted CO ₂ emissions for the actual proposal.
3.	Calculate the reduction from step 1 to step 2: step 1- step 2
4.	Calculate the reduction in step 3 as a % reduction on the 2007 TER: (Step 3 ÷ Step 1) x 100
5.	The appropriate software program (SAP/SBEM) is used to calculate the actual emissions rate for the development without the low and zero carbon generating technologies. This is a repeat of stage 2 and provides a re-calculation of the DER/BER without the low and zero carbon generating technologies.
6.	Calculate the reduction, beyond the 2007 standard, due to the low zero carbon equipment: (step 5 – step 2)
7.	Calculate the percentage reduction beyond the 2007 standard as a result of low and zero carbon equipment: (Step 6 ÷ step 3) x Step 4
Note: The calculation methodology may require to be updated when revised building standards come into force.	

² Energy performance covers the CO₂ emissions arising from the use of heating, hot water and lighting.

Instances When Policy Will Be Relaxed

Development will have deemed compliance with the requirement to install low and zero carbon generating technology if it can be demonstrated that the development will achieve a CO₂ saving greater than required by the current building standards (the minimum standard is likely to change over the life time of the plan as building standards are increased),

Justification

Section 44 of the Climate Change (Scotland) Act 2009 seeks to ensure that public bodies in exercising their functions in the way best calculated contribute to the delivery of the carbon reduction targets and carry these out in the most sustainable way. In addition the Structure Plan has set a target of all new buildings to be carbon neutral by 2016.

It is accepted that the most sustainable way in which the carbon emissions from new buildings can be saved is through improving the energy efficiency of the building. By reducing the energy demand of a building in the first instance as far as is practicable it becomes more feasible to then provide the lower energy requirements through low and zero carbon generating technologies. By allowing the relaxation of policy if a greater CO₂ saving can be achieved the Council will make a greater contribution towards the delivery of the Scottish Government's carbon reduction targets and the Structure Plan target.

Pre-application Discussions

The installation of LZCGT can raise additional issues which need to be tackled at an early stage in planning a development. As an example, ground source heat pumps (which are one of the eligible technologies listed in Table 2), can cause significant damage to trees. Where trees are present on, or adjacent to the site where associated pipes are to be buried, a tree survey should be submitted along with the application highlighting the likely impact of the excavation works on the tree(s) and any mitigation proposed. The impact the excavation works and installation are likely to have on local hydrology should also be investigated. Micro-hydro schemes may require authorisation from SEPA under the Water Environment (Controlled Activities) (Scotland) Regulations 2005.

Before submitting your planning application, we encourage you to discuss your proposal with us. We can advise you of your project's compliance with planning policies and on detailed design matters.

Useful Documents

SPP – <http://www.scotland.gov.uk/>

Development Plan:

Aberdeen City and Shire Structure Plan (2009) – www.aberdeencityandshire-sdpa.gov.uk

Aberdeen City Council (2008) Aberdeen Local Development Plan - <http://www.aberdeencity.gov.uk/localdevelopmentplan>

Detailed Advice on LZC Equipment:

Scottish Government (2002) PAN 45: Renewable Energy Technologies - <http://www.scotland.gov.uk/Publications/2002/02/pan45/pan-45>

Scottish Government (2006) Annex to PAN 45 Renewable Energy Technologies: Planning for Micro Renewables - <http://www.scotland.gov.uk/Publications/2006/10/03093936/0>

Greater London Authority (2004) Integrating renewable energy into new developments: Toolkit for planners, developers and consultants - http://www.london.gov.uk/mayor/environment/energy/renew_resources.jsp

Building Standards Division - Safe and sustainable installation of low carbon equipment - Guides
<http://www.scotland.gov.uk/Topics/Built-Environment/Building/Building-standards/publications/pubtech#a15>

SEPA (2010) Supporting Guidance WAT-SG-62 Geothermal Abstraction - Geothermal Energy
<http://search.sepa.org.uk/sepa?action=search&q=geothermal%20energy>