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PROJECT NAME

16a Chesham Road

DATE

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ENERGY STRATEGY

Compliance with CS1 & CS2



Energy Strategy

Project: 5294KJ - 2023.11 SAP (16a Chesham Rd - RHM Planning)

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Executive Summary

This Energy Strategy has been compiled to demonstrate compliance with policies CS1 and CS2 of the North Somerset Core Strategy.

The proposal is for the erection of one detached, one-bed dwelling on land at 16a Chesham Road, Weston-super-Mare.

To demonstrate the amount of energy saved, firstly, SAP calculations achieving Part L compliance were modelled to provide 'baseline' energy demand and emissions. Then, appropriate decentralised renewables and low carbon technologies were included in the SAP calculations to provide the final energy demand figures for comparison. More detail is provided in the sections following.

The results can be summarized below:

Total Contribution to Energy Demand by Renewables and Low Carbon Technologies

35.70% or more

Result

Pass



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Design Principles to Reduce Energy Consumption and Carbon Emissions

Fabric

Low U-values and good detailing will help to limit heat losses through the fabric of the proposed dwelling.

All non-repeating thermal bridges (such as those between the external walls and the roofs) will be specified to Recognised Construction Details (RCDs). This will ensure that heat losses through these junctions are minimised and that the corresponding psi values can be utilised in the SAP calculations.

Fenestration and Solar Gain

Careful consideration will be given to the fenestration. Low U-values will need to be specified to limit heat losses through these areas. The glazing designs allow for passive heating of the dwelling through solar gains. Additionally, the windows will be openable where practical and internal shading will be employed.

The glazed openings will also maximise the available daylight into the dwelling. This will not only improve comfort levels for the occupants but also reduce the energy consumption through artificial lighting.

Mechanical Services

A well-designed building envelope must be supplemented by appropriate services within the building. It is proposed that the heating and hot water to the dwelling is provided by an air source heat pump.

Lighting

It is proposed that only energy efficient lighting is installed at the dwelling. This means that all light fittings should have lamps with a luminous efficacy of greater than 45 lamp lumens per circuit-watt and a total output greater than 400 lamp lumens.



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Low and Zero Carbon Technologies

As explored in the section on selecting low and zero carbon technologies, it has been identified that solar panels to generate either heat or electricity should be feasible.

Overall performance

The following tables detail how the proposed dwelling has been specified at this stage, incorporating the above principles. Also displayed is how the building performs in relation to the building regulations and the energy planning requirements for CS1 & CS2.

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Selecting Low and Zero Carbon Technologies (LZC)

Table 1 – Feasibility Matrix of Appropriate Renewables

Showing the considerations in choosing a LZC technology for this site.

Technology	Requirements	Requirements Met?	Appropriate?
Photovoltaic panels	Roof facing east to west (through south)	Yes	Yes
	Little/no or modest overshadowing	Yes	
	Flat roof or pitched roof not greater than 45°	Yes	
	Any size development	Yes	
Solar thermal	All requirements as for photovoltaic panels	Yes	Yes
	Hot water tank possible	Yes	
MVHR	Airtight building (no more than 5m ³ /hm ²)	Yes	Yes
Air source heat pumps	Suitable external wall	Yes	Yes
	Aesthetic considerations	Yes	
	Noise impact	Yes	
	Any size development	Yes	
Ground source heat pumps	External space for horizontal trench or vertical borehole	No	No
	Medium to large sized development	No	
	Archaeology	Unknown	
	Best suited to underfloor heating	Yes	
Biomass	Space needed for plant, fuel storage and deliveries	No	No
	Medium to large sized development	No	
	Minimal impact on residents (air quality, deliveries)	No	
Combined heat and power	Space need for plant, access and servicing	No	No
	Large sized development (large heat demand)	No	
District heating	Available network	No	No
	Very large sized development (substantial heat demand)	No	



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Feasibility of Appropriate Renewables - Conclusion

Due to the location, size and type of development some renewable technologies are not appropriate for this site.

As a standalone technology, solar thermal panels would not provide sufficient carbon reductions in order to achieve compliance.

An air source heat pump is feasible for this development. The performance of the unit has been selected to be conservative whilst being reflective of products available on the market. Additionally, the heat pump will also provide hot water heating via a cylinder fed from the heat pump. This will allow space and hot water heating to the dwelling to be provided year-round without requiring an additional 'top up' heating system. The use of an air source heat pump will need to be confirmed by survey before installation.

Further to this, photovoltaic panels (PV) are also feasible. It is proposed that panels could be installed on the main, south facing roof. As the proposed dwelling is due to be positioned within an existing residential area, the addition of the PV would not have a detrimental effect on the visual landscape. The use of solar panels will also need to be confirmed by survey before installation.

In the future, if a district heating system were to be introduced to the area, the proposed dwelling could be connected to this network. However, due consideration should be given to the small-scale of this development.

Appropriate Solution

Solar Photovoltaic Panels

Air Source Heat Pump

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Proposed Fabric and Services Specification

Table 2 – Baseline Compliance

Showing the minimum specification required to achieve compliance with Part L. The specification is assumed at this stage as no specific build-ups are currently available.

Category	Item	Reference/Source	Value/Details
Building Fabric (W/m²K)	Ground Floor	Assumed	0.13
	External Walls	Assumed	0.18
	Roof	Assumed	0.11
Fenestration (W/m²K)	Solid Door	Assumed	1.00
	Fully Glazed Door and Windows	Assumed	1.20
	Roof Light	Assumed	1.30
Thermal Bridging (y-value)	Recognised Construction Details (RCDs)	Calculated	0.046
Ventilation	Air Permeability (m ³ /hm ²)	Assumed	5.00
	Mechanical Ventilation	Assumed	Natural Ventilation
Heating	Primary Heating System	Assumed	Mitsubishi Electric Ecodan 6.0kW PUZ-WM60VAA (Electric air source heat pump)
	Controls	Assumed	Time and Temperature zone control
	Heat Distribution	Assumed	Underfloor heating
	Water Heating	Assumed	150 litre hot water tank, fed by the air source heat pump. 1.86kWh/day declared loss factor
	Secondary Heating System	Assumed	None
Additional Features	Low Energy Lighting (%)	Assumed	100
	SAP Appendix Q	Assumed	None
	Renewables	Assumed	None
	Regulation 36 Compliance (litres/person/day)	Assumed	125

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Table 3 – Proposed LZC Technologies Renewables

Showing updates to the baseline specification to reduce energy demand.

Category	Item	Reference/Source	Value/Details
Additional Features	Renewables	Proposed	1.20kWp PV panels (45°* mounted, South, with little or no shading)

**The SAP calculation accepts 0°, 30°, 45°, 60° and 90°. The angle given is the nearest of these values to the true pitch of the PV.*

A total array of 1.20kWp of photovoltaic panels has been proposed for this development to exceed the target (10% contribution to energy demand by renewables or low carbon technologies).

Additional panels could be added to further increase the potential output, as appropriate.

This size of array can be achieved with e.g. 3 × 400 Watt panels pre plot and take up an area of approximately 6m² of roof space.



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Table 4 – Summary Table

Showing the contribution to the energy demand from LZC technologies.

	Energy demand (kWh pa)	Energy saving achieved (%)
Building Regulations Part L compliance (“Baseline” energy demand)	2,871.83	
Proposed scheme after adding PV	1,846.48	35.70

For further details please refer to the SAP Reports