

# Energy and Sustainability Statement

## Carmarthen West



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Lovell Partnerships Ltd



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# Executive Summary

This Energy and Sustainability Statement has been prepared in support of a planning application for a residential housing development at Carmarthen West, just north of Maes Pedr, Carmarthen, Wales.

This Statement includes a carbon dioxide emission assessment showing how selected energy efficiency, low carbon and renewable energy measures have been considered and those which are deemed appropriate for the scheme.

Sample Standard Assessment Procedure (SAP) Calculations using SAP 10.2 have been prepared for the dwellings based upon the construction specification set out within the report, using planning stage drawings. This enables an assessment of the carbon dioxide emissions arising from the site to be undertaken and has allowed a number of different systems and technologies to be tested.

A fabric first approach has been adopted to minimise carbon emissions and reduce energy regulated and unregulated usage by reducing uncontrolled heat loss through high performance insulation, well designed thermal junctions, low airtightness targets, and high-performance glazing. As a result, operational energy and carbon emissions are significantly reduced through the base build, creating a strong foundation for the adoption of renewable technologies to further improve the dwellings performance.

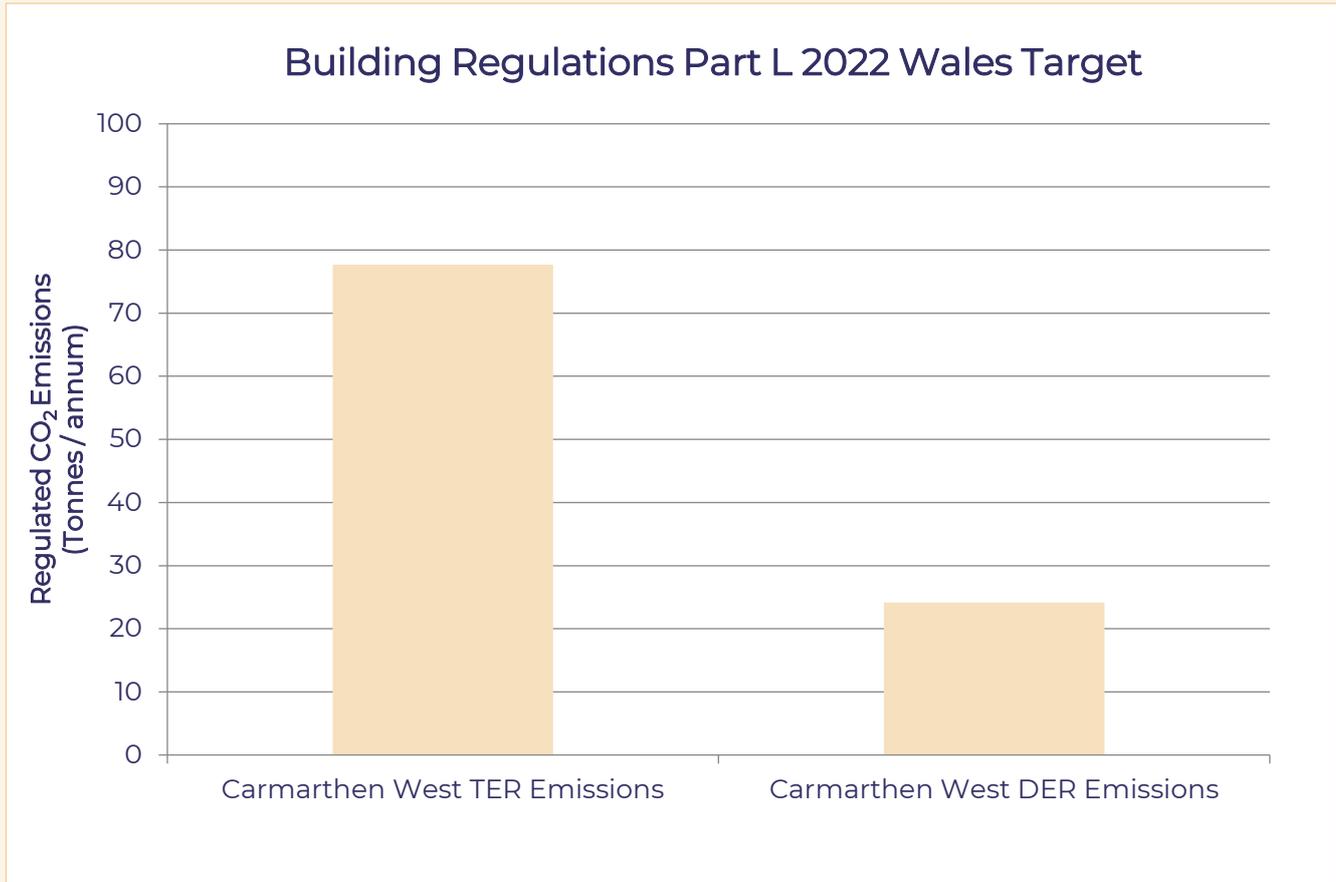
A review of possible low carbon and renewable technologies has been conducted, and the new development site proposes to adopt the use of Air Source Heat Pump (ASHP) and Waste Water Heat Recovery (WWHRS) across all homes on site. Photovoltaic Panels (PV) are proposed on the social rental dwellings to ensure that these house types achieve an EPC A rating, as required by the client.

