ENERGY PERFORMANCE SERVICES
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Energy Statement for

New Dwelling at
Trevone
Crackington Haven
Bude
Cornwall
EX23 0JQ

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1. PLANNING POLICY

Policy SEC1 Part 2b states that The Climate Emergency DPD will Guide Cornwall Council in addressing climate change within planning decisions. Policy SEC1 Sustainable Energy and Construction Part 2b focusses on the energy use of new-build homes in a drive towards net zero operational demand. In Summary, the three elements of this are
A) a space heating energy threshold – 30kWh/m2/year
B) a total energy threshold – 40kWh/m2/year
C) a renewable energy requirement – equal or greater than the total energy demand

2.EXECUTIVE SUMMARY

This report has been prepared in support of the planning application for a development of a New Dwelling at Trevone, Crackington Haven, Bude, Cornwall, EX23 0JQ. As part of the detailed planning submission, this report sets out the proposals in relation to onsite renewables and low carbon systems for the development, including justification for the proposed technology.

In developing this report, reference has been made to the following document:

Policy SEC1 (Sustainable Energy and Construction, part 2).

3.BENCHMARK ENERGY DATA

In order to determine the benchmark energy figures for the development, SAP calculations have been carried out.

The predicted energy use of the development has been broken down into separate energy usages per unit. The tables below illustrate the figures shown in SAP DER worksheet and shows the percentage improvement made to Target emission rates.

3 - INPUT SAP (10.2) DATA

CORNWALL COUNCIL   Etude

SAP Conversion Tool V2.1

Climate Zone: 4 South West England

↓ INSERT INFORMATION HERE ↓

	Results				Inputs - general						
	Space heat demand	Total energy use	Renewable generation	Renewable deficit	Quantity	Plot Name	Bedrooms	Number of storeys	SAP Floor Area	Volume	Site Exposure
	$kWh/m^2_{TFA}/yr$	$kWh/m^2_{GIA}/yr$	% total energy	kWh/year					m2	m3	
	Required values:				Box numbers from SAP calculation printout --->				[4]	[5]	
	<30	<40	100%	0							
EXAMPLE	***29.4***	***33.4***	***108%***	***0***	***1***	***EXAMPLE - Semi Detached House***	***3***	***2***	***93.2***	***235***	***Normal***
	28.8	17.9	103%	0	1	Detached House	3	1	298.14	668	Normal
			Total:	0							

↓ INSERT INFORMATION HERE ↓

*excluding internal partition elements

	Inputs - Space Heating Demand																		
	Air permeability @50Pa	Total area external elements	Total area party elements*	Ventilation system	Heat recovery	Thermal mass	Fabric heat loss	Solar gains											
	m3/m2/hr	m2	m2		%	kJ/m2/K	W/K	W											
	[17]	[31]	[32]+[32a]+[32b]		[23c]	[35]	[37]	[83]											
								Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EXAMPLE	***1***	***193***	***39***	***MVHR***	***79%***	***124***	***55.6***	***91***	***139***	***203***	***285***	***322***	***357***	***307***	***287***	***238***	***162***	***106***	***77***
	2.5	638	0	MVHR	76%	205	148.0	459	850	1341	1952	2447	2544	2405	2019	1550	988	563	385
					0%														
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	Inputs - Total Energy Use										Inputs - Renewables
	Space heat source	Heating efficiency	Space heat source	Heating efficiency	Fraction of heat	Domestic hot water source	Water heating efficiency	Hot water storage losses	Pumps and fans energy	Lighting Efficacy	~~Renewable Generation~~
	(Primary)		(Secondary)					kWh/day	kWh/year	Lumen/Watt	kWh/year
		[206]		[207]	[201]		[216]	[48]	[231]		[233]
EXAMPLE	***Heat pump - air to water***	***311%***				***Heat pump - air to water***	***189%***	***1.4***	***189***	***100***	***-3160***
	Heat pump - air to water	408%				Heat pump - air to water	191%	1.91	1152	100	-5182

↓ INSERT INFORMATION HERE - WHERE APPLICABLE ↓

	Water Heating Reductions - where applicable											
	Inputs only required for: waste water heat recovery, solar hot water and flue gas heat recovery											
	kWh											
	Sum of [63 a, c and d]											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
EXAMPLE												

4.TECHNICAL FEASIBILITY REVIEW OF RENWABLE ENERGY / LOW CARBON 0 PTIO N S

This section of the report reviews the potential options to red emissions of the proposed development.

