# Updated guidance on demonstrating compliance with South Gloucestershire Council's policies on energy and sustainability

## Introduction

On 15th June 2022, national Building Regulations were updated, and Part L 2021 was adopted to enhance energy performance standards for new buildings. The transition from Part L 2013 to Part L 2021 introduced a number of technical changes which affect the design and energy efficiency of buildings, and the underlying assumptions and calculations used to demonstrate compliance with the regulations.

Following these changes South Gloucestershire Council (SGC) has issued this amended guidance for developers and energy consultants, on how to demonstrate compliance with SGC policies and specifically PSP6 where this applies to major, greenfield, residential development and the policy requires a 20% reduction in residual $CO_2$ emissions.

This amended guidance supersedes previous guidance on implementing PSP6, and sustainability policies CS1 (8), CS3, and CS4.

For more information, please contact environmentalpolicy@southglos.gov.uk

## Requirements and relevant planning policies

All major (residential and non-residential) development proposals are required (via the Local Planning Application Requirements list) to include the submission of energy information in the form of a Sustainable Energy Statement or as part of a Design and Access Statement.

Major development is defined as residential development comprising 10 or more dwellings, or development comprising over 1000$m^2$ of floor space. The minimum information that should be provided to enable the Council to evaluate compliance with relevant planning policies is set out below.

The relevant planning policies are:

- Core Strategy policies (adopted December 2013):
    - CS1(8) **High Quality Design**;
    - CS3 **Renewable and Low Carbon Energy Generation**; and
    - CS4 **Renewable or Low Carbon District Heat Networks**
- **Policies, Sites and Places (PSP) Plan Policy 6 – on-site renewable and low carbon energy** (adopted November 2017).
    - Please refer to the PSP plan webpage for further details.

## Policy CS1(8) - demonstrating high quality design

Policy CS1(8) seeks to ensure that all new development minimises the amount of energy and natural resources used during construction and the operation of a development over its lifetime.

The design of a development should enhance energy efficiency and allow for the addition of renewable and/or low carbon energy technologies for example heat pumps to generate renewable heat, or solar photovoltaic (PV) panels to generate electricity.

SGC regards the reduction in energy demand through improvements in fabric efficiency and air permeability as the first step to lowering operational carbon emissions. Reductions in energy demand which exceed the minimum defined by the Building Regulations will be seen as an indication of good design. The policy also encourages higher energy efficiency standards in non-residential schemes for example by targeting BREEAM 'Very Good' or higher.

All developments are expected to ensure the design and orientation of buildings and roofs will optimise the siting and efficient operation of solar technology, without increasing the risk of summer overheating.

## PSP6 – on-site renewable and low carbon energy

Parts 1 and 2 of PSP Policy 6 encourage *all* development to minimise end-user energy requirements over and above the standard set by current Building Regulations and to achieve this through energy efficiency measures. As with CS1, policy PSP6 expects the design and orientation of a development to facilitate the siting and installation of solar technology.

For residential 'for-sale' development and speculative commercial development, renewable generation or additional capacity should also be offered as an optional extra.

To ensure policy compliance, planning applications should therefore set out the design principles and detailed measures that will be applied to the proposed development to demonstrate:

- How energy efficiency and demand reduction standards set in the current Building Regulations will be outperformed; and,
- How the appropriate siting and efficient operation of solar technology, micro-renewables, and/or other renewable/low carbon energy installations and infrastructure will be achieved.

In terms of 'outperforming building regulations', normally we would expect developments to achieve at least a 10% improvement in energy conservation and would particularly welcome developments which achieve higher levels of demand reduction for example by targeting Passivhaus fabric efficiency and air permeability standards.

We may ask for SAP (Standard Assessment Procedure) calculations to be submitted to show how improved standards will be achieved (please see amended guidance below with reference to PSP6 in major residential developments). Evidence of 'as-built' performance may be required to demonstrate that higher efficiency standards have been met in practice e.g., projected annual energy yields for installed PV systems, and copies of air tightness certificates. This is to limit the energy performance gap between the design and actual operation of the building.

## New development – Sustainable Energy Information

The specific energy information that we would expect to be included within Sustainable Energy Statements submitted with planning applications is detailed below for different the types of development proposals.