This passive fabric first, energy efficient technology second approach, works to produce a scheme that exceeding Part L carbon standards by **68.89%**. This means that these dwellings are almost **70%** more energy efficient and emit less carbon emissions than a dwelling in compliance with current building regulations. This contributes to a home that is better for the environment and more cost effective to live in.

This approach complies with the following relative policies and requirements:

- Planning Policy Wales
- Approved Document Part L (2022 edition) Part L Wales 2022
- Carmarthen County Council Local Development Plan (2006 – 2021) policies SP1, SP2, SP11, GP1

Predicted Site Wide Carbon Emissions



Graph 1 – Predicted Annual Site Wide Carbon Emissions

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# 1. Introduction

This Energy and Sustainability Statement has been prepared in support of a planning application for a residential housing development at Carmarthen West, just north of Maes Pedr, Carmarthen. The proposed development site is comprised of 84 low rise residential open market, social rental and Low Cost Home Ownership (LCHO) homes. The proposed development site comprises of the following tenure mix;

- 42 No. Open market houses
- 25 No. Social rental houses
- 17 No. LCHO houses

The following statement seeks to outline how the proposed development site will comply with the relevant national and local policies relating to carbon emission reduction. In particular the following documents have been referred to in this statement to demonstrate compliance:

- Planning Policy Wales
- Approved Document Part L (2022 edition)
- Carmarthen County Council Local Development Plan 2006 – 2021

This report will ensure the development incorporates sound sustainability principles by:

- Reducing carbon emissions associated with the development redesign by following the Energy Hierarchy and promoting a fabric first construction solution
- Carrying out a Renewable Energy Feasibility Assessment to determine the most viable low carbon and renewable technologies for the development
- Identifying additional solutions outside the scope of renewable energy technologies which will assist in improving the energy efficiency of the proposed development

# 2. Policy Review

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## 2.1 Policy Context

Anthropogenic climate change can be described as the production of greenhouse gases and associated change in global climate caused by human activity. In response to the increased scientific awareness of the effect of human activities there has been a push in developed economies towards more sustainable development.

In 1992, the UK signed the Kyoto protocol committing itself and other nations to cut emissions of various greenhouse gases, the most significant being carbon dioxide. Since then, different policies and targets have been set at national, regional and local levels to stimulate and regulate more sustainable development. The Climate Change Act 2008 set carbon budgets to ensure that by 2050 there would be at least an 80% reduction in UK carbon emissions from the 1990 baseline. Additionally, the Conference of the Parties COP21 Paris agreement limiting global warming to 1.5 - 2°C above pre-industrial levels came into force in November 2016.

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## 2.2 National Policy

### 2.2.1 Planning Policy Wales 2024

Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs, MTANs and policy clarification letters comprise national planning policy.

The primary objective of PPW is to ensure that the planning system contributes towards the delivery of sustainable development and improves the social, economic, environmental and cultural well-being of Wales, as required by the Planning (Wales) Act 2015, the Well-being of Future Generations (Wales) Act 2015 and other key legislation and resultant duties such as the Socio-economic Duty. A well-functioning planning system is fundamental for sustainable development and achieving sustainable places.

PPW promotes action at all levels of the planning process which is conducive to maximising its contribution to the well-being of Wales and its communities. It encourages a wider, sustainable and problem-solving outlook which focuses on integrating and addressing multiple issues rather than on an approach which is fragmented, un-coordinated and deals with issues in isolation. It provides an opportunity to remove any actual or perceived problems in current approaches and stimulate and support innovative and creative ideas as well as high standards of evidence and assessment to underpin the preparation of development plans and strategies and individual proposals. Monitoring and learning from development outcomes so as to drive sustainable improvements in planning practice is also important.

