



Land adjacent Parc Veau House

Energy Statement

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1 Energy Statement

1.1 Introduction

- 1.1.1 Erban Consulting Limited was instructed by Property Group SW Limited to prepare an energy statement for the proposed development of two dwellings at Land adjacent to Parc Vean House, Coach House Lane, Redruth, TR15 2TT.
- 1.1.2 The purpose of this report, and the energy summary tool that accompanies it, is to demonstrate that each dwelling would achieve Net Zero Carbon in accordance with Policy SEC1 part 2b of Cornwall Council's *Climate Emergency Development Plan Document*.
- 1.1.3 In accordance with national and local policy there is a commitment to reduce energy consumption and carbon dioxide (CO₂) emissions at this development by constructing in accordance with the energy hierarchy:
- i. Reduce the energy load of the development.
 - ii. Maximise the energy efficiency of the fabric.
 - iii. Deliver on-site low carbon or renewable energy systems.
 - iv. Deliver carbon reductions through off-site measures or offsetting.
- 1.1.4 It should be noted that whilst this report sets out the specification that it is anticipated would be adopted to reduce the CO₂ emissions of the dwellings, this is subject to change as the technical design of the development progresses. The commitment to construct the dwellings in accordance with the energy hierarchy, and to achieve Net Zero Carbon, will not change.

1.2 Development description

- 1.2.1 Erection of 2 semi-detached dwellings and associated works.

2 Legislation, Policy and Guidance

2.1.1 The following national and local planning policy guidance have been considered in determining the development's energy strategy.

2.1 National: National Planning Policy Framework (NPPF) (July 2021)

2.1.1 The *National Planning Policy Framework (NPPF)* was designed to simplify and clarify planning policy and to make the planning system more accessible. It details the government's view of what sustainable development in England means in practice and states that there are three objectives to sustainable development:

- **an economic objective** – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;
- **a social objective** – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering a well-designed and safe built environment, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and
- **an environmental objective** – to contribute to protecting and enhancing our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

2.1.2 The following are extracts from the NPPF that specifically relate to sustainable design and energy which have been referenced due to their relevance to this report.

Paragraph 154

New development should be planned for in ways that:

a) avoid increased vulnerability to the range of impacts arising from climate change. When new development is brought forward in areas which are vulnerable, care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure; and

b) can help to reduce greenhouse gas emissions, such as through its location, orientation and design. Any local requirements for the sustainability of buildings should reflect the Government's policy for national technical standards.

Paragraph 157

In determining planning applications, local planning authorities should expect new development to:

a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and

b) take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

2.2 Cornwall Local Plan Strategic Policies 2010-2030 (November 2016)

- 2.2.1 Policy 2 of the *Cornwall Local Plan* is of most relevance to this report. An extract from Policy 2 is provided below setting out the requirement for development to deliver increased energy efficiency and to deliver renewable and low carbon energies.

Policy 2: Spatial Strategy

New development should provide a sustainable approach to accommodating growth, providing a well balanced mix of economic, social and environmental benefits...Overall, development should seek to meet the following objectives of the Plan for Cornwall:

1. Proposals should assist the creation of resilient and cohesive communities by:
 - a. Delivering renewable and low carbon energies, increasing energy efficiency and minimising resource consumption through a range of renewable and low carbon technologies;
 - b. Ensuring that built and environmental assets can adapt to and be resilient to climate change.

2.3 Climate Emergency Development Plan Document (February 2023)

- 2.3.1 The *Cornwall Climate Emergency Development Plan Document (DPD)* is part of Cornwall Council's response to the climate emergency and their commitment to reduce carbon. Policy SEC1 parts 1 and 2b are of particular relevance to this report and set out Cornwall Council's aspiration for developments to achieve Net Zero Carbon.

Policy SEC1 – Sustainable Energy and Construction

Development proposals will be required to demonstrate how they have implemented the principles and requirements set out in the policy below.

1) The Energy Hierarchy

All proposals should embed the Energy Hierarchy within the design of buildings by prioritising fabric first, orientation and landscaping in order to minimise energy demand for heating, lighting and cooling. All proposals should consider opportunities to provide solar PV and energy storage.

2b) New Development - Residential

Residential development proposals will be required to achieve Net Zero Carbon and submit an 'Energy Statement' that demonstrates how the proposal will achieve:

- Space heating demand less than 30kWh/m²/annum
- Total energy consumption less than 40kWh/m²/annum; and
- On-site renewable energy generation to match the total energy consumption, with a preference for roof-mounted solar PV.

Where the use of onsite renewable to match total energy consumption is demonstrated to be not technically feasible (for example within apartments) or economically viable, renewable energy

generation should be maximised as much as possible; and/or connection made to an existing or proposed low carbon district energy network; or where this is not possible the residual energy (the amount by which total energy demand exceeds the renewable energy generation) is to be offset by contribution to Cornwall Council's Offset Fund.

