

Planning

New House
at No 79
Murford Avenue,
Hartcliffe,
Bristol

Sustainable Energy
Statement
to meet Bristol City
Council Development
Framework Core
Strategy Policy BCS14

Revision B
Issued 13 December 2021



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1.0 Context

This document is prepared in partial response to the Bristol Development Framework Core Strategy published by Bristol City Council in June 2011, as applied to the scheme at the above site address. This document provides an evaluation in regard of policy BCS14 'Sustainable Energy' and is presented to form part of a wider Sustainability Statement.

The scheme is required to comply with Building Regulations 2013, Part L1A (conservation of fuel and power in new dwellings).

2.0 Sustainable Energy Strategy Evaluation

The development has been evaluated for compliance with the Bristol Core Strategy BCS14 'Sustainable Energy' in accordance with the Sustainable Energy Strategy set out in the Climate Change & Sustainability Practice Note (December 2012).

The methodology followed is set out below, using the structure detailed in the above Practice Note. The aim is to achieve where feasible a net 20% saving in CO₂ emissions from the energy use in the development, via the on-site generation of renewable energy, or to compensate for this via allowable solutions.

Energy studies have been carried out for the dwelling demonstrating compliance with Building Regulations and with renewable technologies to demonstrate the 20% saving in CO₂ emissions. Predicted energy demand and emissions data is listed in Appendix 1.

3.0 Detailed measures

3.1 Baseline energy demand

The proposed house has been modelled to comply with all thermal and energy requirements of Building Regulations Part L1A, including thermal elements, wall (0.19 W/m²K u-value), floor (0.12 W/m²K u-value), roof (0.09 W/m²K u-value) and windows (1.4 W/m²K u-value) beyond the Part L1A limiting values, air permeability of 5.0 m³/hm², 100% low energy light fittings and high efficiency gas combi boilers.

<i>Projected annual energy demand and regulated CO₂ emissions of the development as a Part L Building Regulations compliant scheme without renewable energy supply (derived by SAP methodology)</i>		
Baseline energy demand (kWh pa)	6,802 kWh pa	
Regulated emissions (kg pa)	1,609 kg CO ₂ pa	

3.2 Heating systems

The choice of heating system follows the hierarchy set out in policy BCS14 of the Core Strategy, and is as follows:

1. No existing CHP/CCHP distribution networks exist in the locality.
2. The scale of development means that use of site-wide renewable CHP/CCHP is not applicable.
3. Likewise the scale of development means that use of site-wide gas fired CHP/CCHP is not applicable.
4. The scale of development means that use of site-wide renewable community heating / cooling is not applicable.
5. Likewise the scale of development means that use of site-wide gas fired community heating / cooling is not applicable.
6. Individual building renewable heating has been evaluated as part of the energy strategy. This has not been selected due to the scale of the dwellings and site constraints.

The following sections will also demonstrate that the savings in emissions can be achieved through the use of other renewable technologies.

<i>Projected energy saving resulting from use of CHP; and the resulting saving in CO2 emissions: If applicable (and excluding savings made from the use of renewable fuels powering systems – dealt with separately under section 5.4) (derived by SAP methodology)</i>		
Emission savings from the use of CHP systems (kg pa)	0	
Energy savings from the use of CHP systems (kWh pa)	0	
Total regulated emissions after CHP savings (kg pa)	1,609 kg CO2 pa	

3.3 Energy efficiency measures

The dwellings have been detailed in compliance with the requirements of Building Regulations 2013. The walls, floor, roof and windows are designed to achieve or better the limiting values of new thermal elements. No additional energy efficiency measures are deemed appropriate at this stage.

<i>Energy efficiency measures to minimise the energy requirements of the proposed development and the resulting savings in energy demand and emissions: [Savings arising from CHP and energy efficiency subtracted from the total regulated emissions projected under section 5.1 above.] (derived by SAP methodology)</i>		
Energy savings from energy efficiency measures (kWh pa)	112	
Emission savings from energy efficiency measures (kg pa)	5	
Total regulated emissions after CHP savings and energy efficiency measures (kg pa) (" residual emissions ")	1,604 kg CO2 pa	

3.4 On-site renewables

Renewables are evaluated in the following table with regard to limitations of the specific site situation and context, and key considerations for the technology:

Necessary situation for appropriate use of technology				Appropriate to this case?
Necessary Building characteristics	Uses	Scale	Considerations	
Photovoltaic panels				
Pitched roof with limited overshadowing.	All uses. Especially suitable for where extensive IT use and / or lighting, e.g. offices, schools.	All scales.	To maximise potential need to consider orientation.	YES. Pitched roof with PV installed at 30 degrees facing east or west.
Solar thermal				
Pitched roof with limited overshadowing. Hot water tank needed (not compatible with combi boilers).	All uses.	All scales. Can be used with other fuel source to pre-heat water and so reduce fuel consumption.	Needs a demand for hot water – domestic or canteens, showers, washrooms.	YES. Pitched roof with solar thermal installed at 30 degrees facing east or west. Combi boiler likely.
Air source heat pumps				
Sited on external walls.	Any.	Any, but more likely to be appropriate at small scale.	Careful siting needed to reduce aesthetic impact. Potential noise impact. Powered by electricity, so lower carbon reduction than other technologies	YES. Installed to gable elevation.
Biomass				
Space needed for plant, fuel storage and deliveries.	Mixed use, schools, offices, commercial, residential – especially multi-residential – best where constant energy demand.	Medium to large, viable where heat demand is above 15 kW, can be combined with gas for summer / backup use.	Air quality impact. Impact of deliveries on residents. Fuel source (is supply secured). Distance transported.	NO. Development too small scale and insufficient space for plant and fuel storage.
Ground source heat pumps				
External space for horizontal trench or vertical borehole.	Any.	Medium to large.	Archaeology. Usually combined with underfloor heating, so slow to respond. Can combine with landscaping.	NO. Limited external space.