PPW and the National Development Framework (published as Future Wales – the National Plan 2040) set out how the planning system at a national, regional and local level can assist in delivering these requirements through Strategic Development Plans (SDPs) and Local Development Plans (LDPs). Strategic Plans should be prepared on a regional basis and should reflect functional areas, to address issues such as regional housing markets, travel to work patterns and economic opportunity areas. The preparation of an SDP allows opportunities and challenges to be considered and planned for in an integrated and comprehensive way, promoting the achievement of positive planning outcomes. Local Development Plans should set out a vision for how places are expected to change in land-use terms to accommodate development needs over the plan period. This provides certainty for developers and the public about the type of development that will be permitted at a particular location. LDPs contain locally specific policies to explain or develop national policy further and to take forward local priorities for action. Evidence is needed to support LDP policies which is tested through the Examination procedure. They may be prepared individually or jointly by two or more planning authorities. LDPs should have regard to the relevant local well-being plans and area statements which have been produced for the area. LDPs must be in general conformity with Future Wales and SDP.

## 2.2.2 Future Wales: The National Plan 2024

Future Wales: The National Plan 2040 is the national development plan for Wales and sits at the top of the Welsh planning framework. It provides the strategic spatial direction for growth and development and must be read alongside Planning Policy Wales (PPW), which sets out the detailed policy framework. Together, they form the statutory basis for planning decisions in Wales, with local development plans and regional strategies required to be consistent with their objectives. Future Wales establishes a clear national commitment to decarbonisation, renewable energy generation, and sustainable placemaking, aligning with the Welsh Government's target of achieving net zero by 2050.

In relation to energy, Future Wales identifies priority areas for large-scale renewable energy projects, supports the integration of local energy networks, and emphasises energy-efficient and low-carbon design across new development. It seeks to reduce reliance on fossil fuels by promoting compact growth, sustainable transport, and whole-life carbon considerations in the built environment. Energy Statements should therefore demonstrate how proposals align with these national ambitions, ensuring that new development actively contributes to the transition towards a low-carbon, climate-resilient Wales.

## 2.2.3 Planning for Sustainable Buildings: Practical Guidance (July 2024)

The Welsh Government's Planning for Sustainable Buildings guidance sits beneath Planning Policy Wales (PPW) and Future Wales: The National Plan 2040, translating national objectives on climate change and sustainable placemaking into clear expectations for development proposals. It ensures that energy efficiency, carbon reduction, and climate resilience are embedded in the planning process, providing the link between high-level policy ambitions and Local Development Plan requirements. This positions the guidance as a practical tool for demonstrating how new development contributes to the delivery of Wales's wider sustainability and decarbonisation objectives. The guidance prioritises a fabric-first approach to reducing energy demand and the integration of low and zero carbon technologies.

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## 2.3 Local Planning Policy:

Carmarthen County Council Local Development Plan (2006 – 2021) has set out strategic objectives and core policies in tackling climate change and wider sustainable issues.

### 2.3.1 GP1: Sustainability and High Quality Design

Development proposals will be permitted where they accord with the following:

1. It conforms with and enhances the character and appearance of the site, building or area in terms of siting, appearance, scale, height, massing, elevation treatment, and detailing;
2. It incorporates existing landscape or other features, takes account of site contours and changes in levels and prominent skylines or ridges;
3. Utilises materials appropriate to the area within which it is located;
4. It would not have a significant impact on the amenity of adjacent land uses, properties, residents or the community;
5. Includes an integrated mixture of uses appropriate to the scale of the development;
6. It retains, and where appropriate incorporates important local features (including buildings, amenity areas, spaces, trees, woodlands and hedgerows) and ensures the use of good quality hard and soft landscaping and embraces opportunities to enhance biodiversity and ecological connectivity;
7. It achieves and creates attractive, safe places and public spaces, which ensures security through the 'designing-out-crime' principles of Secured by Design (including providing natural surveillance, visibility, well lit environments and areas of public movement);
8. An appropriate access exists or can be provided which does not give rise to any parking or highway safety concerns on the site or within the locality;
9. It protects and enhances the landscape, townscape, historic and cultural heritage of the County and there are no adverse effects on the setting or integrity of the historic environment;
10. It ensures or provides for, the satisfactory generation, treatment and disposal of both surface and foul water;
11. It has regard to the generation, treatment and disposal of waste.
12. It has regard for the safe, effective and efficient use of the transportation network;
13. It provides an integrated network which promotes the interests of pedestrians, cyclists and public transport which ensures ease of access for all;

### 2.3.2 SPI: Sustainable Places and Spaces

Proposals for development will be supported where they reflect sustainable development and design principles by:

1. Distributing development to sustainable locations in accordance with the settlement framework, supporting the roles and functions of the identified settlements;
2. Promoting, where appropriate, the efficient use of land including previously developed sites;

3. Integrating with the local community, taking account of character and amenity as well as cultural and linguistic considerations;
4. Respecting, reflecting and, wherever possible, enhancing local character and distinctiveness;
5. Creating safe, attractive and accessible environments which contribute to people's health and wellbeing and adhere to urban design best practice;
6. Promoting active transport infrastructure and safe and convenient sustainable access particularly through walking and cycling;
7. Utilising sustainable construction methods where feasible;
8. Improving social and economic wellbeing;
9. Protect and enhance the area's biodiversity value and where appropriate, seek to integrate nature conservation into new development.