Where economic viability or technical constraints prevent policy compliance, proposals should first and foremost strive to meet the space heating and total energy consumption thresholds. Proposals must then benefit as much as possible from renewable energy generation and/or connection to an existing or proposed low carbon district energy network. As a last resort, any residual energy is to be offset by a contribution to Cornwall Council's Offset Fund, as far as economic viability allows.

2.4 Climate Emergency DPD Policy Guidance (March 2023)

- 2.4.1 This document sits alongside the *Climate Emergency DPD*, providing information and direction on how to interpret the policies in the DPD.

2.5 Climate Emergency Development Plan Document – transition arrangements for applying Policy SEC1 Part 2b (March 2023)

- 2.5.1 This document sets out Cornwall Council's delay in implementation of Policy SEC1 Part 2b until 15 June 2023 and provides the opportunity for applying flexibility in meeting the policy until 14 June 2024.

3 Methodology

- 3.1.1 An assessment of each dwelling's performance against the following three aspirations set out in Policy SEC1 Part 2b of the *Cornwall Climate Emergency DPD* will be made:
- Space heating demand less than 30kWh/m²/annum;
 - Total energy consumption less than 40kWh/m²/annum; and
 - On-site renewable energy generation to match the total energy consumption, with a preference for roof-mounted solar PV.
- 3.1.2 Elmhurst Energy's Design SAP 10 software (SAP 10.2) will be used for the assessment, with data extracted from the SAP output document "Calculation of EPC Costs, Emissions and Primary Energy", and input into Cornwall Council's *Energy Summary Tool SAP v2*. The energy summary tool is submitted alongside this statement.

4 Assessment

4.1 Reducing the energy load of the development

4.1.1 The following design measures would be taken to reduce the energy load of the development.

Passive solar and passive cooling design

4.1.2 The dwellings have been designed to gain benefit from passive solar energy as far as is practical with relatively unobstructed south facing windows provided to both dwellings.

4.1.3 Measures would be taken to reduce the risk of the dwellings overheating. Internal heat generation would be minimised by:

- Insulating all hot water pipes beyond Building Regulation standards;
- Installing 100% low energy lighting; and
- Installing energy efficient equipment where applicable.

4.1.4 Heat entering the plots would be minimised through:

- High levels of insulation; and
- Specifying glazing with a solar transmittance value that has been carefully considered to strike the balance between useful solar gain in the winter and unwanted solar gain in the summer.

4.1.5 Passive ventilation has been designed for by:

- Including openable windows to all dwellings; and
- Providing cross-ventilation.

4.1.6 These measures mean that the dwellings would not require active cooling.

Unregulated energy

4.1.7 Unregulated operational CO₂ emissions would be minimised by:

- Ensuring that any fridges or fridge-freezers installed would have at least an A+ rating under the EU Energy Efficiency Labelling Scheme;
- Ensuring that any washing machines or dishwashers installed would have at least an A rating under the EU Energy Efficiency Labelling Scheme;
- Ensuring that any tumble dryers or washer dryers installed would have at least a B rating under the EU Energy Efficiency Labelling Scheme;
- Providing building users with a leaflet explaining the EU Energy Efficiency Labelling Scheme to encourage responsible purchasing of white goods; and
- Providing all external space lighting with energy efficient lamps and passive infrared red (PIR)/daylight cut off sensors.

4.2 Maximising the energy efficiency of fabric

4.2.1 Table 1 details the proposed construction specification to the dwellings. The second column in this table sets out Approved Document L 2021 limiting fabric parameters in order to show the elements of the specification that provide an improvement. The specification incorporates low U-values, a low air leakage, good thermal bridging, mechanical ventilation with heat recovery, and low energy lighting.

Table 1: Proposed construction specification to the dwellings

	Approved Document L limiting fabric parameters	Proposed construction specification
U-value of external walls	0.26 W/m ² K	0.18-0.19 W/m ² K
U-value of ground floors	0.18 W/m ² K	0.11 W/m ² K
U-value of main roofs	0.16 W/m ² K	0.11-0.12 W/m ² K
U-value of doors	1.60 W/m ² K	1.20 W/m ² K
U-value of windows	1.60 W/m ² K	1.20 W/m ² K
Air permeability	8 m ³ /h.m ² at 50 Pa	2 m ³ /h.m ² at 50 Pa
Ventilation	Intermittent extracts	Mechanical ventilation with heat recovery
Lighting	Lamps with a luminous efficacy of 75 light source lumens per circuit-watt	Lamps with a luminous efficacy of 100 light source lumens per circuit-watt
Thermal bridging	Default ψ value of 0.200	The use of calculated details to achieve a ψ value of circa 0.035
Water heating reduction measures	None	Waste water heat recovery units to the bathrooms and en-suites

4.3 Delivering on-site low carbon or renewable energy systems

4.3.1 Having reduced the energy demand of the plots, the next step in the energy hierarchy is to incorporate on-site low or zero (LZC) carbon energy systems. Below is an assessment of the feasibility of incorporating LZC systems at this site.