Outcome:

The site situation and context places limitations on use of renewables, but can be viably used.

<i>Renewable energy sources incorporated into the proposed development and the resulting savings in emissions (including any emission savings from the use of renewable fuels to power CHP):</i>	
Total renewable capacity	0.90 kWp
Saving on residual emissions from the use of renewables (kg pa)	354 kg CO2 pa
Saving on residual emissions from the use of renewables (%)	22.10 %

Note:

The above figures assume that the gas combi boiler is replaced with an ASHP installed to serve the heating and hot water systems, with photovoltaic panels installed at 30 degrees on the east facing roof at 30 degrees, and therefore the energy generation from this has been evaluated. These are listed in the Appendix to this document. Detailed system design and configuration by a specialist supplier will be necessary to confirm final outputs, and other configurations may also be possible.

3.5 Allowable solutions

Due to the constraints of the site and scale, as detailed in the preceding sections, allowable solutions offsite are deemed not applicable:

<i>Further savings achieved from a financial contribution or other "allowable solution".</i>	
Additional saving on residual emissions from allowable solutions (kg pa)	0
Additional saving on residual emissions from allowable solutions (%)	0
Total savings on residual emissions from renewables and allowable solutions (%)	22.10 %

4.0 Summary table of savings as BCS14 methodology.

The complete savings are therefore detailed in the following summary table, as the format of BCS14 guidance.

	Energy demand (kWh pa)	Energy saving achieved (%)	Regulated CO ₂ emissions (kg pa)	Saving achieved on residual CO ₂ emissions (%)
Building Regulations Part L compliance ("Baseline" energy demand & emissions)	6,802 kWh pa		1,609 kg pa	
Proposed scheme after energy efficiency measures and CHP ("Residual" energy demand & emissions)	6,690 kWh pa	1.65 %	1,604 kg pa	
Proposed scheme after on-site renewables	2,407 kWh pa	64.00 %	1,249 kg pa	22.10 % saving on residual emissions
Proposed scheme offset for financial contribution or other "allowable solution"			0	0 %
Total savings on residual emissions				22.10 %

5.0 Summary

It is considered that the above demonstrates that the development shows reasonable improvements that will offer more sustainable and energy efficient accommodation, and is in compliance with the sustainable energy aims and targets of the Core Strategy.

It is proposed that 0.90 kWp of PV is installed to achieve the 20% saving in CO₂ emissions. For example, this equates to 3 panels of circa 0.30 kWp output on the east facing (rear) roof of the house, at 30 degrees.

This provides a total of 22.10% saving on residual emissions.

6.0 Appendix 1 – Breakdown of energy demand and emissions

The predicted energy demand and emissions data for the dwelling, together with the renewable systems modelled, are listed in the following table; tabulated as the process of the BCS14 guidance.



BCC Ref	Baseline Energy Demand		Energy Demand and Emissions after Applicable Measures						Energy Demand and Emissions after On-Site Renewables			Energy Demand and Emissions after Further Measures & Allowable Solutions			Overall Savings on BuildingRegs		Overall savings on Residual		Notes on applied measures		
	2.1		2.2		2.3		Residual Demand & Emissions		2.4			2.5			% saving achieved over B.Reg energy demand	% saving achieved over B.Reg threshold emissions	% saving achieved on Residual energy demand	% saving achieved over Residual emissions			
Dwelling	kWh pa	kg CO2 pa	kWh pa	kg CO2 pa	kWh pa	kg CO2 pa	kWh pa	kg CO2 pa	kWh pa	kg CO2 pa	energy savings from this measure	emission savings from this measure	kWh pa	kg CO2 pa	energy savings from this measure	emission savings from this measure	% saving on residual energy demand	% savings on residual emissions	PV panel (kWp)	orientation / pitch (degrees)	
House	6802.11	1609.22	6802.11	1609.22	6690.14	1603.69	6690.14	1603.69	2407.08	1249.27	4395.03	359.95	2407.08	1249.27	-111.97 n/a	-5.53 n/a	64.6%	22.4%	64.0%	22.1%	0.90 East facing / 30 degrees + ASHP
	6,802	1,609	6,802	1,609	6,690	1,604	6,690	1,604	2,407	1,249			2,407	1,249							0.90 kWp total PV capacity
	baseline energy demand	baseline regulated emissions	energy demand after CHP/CCHP	regulated emissions after CHP/CCHP	energy demand after efficiency	emissions after efficiency measures	"residual" energy demand	"residual" emissions"	energy demand after renewables	emissions after renewables			energy demand after further efficiency measures	emissions after further efficiency measures							
									4,283	354			0	0							
Note:	All energy demand figures are entered as 'primary energy' i.e. the total energy originally needing to be generated at source; as opposed to the lesser figures recorded on consumption meters/energy bills at point of use; which are after transmission losses have taken place in the transfer of energy from generator to user.																				
									64.0%	22.1%			64.0%	22.1%	YES, compliant with BCC BCS14 minimum 20% requirement		22.1% total savings kg CO2 pa				
									% saving on residual energy demand	% savings on residual emissions			% saving on residual energy demand	% savings on residual emissions							