### 2.3.3 SP2: Climate Change

Development proposals which respond to, are resilient to, adapt to and minimise for the causes and impacts of climate change will be supported. In particular proposals will be supported where they:

1. Adhere to the waste hierarchy and in particular the minimisation of waste;
2. Promote the efficient consumption of resources (including water);
3. Reflect sustainable transport principles and minimise the need to travel, particularly by private motor car;
4. Avoid, or where appropriate, minimise the risk of flooding including the incorporation of measures such as SUDS and flood resilient design;
5. Promote the energy hierarchy by reducing energy demand, promoting energy efficiency and increasing the supply of renewable energy;
6. Incorporate appropriate climate responsive design solutions including orientation, layout, density and low carbon solutions (including design and construction methods) and utilise sustainable construction methods where feasible.

### 2.3.4 SP11: Renewable Energy & Energy Efficiency

Development proposals which incorporate energy efficiency measures and renewable energy production technologies will be supported in areas where the environmental and cumulative impacts can be addressed satisfactorily. Such developments will not cause demonstrable harm to residential amenity and will be acceptable within the landscape. Each proposal will be assessed on a case by case basis.

# 3. The Proposed Development

The newly proposed residential site is located just north of Maes Pedr to the West of Carmarthen town centre, Wales. The proposed site layout is highlighted circled within the red boundary below.

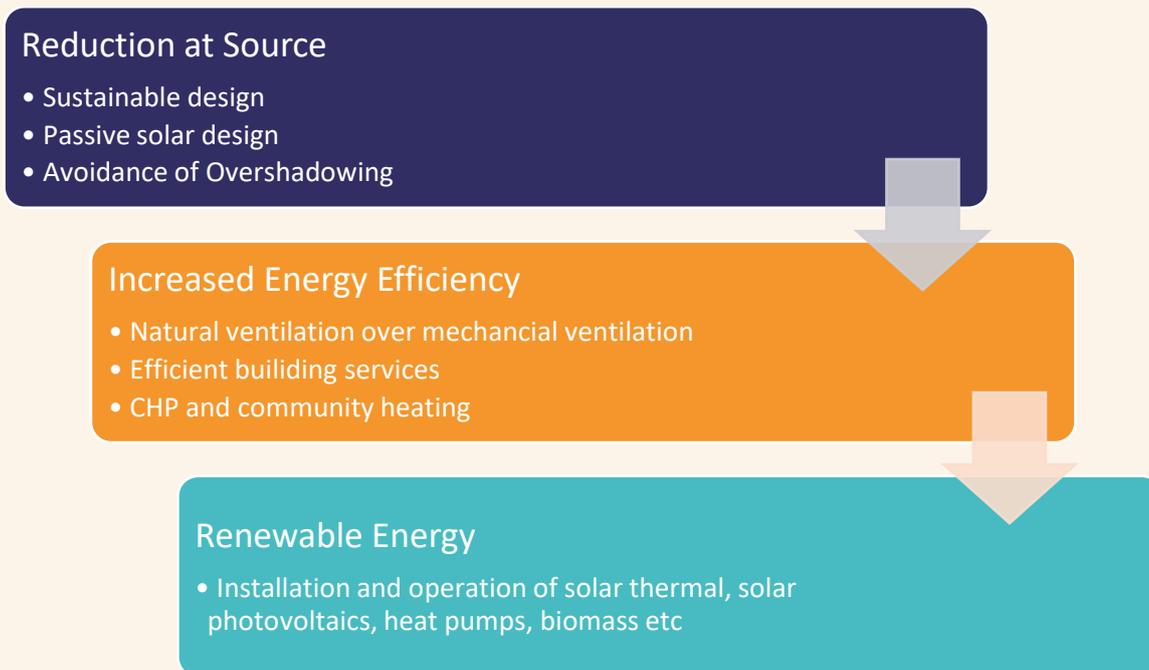


Figure 1: Site Location of Carmarthen West, Courtesy of Google Maps



# 4. The Energy Hierarchy

The Energy Hierarchy is a widely adopted and recognised set of principles to guide design, planning and development decisions to optimise energy provision. The Hierarchy prioritises minimising the need for energy consumption through firstly design and energy efficiency and then through generating the reduced energy demand via renewables. The Hierarchy can also help to balance the economic and environmental dimensions of sustainability, supporting choices which are both environmentally and economically sustainable.