4.3.2 Connection to existing heating or cooling networks

4.3.3 There are no existing or proposed networks in the vicinity of the development. Therefore, the development would not connect to an energy network nor allow provision for future connection.

Biomass boilers

4.3.4 The new dwellings would have short heating response times because they are well insulated and relatively light-weight. They would also have variable space heating demand and intermittent water heating demand. Biomass boilers are not suited to this because the burning of fuel is not instantaneous, and they take a long time to heat up and cool down. Further concerns regarding the installation of a biomass heating system at this development include:

- The Nitrous Oxide (NO_x) and particulate matter (PM₁₀) emissions from biomass systems are relatively high, and their use can have a significant impact on local air quality.
- Biomass fuels are expensive.
- A significant amount of space would be required for plant, fuel storage and delivery.

4.3.5 For these reasons, biomass boilers are not considered a viable solution at this development.

Air source heat pumps

4.3.6 Air source heat pumps (ASHPs) are powered by electricity and typically have a Coefficient of Performance (CoP) of between 2 and 4. There is sufficient area around the plots for their installation and it is suggested that ASHPs are a feasible solution.

Ground source heat pumps

- 4.3.7 Ground source heat pumps (GSHPs) typically achieve higher efficiencies than ASHPs. Subject to ground assessments, they are considered an appropriate solution for this development. However, they require the installation of either a ground loop or a vertical borehole which means that their installation is more expensive and more complicated than the installation of ASHPs.

Wind power

- 4.3.8 Locating a wind turbine in a residential area presents several difficulties. These include the area required for the turbine, turbulence caused by nearby buildings, installation and maintenance access, environmental impact from noise and vibration, and visual impact on the landscape. The RenSMART Maps Wind Speed Tool shows that average wind speed at 10 metres above ground at this development is 5.9m/s. Once the turbulence from the man-made obstacles around the development has been taken into consideration, it is unlikely that a wind turbine would generate sufficient electricity to make it cost effective. For these reasons, wind power is not considered an appropriate solution.

Solar thermal collectors

- 4.3.9 Solar thermal collectors are a mature and reliable technology. There is sufficient roof area at a favourable orientation to achieve reductions in CO₂ emissions through their installation. It is suggested that this technology is technically feasible although the CO₂ emissions achieved through their installation would be limited to the hot water demand of the plots.

Solar photovoltaic (PV) panels

- 4.3.10 Solar PV panels are a mature and reliable technology. There is sufficient roof area to generate significant renewable energy and achieve significant reductions in CO₂ emissions through their installation. It is suggested that this technology is feasible.

Preferred solution

- 4.3.11 ASHPs, GSHPs, solar thermal collectors and solar PV panels are the LZC technologies considered to be appropriate at this development. The preferred approach is to install ASHPs and solar PV panels.
- 4.3.12 For the purposes of calculating energy consumption and emissions, a Daikin Altherma EDLA06EV3 air source heat pump has been input into the SAP assessment for each dwelling. This is subject to change, dependent on heating designs and the commercial viability of the product specified versus other products with a similar performance in the market.
- 4.3.13 9 no. 405W solar PV panels are proposed to each dwelling; 7 on the south facing roof of each dwelling and 2 on the east/west facing roof of each dwelling.

Energy storage

- 4.3.14 Purchasers would be offered solar PV diverters and/or solar PV batteries as an optional extra purchase.

4.4 Off-site measures and carbon offsetting

- 4.4.1 Neither off-site measures nor carbon offsetting are proposed because the development would be a Net Zero Carbon development.

4.5 Net Zero Carbon

- 4.5.1 As shown in the *Energy Summary Tool SAP v2* that accompanies this energy statement, each plot would achieve:

- Space heating demand less than 30kWh/m²/annum;
- Total energy consumption less than 40kWh/m²/annum; and
- On-site renewable energy generation to match the total energy consumption.

4.5.2 Therefore, each plot would achieve Net Zero Carbon, in accordance with the definition set out in Policy SEC1.

5 Conclusions

- 5.1.1 The 2 dwellings proposed at Land adjacent Parc Vean House would be constructed in accordance with the energy hierarchy.
- 5.1.2 A combination of passive solar design, energy efficiency measures, the installation of air source heat pumps, and the installation of solar photovoltaic (PV) panels would enable each plot to achieve Net Zero Carbon, in accordance with the aspirations of Policy SEC1 Part 2b of Cornwall Council's *Climate Emergency Development Plan Document*.