### Major residential, commercial and mixed-use developments

1. State which version of the Building Regulations is applicable to the development, taking into account any planned changes in the energy requirements defined by the regulations over the build-out period.

2. Calculate the **regulated** energy demand and **regulated** $CO_2$ emissions of the proposed development, assuming construction to the minimum energy performance required by the applicable Building Regulation standards.

3. Demonstrate how landform, layout, building orientation, massing and landscaping will be optimised to minimise energy demand for heating and hot water, and the risk of summer overheating. (Please see further guidance below)

4. Describe what energy efficiency measures are being included which will reduce the energy demand and the associated emissions of the development beyond the requirement set by the Building Regulations, with quantification of the additional energy efficiency measures and a simple explanation of how this has been calculated.

5. Describe the heating and hot water system that is being proposed, and how this reduces carbon emissions compared to a typical high efficiency gas boiler system. (Please see guidance below).

### Climate adaptation and resilience to overheating.

An important design issue recognised in the NPPF (2021) is the risk of overheating; this needs to be factored into the design new developments from the outset. This is particularly pertinent given the record-breaking temperatures recorded in the summer of 2022 which far exceeded modelled projections. Therefore, we advise applicants to carry out an assessment of overheating risk using dynamic thermal modelling and a recognised assessment methodology such as the Chartered Institute of Building Services Engineers technical memorandum 52 or 59 (referred to as CIBSE TM52 and CIBSE TM59) or equivalent. The assessment should use up-to-date weather files which take account of projected changes in the local climate during the lifetime of the development (normally considered to be 60 years+). In practice this means using weather files for 2020, 2050 and 2080[1].

Any overheating issues or 'fails' identified by the modelling should be addressed in the design using appropriate mitigation measures and design changes, including passive measures such as external shading and green infrastructure. Active cooling measures that increase carbon emissions (i.e., air conditioning units) should be avoided.

[1] We recommend assessment using 2080 weather files to determine whether mitigation measures can be fitted as part of normal maintenance and refurbishment programmes during the life of the building or if changes to the proposed design are required.

## Specification of heating and hot water systems

To mitigate climate change it is essential that we move away from fossil fuel heating systems (i.e. gas boilers) and switch to renewable sources of heat. All new developments are therefore expected to incorporate renewable sources of heat, for example, heat pumps (air, ground, water source), micro heat networks, solar thermal, etc.

To be counted as renewable, heat pumps must have a minimum seasonal efficiency of 250%. Where heat pumps, including VRF units, are selected these should be designed and specified to minimise the global warming impact of the refrigerants they contain by:

- Designing and sizing systems to minimise the volume ('charge') of the refrigerant; and
- Selecting devices using refrigerants with the lowest GWP (global warming potential) available and considering whether $CO_2$ refrigerant heat pumps, or heat pumps using refrigerants with zero GWP would be suitable; and
- For non-residential systems specifying refrigerant leak detection and monitoring systems in accordance with Best Practice and where applicable targeting all available credits in BREEAM 2018 *Pol 01 – Impact of refrigerants*.

## Additional information applicable to proposals for *major greenfield residential development* (10 or more dwellings)

For major residential development proposals on greenfield sites, policy PSP6 has an additional requirement to reduce residual regulated and unregulated $CO_2$ emissions by at least 20% via the use of renewable and/or low carbon energy generation sources on or near the site.

Following the introduction of Part L (2021) we have amended the methodology for demonstrating the reduction in residual emissions in compliance with PSP6. We have made this change because the Target Emission Rate[2] (TER) now includes an assumption about the use of on-site renewable energy generation which must be accounted for when presenting the figures for your scheme.

The baseline against which development will be required to reduce $CO_2$ emissions by at least 20% is *total* residual energy consumption; this includes regulated energy use (space heating, hot water, lighting and ventilation); *and* unregulated energy use (appliances and cooking).

Applications should provide the relevant SAP Worksheets, BREL Compliance Reports and BRUKL documents as supporting information, in the appendices to the Sustainable Energy Statement.

### Calculation methodology:

To demonstrate compliance with policy PSP6, the Energy Statement must address each of the steps below and clearly identify the $CO_2$ emissions of the development at each step of the calculation.