Graph 2 – Energy Hierarchy

It is considered that the above principles carbon reduction forms the most appropriate approach from both the practical and financial perspective. The industry is broadly in agreement that the energy efficiency and low carbon technologies have the greatest impact offsetting CO<sub>2</sub> emissions. Therefore, it is logical to encourage enhanced mitigation through energy efficiency and low carbon technologies in the first instance, as opposed to applying renewables as the first option at a significantly greater cost.

This fabric first approach has been adopted within the proposed site redesign.

# 5. Fabric Performance

The energy performance of a building is affected by its design, construction and use and whilst occupant behaviour is beyond the remit of this statement, better design and construction methods can significantly reduce the life cycle emissions of a building and assist the occupant to reduce consumption.

Sustainable design is not just about incorporating renewable technologies; buildings should be designed at the outset to provide suitable environmental conditions for the occupants whilst also consuming as little energy as practically possible.

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## 5.1 Passive design

Passive design is a key principle of sustainable design and can be used to reduce the building's energy demand. Passive design responds to local climate and site conditions to maximise the building user's comfort and health while minimising energy use.

At the earliest stage the homes have been designed using a fabric first approach as to initially minimise energy and resulting CO<sub>2</sub> emissions. Particular attention will be paid to thermal envelope, and a high level of insulation will be specified to all thermal elements to minimise heat losses.

The development has been designed to improve daylighting in all habitable spaces, as a way of improving the health and wellbeing of its occupants. The majority of the habitable rooms, such as living rooms, will benefit from large windows to increase the amount of daylight within the internal spaces.

A portion of the buildings heat loss will occur due to air infiltration. Good construction detailing and the use of best practice construction techniques will minimise the amount of air infiltration. Extra attention to detail will be paid, with adequate sealing to all junctions in the thermal envelope, service penetrations and window casements.

Decentralised mechanical extract will be used to provide fresh air to the dwelling along with operable windows in order to prevent overheating during hottest summer months.

Given the early stage of this project the construction of certain thermal elements have not been finalised. Target u-values, which the client will achieve with their final specification, have been used in these instances.

The following table provides a summary of the energy efficient and carbon reducing design characteristics incorporated across the development.

Table 1: Energy Efficient Measures of SAP Calculations

Design SAP Data Input Table			
Element		Details	Comments
Floor U-Values	Ground Floors	0.11 W/m <sup>2</sup> K	Specialist Floor Construction
	Floors over Garage	0.24 W/m <sup>2</sup> K	300mm insulation between joists
Wall U-Values	External Walls – Masonry	0.18 W/m <sup>2</sup> K	100mm Partial Fill Insulation
	External Walls – Timber	0.18 W/m <sup>2</sup> K	Insulated timber frame
	Party Walls	0.00 W/m <sup>2</sup> K	Fully filled and capped
Roof U-Values	Plane Roof	0.09 W/m <sup>2</sup> K	500mm insulation at Joists
Opening U-Values	Windows	1.20 W/m <sup>2</sup> K	G Value: 0.63
	Half Glazed Doors	1.20 W/m <sup>2</sup> K	G Value: 0.63
	Door to Garage	1.50 W/m <sup>2</sup> K	
	Front Door	1.20 W/m <sup>2</sup> K	Solid Composite Door
Thermal Bridging	y-value	Various	Bespoke Psi Values
Ventilation	Air Tightness	4.00 m <sup>3</sup> /hm <sup>2</sup>	All Dwellings to be Air Tested
	Mechanical Ventilation	dMEV	Vent Axia
Lighting		100% Low Energy Lighting	Pendant Lighting Rated at 8W with an Efficacy of 80 Lumens/Watt

## 5.2 Lovells Design Approach

At Lovell, we ground every scheme in the Energy Hierarchy - Be Lean, Be Clean, Be Green, Be Seen, so homes are efficient by design, simple to run and comfortable to live in.

In practice this means a fabric-first focus (optimised U-values and glazing g-values, tighter air-permeability, thoughtful orientation, and efficient form and components) to minimise heat loss while safeguarding daylight and comfort. Where appropriate, efficient electric heating (e.g., air-source heat pumps) and WWHRs further reduce operational energy and bills. We also support residents with clear inductions and smart metering so households can understand and manage energy in use. This hierarchy led approach delivers lower running costs for occupants, healthier indoor environments, and a transparent route to compliance with evolving standards.