Solar Hot Water

Solar thermal panels collect solar radiation to heat water that can then be used for either domestic hot water generation or space heating. There are two types of solar thermal collectors: flat plate and evacuated tube. Evacuated tube technology being the more efficient, and therefore, requiring less active collector area than that of a flat plate system. However, the capital cost is comparable for the two technologies. The system consists of solar collectors that are often roof mounted. Water is passed through the collectors and then to a heat exchanger in a hot water cylinder that will also incorporate a top up heat source to ensure adequate temperatures are achieved. Solar thermal systems can produce energy from diffuse sunlight and are therefore less susceptible to the effects of orientation and angle on the performance. Systems are normally sized to provide 50% of the annual domestic hot water for a typical development to avoid over-sizing issues. A dedicated domestic hot water cylinder is required along with sufficient space to install it. Due to this not meeting the 10% reduction or the SAP requirements as a stand-alone measure for the development, this has not been considered as an option.

Small Scale Wind Turbines

Wind turbines convert the power of the wind into electrical energy. They can range from small domestic turbines producing a few hundred watts to large offshore turbines with capacities of 3MW. A detailed study of the wind speed, turbulence and potential noise issues is required to be carried before considering this type of technology to ensure that it is suitable for the particular application. Small scale turbines are available in a range of costs, from £1500 for a domestic sized 0.6kWp turbine to £20,000-30,000 for 6kWp turbines. Due to the site constraints, there is little scope on site to install a turbine and not considered to be a proposal that would be accepted due to the significant visual impact. Therefore, the use of this technology has not been considered further.

Water / Ground Source Heat Pumps

Water/Ground source heat pumps are used to extract heat from the water/ground during the heating season and to reject heat to the ground/water during the cooling season. Typical capital costs are £1800-£2000 per kW of installed plant for ground source, making it one of the more expensive renewable / low carbon energy technologies. Due to amount of ground space required to install the thermal piping, or alternatively bore-holes, this has not been considered as an option.

Biomass

The most common form of energy generation using biomass is combustion of wood in treated or untreated form. Potential fuel sources include solid wood fuel, wood chips, pellets and briquettes. Combustion of the wood generates energy that can be used directly for space heating and hot water. Biomass heaters range from simple wood burning stoves to large fully automated boilers intended for large commercial/public buildings. With limited outside building space available for wood/pellet storage this option is not practical.

Combined Heat & Power (CHP)

CHP is generally considered a low carbon technology, rather than a renewable energy source unless a biofuel is used. CHP systems use either a gas or a biofuel engine to generate both heat and electricity in a 2:1 ratio. A CHP unit can be located within a dedicated plant room or within a dedicated 'energy centre' connected via a district heating main. To ensure a CHP unit offers maximum efficiency, the heating load must be constant throughout the year. For this reason, CHP systems are often used for heating swimming pools.

Air Source Heat Pumps

These are fitted externally, take heat out of the air and can be used for radiators or underfloor heating and supply of hot water. They do not take up a lot of space.

This technology has been considered both suitable and practical for the development to both fulfil the SAP requirements and renewable policy SEC1

Photovoltaic Panels (PV Panels)

Photovoltaic (PV) systems convert energy from the sun into electricity through semi-conductor cells. Systems consist of cells connected and mounted into south facing modules. Modules are connected to an inverter to turn their direct current (DC) output into alternating current (AC) electricity for use in buildings or export to an electrical grid at a fuse box. PV systems require only daylight, (not direct sunlight) to generate electricity (although output increases as insulation levels increase), so energy can still be produced in overcast or cloudy conditions. A typical capital cost is £220/m2 (including builders work in connection and attendance by a PV specialist), equating to approximately £7000 per kW output.

Due to a sufficient south facing roof area available, the use of PV panels along with a battery storage bank has been considered as the most practical renewable technology for the development as well as meeting the obligations to policy SEC1.

5.WATER EFFICIENCY MEASURES

Sanitary appliances and whitegoods will be designed to not exceed 125 Litres per person per day usage and have been factored into the SAP Calculations.

6.CONCLUSION

From carrying out an analysis of the predicted baseline energy consumption and resulting carbon emissions for the proposed development using SAP 10 Methodology, an Air Source Heat Pump to supply heating and hot water with the addition of a solar PV array is the most viable option within the constraints of the site. These are to be installed along with the following measures.

A fabric first approach with the property achieving low u values for all external elements as well as detailed thermal bridging design.
A highly airtight property with a design air permeability of 2.5 (m3/m2.hr at 50Pa) or less.
The installation of high efficiency heating controls.
The installation of high efficiency lighting.
(Mechanical Ventilation and Heat Recovery Unit) will be used within the dwelling

The scheme has been demonstrated to satisfy all the criteria of the Policy SEC1 Part 2b of The Climate Emergency DPD

No off-set payment is considered needed for this development as the renewable energy generation target has been met.