Please note that when calculating $CO_2$ emissions, the carbon factors listed in the latest SAP guidance should be used, and specified in your Energy Statement.

*Regulated emissions*

1. Model dwellings using the methodology in Part L 1A (2021) of the Building Regulations to predict *regulated* $CO_2$ emissions.
    a. Note: For residential development this is based on a building with a gas boiler, as assumed in the Notional Building.
2. Reduce energy consumption by amending the design to include *additional* energy efficiency measures that exceed the energy efficiency requirements defined in the Building Regulations.
    a. Note: In some instances, reducing regulated $CO_2$ emissions below the Target Emission Rate (TER), may not be possible using energy efficiency measures alone.
    b. If that is the case, we will assess the energy efficiency measures you are proposing and the resultant reduction in energy demand and emissions, by comparing these with the specification of the Notional Building[3] and the energy efficiency measures this assumes, and the information you present in the detailed energy tables (please see below).

[2] The TER is maximum allowable $CO_2$ emission rate for the dwelling for it to comply with the Building Regulations.
[3] The Notional Building is a theoretical dwelling of the same size and shape as the actual dwelling with standardised properties for fabric and services. It is used within the Building Regulation calculations.

3. Calculate the *regulated* 'residual emissions' – that is the regulated emissions of the proposed design *with* energy efficiency measures[4] but *before* the application of renewable technologies.

    a. **Note**: If the regulated emissions of the proposed dwelling *after* the addition of energy efficiency measures are higher than the TER[5] then the TER should be used as the baseline for calculating the reduction in regulated residual emissions.

4. Utilise renewable energy technologies to reduce regulated residual emissions by at least 20%.

5. Fill in the Energy Tables below and include these with your Energy Statement.

    a. Note: To speed-up the process of reviewing your application please present and complete the Energy Tables exactly as set out below.

*Unregulated emissions*

To calculate the unregulated element of projected energy use and associated $CO_2$ emissions, the latest[6] Building Regulations Standard Assessment Procedure (SAP) for Energy Rating of Dwellings methodology (currently version 10.2) should be used. This includes guidance[7] on estimating unregulated energy use for cooking and appliances).

6. Calculate unregulated energy demand (kWh/year) and associated $CO_2$ emissions ($kgCO_2$ per year) for your scheme.

7. Calculate 20% of the unregulated emissions. (This is the target by which unregulated emissions should be reduced).

8. Calculate the amount of renewable energy generation required to reduce unregulated emissions by 20% or more using one or more technologies[8].

9. Fill in the Energy Tables below and include these with your Energy Statement.

Further guidance for use in cases where the development cannot meet the Building Regulations Target Emissions Rate (TER) using energy efficiency measures alone.

South Gloucestershire Council regard the reduction in energy use through a 'fabric-first' approach as an essential first-step to reducing emissions in new buildings. Therefore, we expect development to achieve compliance with Part L through energy efficiency measures alone wherever possible.

Following the introduction of Part L (2021) which assumes inclusion of renewable technologies in the Notional Building, there may be some instances where technically this is not feasible. Where this is the case, we will assess the energy efficiency improvements of your scheme by comparing the measures you propose with the measures in the Notional Building specification and the information you provide in the detailed Energy Tables.

[4] This includes savings from CHP if this is being specified.
[5] I.e., compliance with the Building Regulations cannot be achieved using energy efficiency measures alone.
[6] Please refer to the BRE website for the latest version of SAP.
[7] Including Section 12 and Appendix L.
[8] For example you may include heat pumps and roof-mounted PV or solar thermal.

You should provide the relevant SAP and BRUKL documents in the appendices to your Energy Statement. If the TER cannot be exceeded using energy efficiency measures alone the TER should be used as the baseline for calculating the 20% reduction in regulated residual emissions through renewables.

In these cases:

- The 'TER without PV' should be calculated and shown in Table 2a. This shows the Building Regulations energy target without renewables included.
- Energy efficiency improvements on the Part L notional building must be demonstrated using Table 2b below.
- 20% regulated carbon emissions reductions must be achieved through renewable technologies when compared the Part L TER.