Our sustainability approach addresses water, embodied carbon and nature alongside energy. We integrate SuDS and resilient blue-green infrastructure, permeable surfaces, rain gardens, green roofs and native, drought-tolerant planting, together with water-efficiency measures, rainwater harvesting, and practical details such as well-insulated, shortened hot-water pipe runs to reduce wastage at the tap. During construction, we cut embodied and site emissions through measures such as renewable site power, eco cabins, high waste diversion rates, lower carbon fuels for plant, EV charging for site traffic, and a localised supply chain. For residents, that results in homes and places that better manage flood risk, use less water and support biodiversity; for the planning authority, it demonstrates a forward-looking, proportionate pathway to compliance and net zero-aligned outcomes across both operational and whole life carbon.

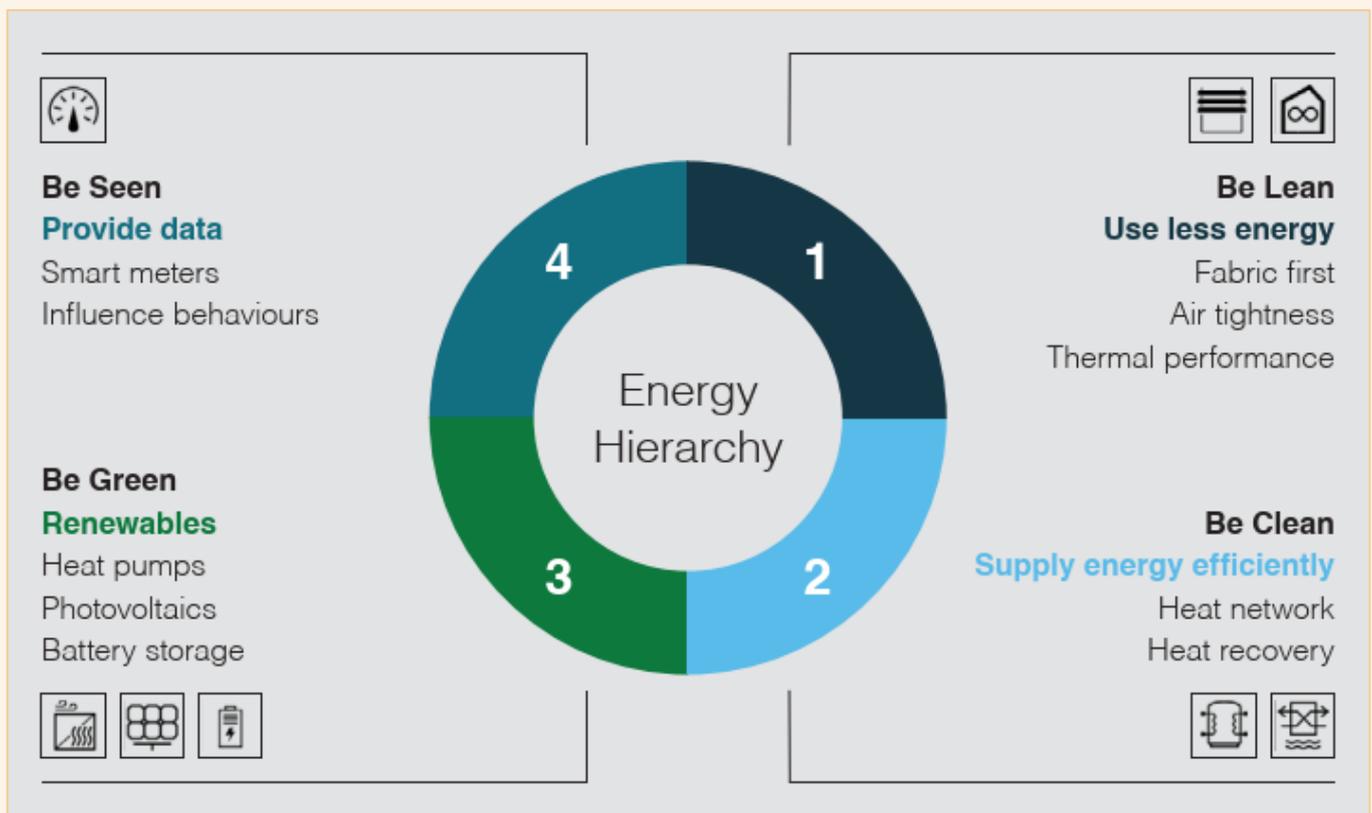


Figure 3: An illustration of Lovells Energy Hierarchy Approach

# 6. Renewable Technologies

This section reviews the suitability of various renewable technologies for this site redesign.

