

Technical Design Note

Project name	Porthcawl Waterfront Regeneration		
Design note title	Energy Statement		
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1 Executive Summary

This report provides an analysis of the energy strategy for the proposed Porthcawl Waterfront Regeneration project, incorporating 980 residential homes, new café / restaurants, leisure, shops, community facilities and hotel.

The report also outlines the key policy drivers and provides a summary of the energy modelling completed for the multi-development, with named system requirements applied to comply with policies explained in Section 3.

In devising the energy strategy for the development, consideration has been taken of the local and national planning policies, as well as other relevant requirements. The strategy has been based upon the Energy Hierarchy, which aims at first to reduce energy requirements, followed by improve energy efficiency and then implement renewable technologies if/as required.

This report concludes that the most appropriate sustainable building services strategy for the multiple units is fully electric systems, with proposals for:

- Air to water heat pumps (ASHPs)
- Air conditioning via Variable Refrigerant Flow (VRF) in concurrence with Fan Coil Units (FCU)
- Balanced mechanical ventilation through Air Handling Units (AHU), either de-centralised ceiling mounted or central air handling plant.
- Photovoltaic Panels (PV) are proposed as the schemes renewable energy source to achieve compliance. PV arrays will be dedicated to each of development units with a unique minimum size requirement to comply with Welsh Building Regulations 2022.



2 Introduction

Stantec have been appointed on behalf of The Urbanists to prepare a report detailing the proposed energy requirements of Porthcawl Waterfront Regeneration as part of planning submittal works.

The development will be required to comply with Building Regulations Part L1 and L2 Wales for residential and non-residential buildings respectively criteria. A detailed Dynamic Simulation Model (DSM) calculation will be performed for each phase to assess compliance.

2.1 Site Context

The current layout of the site consists of 980 homes, new café / restaurants, leisure, shops, community facilities and hotel

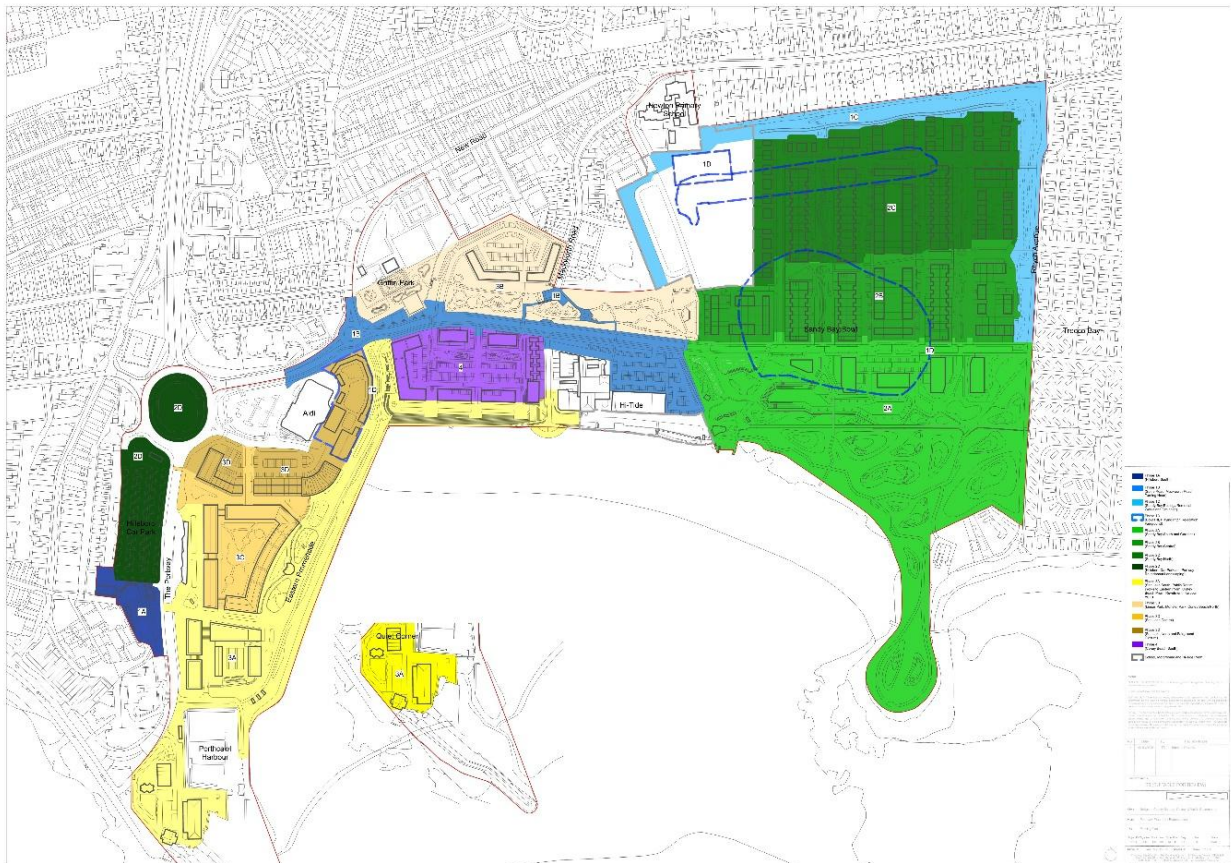


Figure 1 Phasing Plan for the project prepared by The Urbanists (refer to full scale drawing file for further detail)

3 Building Regulations and Planning Policy

Policy and Regulations Overview

Local and national policy, regulations and guidance have been followed. Best practice standards and the high aspirations of the client have also been integrated.