## Energy tables to be completed and submitted with Sustainable Energy Statements

### Energy Table 1a

Complete this summary table to show how your scheme will achieve a 20% reduction in *regulated* residual emissions.

| **Regulated** residual emissions | Regulated Energy Demand (kWh/yr) | Regulated $CO_2$ emissions (kg/yr) | $CO_2$ saved (kg/yr) | Percentage reduction in $CO_2$ emissions (%) |
|---|---|---|---|---|
| Baseline Part L TER<br><br>(See **note 1** below) | | A | --- | --- |
| Proposed scheme after energy efficiency measures<br><br>(See **note 2** below) | | B | A – B | ((A – B) / A) x 100 |
| Residual emissions<br>Proposed scheme after energy efficiency measures *and* CHP if applicable.<br>(*Note: Where CHP is not specified this will be the same as 'B' above*). | | C | B – C | ((B – C) / B) x 100 |
| Proposed scheme after on-site renewables<br><br>(See **note 3**) | | D | C – D | ((C – D) / C) x 100<br>THIS SHOULD BE MIN. 20% TO COMPLY WITH PSP6<br><br>(See note 4) |
| Total regulated $CO_2$ reduction beyond Part L TER<br>See **note 4** | | | A – D | ((A – D) / A) x 100 |

Notes on Energy Table 1a

- Note 1: The TER figure should be used to calculate the baseline.
    - For dwellings, the Part L methodology sets the Notional Building heat source as gas boilers to calculate the TER, (unless the dwelling is connecting to an existing heat network).
- Note 2: This is based on the Actual Building, including the proposed energy efficiency measures.
    - It is understood that in some cases it may not be feasible for $CO_2$ emissions to meet or be lower than the Part L TER at this stage due to PV being included in the TER calculation.
    - Energy efficiency measures will also be assessed through comparison of proposed measures to those set in the Notional Building specification and the information provided in the detailed energy tables.
- Note 3: This is based on the Actual Building for the proposed design, including all low carbon and renewable energy generation.
- Note 4: In some cases, where it can be demonstrated that it is not feasible for the 'residual emissions' to be lower than the TER, for the purpose of assessing compliance with PSP6, the 20% calculation will be assessed against the Part L TER.

Energy Table 1b

Complete this table to show how your scheme will achieve a 20% reduction in *unregulated* residual emissions.

| Unregulated residual emissions | Unregulated Energy Demand/Generation (kWh/yr) | Unregulated $CO_2$ emissions (kg/yr) | $CO_2$ saved (kg/yr) | Percentage reduction in $CO_2$ emissions (%) |
|---|---|---|---|---|
| Residual *unregulated* energy demand and emissions (calculated using SAP methodology) | | E | --- | --- |
| Annual contribution from renewable energy generation to unregulated energy demand and emissions<br><br>(See note 5) | | --- | ($CO_2$ emissions reduction from renewable. generation) F | --- |
| Unregulated energy demand and emissions following inclusion of contribution from on-site generation | | G= E - F | --- | --- |
| Percentage reduction in unregulated emissions (%) | --- | --- | E – G | ((E – G) / E) x 100 THIS SHOULD BE MIN. 20% TO COMPLY WITH PSP6 |

Notes on Energy Table 1b

- Note 5: Specifications for the renewable energy measures included in your scheme should be set out in your Energy Statement.
    - For PV the peak capacity (kW) and the projected annual energy yield for the system (kWh/yr) as it will be installed (i.e. taking account of orientation, tilt and shading) should be provided. Shading should be calculated using the Standard Estimation Method in the MCS guidance.

Energy Table 1c

Complete this table which shows the reduction in residual regulated and unregulated emissions

| Summary | Energy demand (kWh/yr) | Emissions ($kgCO_2/yr$) | $CO_2$ saved (kg/yr) | Percentage reduction (%) |
|---|---|---|---|---|
| Residual *regulated* energy demand and emissions (as specified in Energy Table 1a) | | G | --- | --- |
| Residual *unregulated* energy demand and emissions (as specified in Energy Table 1b). | | H | --- | --- |
| Total residual energy demand and emissions | | J = G + H | --- | --- |
| Regulated + unregulated emissions following inclusion of renewable energy measures (*as specified in Energy Tables 1a and 1b*) | | K | | |
| Percentage reduction in residual (regulated and unregulated emissions) | | L | | L = ((J – K) / J) x 100 |