## 6.1 Heat Pumps

### 6.1.1 General Overview

An air-source heat pump works like a fridge in reverse. A refrigerant absorbs heat from the outside air and moves it indoors to warm your home (and often your hot water).

It has three key parts:

- Evaporator coil – takes heat from outdoor air
- Compressor – pushes and compresses the refrigerant to raise its temperature
- Heat exchanger – passes that heat into your home's air or water

Usually, the evaporator and compressor sit outside; the heat exchanger is inside.

Air-to-water systems heat water for a cylinder, underfloor heating, or radiators. The water is lower temperature than a boiler (typically 35–45 °C), so underfloor heating is usually most efficient. Air-to-air systems warm indoor air directly and blow it around with fans. Ground-source heat pumps use the ground's steady temperature (about 12 °C) to heat water or air efficiently, with optional cooling. Heat is drawn because the ground is warmer than the circulating fluid.

For ground loops you can use:

- Boreholes: several holes up to 100 m deep, spaced about 6 m apart
- Foundation loops: closed loops built into piles or pad foundations to make use of existing excavations and maximise contact with the earth

### 6.1.2 Technical Viability and Feasibility

Space needs:

- Like solar thermal, most homes need room for a hot water cylinder.
- Air-source heat pumps (ASHPs) need an outdoor unit and sometimes an indoor unit, depending on whether it's a monobloc or bi-bloc. Some indoor units include a built-in cylinder.
- Ground-source heat pumps (GSHPs) need indoor space; the outdoor part is buried underground.

Efficiency, emissions, and ratings:

- Heat pumps are very efficient—often 300%+ (COP ~3).
- Put simply: 1 kW of electricity in → ~3 kW of heat out.

Using less electricity for the same heat cuts emissions and boosts energy ratings versus direct electric heating or fossil fuel boilers.

Ground source vs air source:

- GSHPs: efficient and stable, but not recommended here due to high costs (drilling boreholes, ground loops) and uncertain ground conditions. Even with horizontal collectors (possible where gardens exist), costs are still much higher than ASHPs. The extra efficiency generally doesn't justify the added expense and complexity.
- ASHPs: cheaper to install, very efficient when designed well, lower emissions, and improve ratings.

Main drawback today:

Electricity costs are still higher than natural gas, so running costs may be above a gas boiler (though still far lower than direct electric heating). This gap should reduce as the UK shifts away from gas and adds more renewables, but current tariffs should be considered.

**Heat pumps are considered to be a recommended technology for this site**

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## 6.2 WWHRS

### 6.2.1 General Overview

Waste Water Heat Recovery Systems (WWHRS) capture heat from warm wastewater, usually from showers, and transfer it to the incoming cold mains via a sealed heat exchanger. As hot wastewater runs to drain, it preheats the cold feed to the shower mixer (and / or hot water appliance), so less energy is needed to reach set temperature. Systems are closed loop (potable and waste streams never mix), have no moving parts, and operate automatically whenever a shower is used. WWHRS can be installed as gravity-fed vertical units on the shower waste stack, or as low-profile, under-tray / under bath horizontal units where headroom is limited, both options deliver reductions in hot water energy demand without using roof space or altering

### 6.2.2 Technical Viability and Feasibility

In low-rise housing, WWHRS is a practical, low-complexity measure, particularly in new build, where layout allows simple inline connection and short pipe reroutes. Vertical, gravity-fed configurations suit upper-floor showers with sufficient fall, offering higher recovery performance; under-tray / under-bath units fit bathrooms with minimal drop (e.g., ground floors or tight joist zones) and maintain standard gravity drainage with modestly lower efficiency.

**WWHRS are considered to be a recommended technology for this site**

## 6.3 Photovoltaics

### 6.3.1 General Overview

Photovoltaic (PV) panels are installed on the roof or elsewhere to convert sunlight into electricity. Ideally this type of system would be installed south-facing with a location that is not shaded by local obstructions. This power from the panels, generated as D.C. (Direct Current), is sent to a device called an inverter. The inverter converts the D.C. (Direct Current), from the solar panels into A.C. (Alternating Current), which is what our appliances use. There are different types of photovoltaic technology - Amorphous, Monocrystalline, Polycrystalline and Hybrid (combines monocrystalline and amorphous technology).