3.2 Planning Policy Wales

The Planning Policy Wales (PPW) Edition 12 was updated in July 2024 and sets out government planning policy for Wales.

The PPW states clearly that the purpose of planning is to help deliver sustainable development and defines three mutually dependent pillars that must be equally considered in order to achieve this:

- Economic
- Social
- Environmental

The PPW focusses on:

- Promoting high-quality design for new homes and places
- Offering stronger protection for the environment

3.3 Planning Practice Guidance

Planning Practice Guidance (PPG) provides further advice on various planning issues associated with development, including those linked to sustainability and renewable energy and underpins the policies within the PPW.

PPG is a material consideration in planning decisions and should generally be followed unless there are clear reasons not to. It sets out how local authorities should include policies that protect the local environment and strategies to mitigate and adapt to climate change and supports developments that are functional and adaptable for the future.

The proposed units will be required to comply with Building Regulations Approved Document Part L1 and L2 2022 for Wales.

3.4 Welsh Building Regulation Part L: Volume 1 (2022)

Compliance with **Approved Document L Volume 1 & 2 (2022 Wales)** of the Building Regulations is a legal requirement and sets the minimum standards for energy conservation in new buildings:

- **Volume 1** applies to dwellings.
- **Volume 2** applies to buildings other than dwellings.

As part of the compliance process, the proposed Porthcawl Waterfront Regeneration buildings are simulated against a notional building (i.e. a benchmark model) of similar dimensions and usage (i.e. forming 'target' minimum compliance measures) and their carbon emission rates compared. The parameters of the notional building are fixed to default templates. It should be noted that these fixed parameters have been demonstrated as unrepresentative of actual operational energy usage and as such should only be considered suitable for demonstrating formal compliance only.

In order to meet the current Part L Wales: (2022) compliance requirements for buildings, the following three criteria must be met the following for each volume

Volume 1:

- The Dwelling Emissions Rate (DER) must not exceed the Target Emissions Rate (TER)
- The Dwelling Fabric Energy Efficiency (DFEE) must not exceed the Target Fabric Energy Efficiency (TFEE) rate.
- The Dwelling Primary Energy Rate (DPER) must not exceed the Target Primary Energy Rate (TPER)

Volume 2:

- The Building Emissions Rate (BER) must not exceed the Target Emissions Rate (TER)
- The Building Primary Energy Rate (BPER) must not exceed the Target Primary Energy Rate (TPER)

3.5 EPC

Energy performance certificate (EPC) is the government's rating of energy conservation in buildings measured on a scale from A+ to G, with G being the worst performing. The A+ rating is the only level at which buildings are considered 'energy positive', namely there is theoretically more on-site renewable energy generation compared to energy consumed.

As per Part L compliance, the systems evaluated include (but not limited to) building fabric, heating, ventilation, cooling, lighting and renewable energy.

As a funding requirement for the Porthcawl Waterfront Regeneration project, a minimum EPC Rating of 'A' is required and shall be used as the minimum threshold for modelling.

3.6 Net Zero Carbon

There are several different ways of quantifying operational net zero carbon (NZC). In the instance for this report, we are terming NZC as an EPC rating of A+ (as discussed in Section 3.5), where the EPC asset rating is over a score of 100.

It should be noted however, in the same way Part L is calculated, the buildings for EPC assessments are modelled using pre-set notional templates as opposed to bespoke profiles. It is for this reason, the EPC A+ rating is not considered the most accurate representation of operational energy usage. For the most accurate prediction of operational energy usage, it is recommended a CIBSE TM54 assessment is carried out.

4 Energy Strategy

4.1 Sustainable and Low Energy Design

The energy strategy for the proposed development will be developed in accordance to local and national policies and will be based on the principles of the Energy Hierarchy

In order to minimise the building's overall energy usage and CO₂ emissions, a four-stage approach shall be adopted. This approach is commonly referred to as the 'energy hierarchy' and is outlined below:

"Reduce" - Use less energy

"Efficiency" - Use energy more efficiently

"Renewables" - Use renewable energy

"Management" - Manage energy effectively

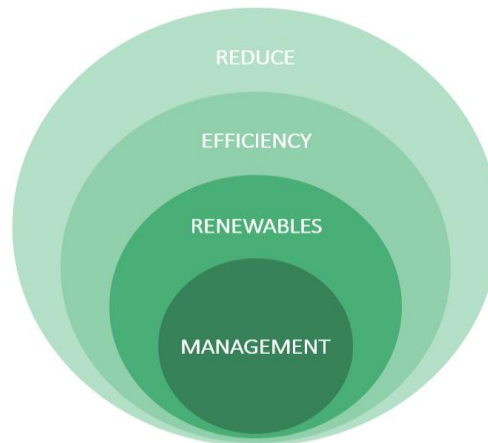


Figure 2 - Energy Hierarchy

4.1.1 "Reduce" - Use Less Energy

In order to achieve a low energy building, it is important to look at the passive design measures that can be introduced into the building design to reduce the need for energy to be produced in the first instance.