Table 2a – residential energy efficiency

| Notional Building TER without PV ($kg/CO_2/m^2$ | Emissions for the proposed building with energy efficiency alone ($kg/CO_2/m^2$) |
|---|---|
| | |
| U-values and air permeability must be provided in Table 2b below | |

Table 2b – Energy efficiency measures

Please provide a summary table of U-values taken from the relevant SAP calculations

| | Part L (2021) values or most recent version of Part L | | |
|---|---|---|---|
| Element or system | Dwellings Limiting values ($W/m^2.K$) | Dwellings Notional values ($W/m^2.K$) | Dwellings Proposed ($W/m^2.K$) |
| Wall | 0.26 | 0.18 | |
| Roof | 0.16 | 0.11 | |
| Floor | 0.18 | 0.13 | |
| Windows | 1.6 | 1.2 | |
| Doors | 1.6 | 1.0 | |
| Roof-lights | 2.2 | 1.7 | |
| Air permeability | 8 | 5 | |

## Developments other than major residential schemes on greenfield sites

For all other developments, where a Design and Access Statement is required, the following energy information should also be included in the Statement or preferably in a separate Sustainable Energy Statement:

- State which version of the Building Regulations is applicable to the development.
- Describe what energy efficiency measures are being included which will reduce the energy demand of the development over and above those required to meet the minimum building regulation standards, including any passive energy measures that have been incorporated into the design.
- Describe what heating and hot water system is being proposed, and how this reduces carbon emissions compared to a high efficiency gas boiler system.
- Describe what renewable / low carbon / decentralised energy generation measures are being included, their installed capacity (kW) and predicted energy generation (kWh/yr)

### New development – Standalone Renewable / Low Carbon Energy Installations

Policy CS3 supports proposals which will generate energy from renewable or low carbon sources, subject to criteria which protects, for example, residential amenity and landscape designations. The policy sets out four factors which will be taken into consideration in assessing proposals and significant weight will be given to these. Proposals will also be required to meet objectives of Policy CS1 (High Quality Design), as far as engineering requirements permit.

Further guidance is provided in the Renewables SPD (Adopted November 2014) which includes specific guidance on renewable technologies including: anaerobic digestion; biomass; heat pumps; hydro power; landfill gas; solar park; solar roof; and wind. With regard to wind, reference should also be made to paragraph 158 and footnote 54 of the NPPF (2021).

The Core Strategy identifies that renewable and/or low carbon energy supplies include, but not exclusively, those from biomass and energy crops, Combined Heat and Power (CHP), waste heat from industrial processes, energy from waste, ground and air source heating and cooling, hydro, solar thermal, photovoltaic generation (including solar farms) and wind power.

Applications for stand-alone renewable / low carbon energy installations should include information which states the proposed installed capacity (kW), predicted energy generation (kWh/yr) and associated $CO_2$ savings (tonnes/yr).

### New development - Heat Networks

Policy CS4 requires development proposals of over 10,000sqm (non-residential) or 100 dwellings (that are wholly or in part at a greater density than 50dph) to fully explore the feasibility of incorporating renewable or low carbon heating or Combined Heat and Power (CHP) infrastructure on site, or connect to or provide a heat distribution network. For smaller developments the policy requires connection to a district heat network if there is one available, subject to it being practical and viable. The policy also ensures that proposals for development that generates significant waste heat as part of an industrial or commercial

process must recover the heat and distribute it, or provide evidence as to why heat distribution is unfeasible.

'Full exploration' of the potential for heat networks in line with Section 2 (Feasibility) of the Chartered Institute of Building Services Engineers (CIBSE) Heat Networks Code of Practice (CP1) will be accepted as meeting the requirements of the Policy.

Along with Bristol City Council, South Gloucestershire Council is investigating the potential for developing heat networks to distribute waste heat from the energy generators and industrial plants of Avonmouth-Severnside to energy consumers in the enterprise area, South Gloucestershire's urban fringes and Bristol city centre. The potential for developing a heat network at Cribbs-Patchway new Neighbourhood (CPNN) is also being explored. The results of these investigations will be published on our heat networks webpage and will inform the development of future policy and planning decisions.