During the early stages of this design, the following shall be considered by the design team:

- Maximising daylight where possible to reduce the amount of time artificial light is required.
- Minimising direct solar gain to minimise the need for air conditioning.
- Maximising control and flexibility of plant installations.
- Reducing building air permeability, limiting uncontrolled air (and heat) transfer.

- Improving the performance of the building thermal envelope (reducing fabric U-values and glazing G-values).
- Maximising the potential thermal mass of the structure to reduce potential overheating particularly in naturally ventilated areas.

4.1.2 "Efficiency" - Supply Energy Efficiently

The following design strategies shall be incorporated to allow the energy produced to be used in the most efficient manner. These include making use of:

- High efficiency LED luminaires
- Lighting controls with daylight linking where practical
- Efficient lighting controls utilising absence detection wherever possible.
- External lighting controlled by photocell(s) with timeclock 'off' over-rides.
- Low velocity pipework and ductwork to reduce fan and pump power consumption.
- High efficiency motors for ventilation plant equipment.
- Separate metering on all relevant systems
- Specification of ductwork pressure testing and building permeability testing.
- Mechanical ventilation with heat recovery efficiencies in excess of that required under EcoDesign directives

4.1.3 "Renewables" - Use Renewable Energy

The third stage of the sustainability and Low Energy Design approach is to take into consideration the use of renewable and low to zero carbon technologies.

For compliance with Part L of the Building Regulations, it is assumed the development will need an allocation of photo-voltaic (PV) panels, orientated to best maximise energy output. The quantities of PV and design arrangement shall be verified during the design stage of each phase.

4.1.4 "Management" - Manage Energy Effectively

The final stage of the hierarchy extends past the design stage and into the operation of the development and is reliant on effective management of energy throughout a building's lifetime.

This stage can be assisted by the design stage through the previous hierarchy steps and the addition of building management systems (BMS) where applicable, energy monitoring systems (EMS), and metering strategies.

4.2 Operational Energy Target

The operational Energy Target for the scheme is currently being set by discussions with all stakeholders for varying building types. The targets will be aligned with current guidelines and be a challenging target for the development.



5 Design Inputs & Assumptions

The following are headline design inputs and assumptions which are to be included as targets during subsequent design periods and form a basis of design for modelling.

5.1 Building Fabric

The following table summarises the building fabric parameters which should be incorporated as part of the detailed design stage taken from the Low Energy Transformation Initiative (LETI)

Table 1: Building Fabric Parameters

Building Element	LETI – Small-scale housing	LETI – Medium and large-scale housing	LETI – Commercial	LETI – Schools	Units
Exposed Floor	0.09	0.09	0.11	0.11	W/m ² K
Exposed Roof	0.11	0.11	0.11	0.11	W/m ² K
Exposed Walls - House	0.14	0.14	0.13	0.14	W/m ² K
Windows	0.8	1.0	1.0 (triple) 1.2 (double)	1.0	W/m ² K
Windows G-value	0.55	0.55	0.4	0.4	m ³ /m ² .hr @ 50Pa
Air Permeability	1	1	1	1	m ³ /h.m ² @50pa

5.2 Thermal Bridging

Thermal bridging shall be calculated using a Y-value 0.04. This is considered industry standard and would be revised accordingly as design progresses

5.3 Energy Targets

Energy Targets for the development are to be in line with most recent guidance. The table below outlines the key targets for each development type which shall inform the basis of design throughout subsequent stages.

Type	Energy Use Intensity (EUI) (kWh/m ² .yr)	Heating Demand (kWh/m ² .yr)
Small-scale Housing	35	15
Medium and large-scale housing	35	15
Commercial Developments	55	15
Schools	65	15

*Information taken from the Low Energy Transformation Initiative (LETI)

In addition to the table above, an EPC of A shall be provided for each building as part of the development. This can be reviewed on a case-by-case basis for each building type.

5.4 Renewables

Where possible, properties in the Porthcawl Waterfront Regeneration scheme will have a portion of renewable technology incorporated for on-site energy generation. The most appropriate technology deemed for the scheme is photovoltaic (PV) panels, intended to be installed on the roof of the relevant buildings.

Each future development would require an energy strategy and energy design which will state whether renewable technology will be included as part of the design.

5.4.1 Battery Storage

It is currently assumed that no battery storage will be present.



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