Table 2: Types of PV

Technology	Characteristics	Power Output & Density
Amorphous	Efficient in low light conditions and cheap but needs a large installation area.	Power output: 1000 units/kWp/year Power density: 62Wm/m <sup>2</sup>
Monocrystalline	High efficiency and fairly expensive. Prefers high-light conditions.	Power output 850-1000 units/kWp/year Power density = 120 Wp/m <sup>2</sup>
Polycrystalline	Lower efficiency and less expensive. Prefers high-light conditions.	Power output 850-1000 units/kWp/year Power density = 120 Wp/m <sup>2</sup>

### 6.3.2 Technical Viability and Feasibility

The site has large areas of pitched roof where photovoltaic panels could be installed. The main benefit to the system is having onsite generation of electrical energy that can be used within a dwelling. Most PV installation are fitted with meters that are export ready, essentially meaning that the electrical energy generated by the PV panels can be exported and sold to the National Grid. This would be dependent on the dwelling's energy provider.

From an emissions and energy perspective as the panels are generating electricity on-site it significantly reduces the emissions and improves the dwelling's energy performance. By having electrical generation on-site this reduces the demand for National Grid Electricity, this therefore reduces the emissions as energy is being generated at source. This is more efficient method of delivery of energy, which is why it has a very positive impact on a dwelling's energy rating. In Part L the notional calculation has PV embedded into the calculation, therefore including PV assists in meeting Part L compliance and in the achievement of good EPC ratings.

**Solar PV is considered to be a recommended technology for this site supporting the achievement of EPC A on social rent homes**

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## 6.4 Solar Thermal

### 6.4.1 General Overview

The most common solar thermal system uses a twin coil cylinder that is heated by both a boiler (or another heat source) and the solar panels. The solar system and the regular heating system do not come into direct contact with each other, and the only shared part is the cylinder.

The free energy in the sun's rays is absorbed by the solar thermal panel and the heat is transferred into the pipe work. The pipe work is filled with a ready mixed liquid containing an antifreeze (glycol) and water, which is pumped gently through a secondary coil inside a twin coil solar cylinder. The heat is deposited in the storage cylinder and the glycol returns to the panel to absorb more free solar energy. The result is a reduction in demand for hot water from the main heating system.

### 6.4.2 Technical Viability and Feasibility

There are available areas of pitched roofs on the site which can accommodate the installation of solar thermal panels. This could be a feasible option. However, modern homes with efficient fixtures and heat recovery technologies have low domestic hot water demand, so the collector can be underutilised much of the year.

**Solar thermal is therefore not considered to be a recommended technology, and no further investigation will be carried out.**

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## 6.5 Wind

### 6.5.1 General Overview

A wind turbine works the opposite of a fan. Instead of using electricity to make wind, like a fan, wind turbines use wind to make electricity. The wind turns the blades, which spin a shaft, which connects to a generator and makes electricity. Small wind systems known as "microwind" or "small-wind" turbines can produce electricity to help power the lights and electrical appliances in a typical home and also generate income from the feed in tariff scheme. Forty percent of all the wind energy in Europe blows over the UK, making it an ideal country for small domestic turbines.

The success of wind power depends totally on the suitability of the site. The key factors are:

- An average wind speed of at least 5 or 6 m/s (metres per second)
- No obstacles nearby which might reduce the wind speed or create turbulence. These include buildings, trees or hills. An ideal site is a smooth hilltop with a clear, open stretch to the prevailing wind
- You are able to connect the turbine to the property and to the national grid

## 6.5.2 Technical Viability and Feasibility

The predicted wind speed for Carmarthen West is 4.1 metres per second at 10m above ground level. Data has been sourced from the NOABL Wind Map which can be found at: <http://www.rensmart.com/Weather/BERR>. Due to the nature of the site, there are limitations as to where a wind turbine could be installed.

The proposed development does not meet the site constraints for wind turbines to work effectively. A specialist assessment would need to be carried out taking in to account all factors that affect the air flow and efficiency of a proposed turbine. Without this information wind turbines are not considered to be feasible on the site.

**Wind Turbines are therefore not considered to be a recommended technology, and no further investigation will be carried out.**

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## 6.6 Biomass

### 6.6.1 General Overview

Biomass is produced from organic materials, either directly from plants or indirectly from industrial, commercial, domestic or agricultural products. It is often called 'bioenergy' or 'biofuels'. For small-scale, domestic or commercial use, the fuel usually takes the form of wood pellets, wood chips or wood logs.

Producing energy from biomass has both environmental and economic advantages. It is a carbon neutral process as the CO<sub>2</sub> released when energy is generated from biomass is balanced by that absorbed during the fuel's production. Biomass can also contribute to waste management by harnessing energy from products that are often disposed of at landfill sites.

### 6.6.2 Technical Viability and Feasibility

Combustion of wood biomass releases higher quantities of NO<sub>x</sub>, SO<sub>x</sub> and particulates (PM<sub>10</sub> and PM<sub>2.5</sub>) compared to a comparable system fuelled by natural gas. This would have a negative impact upon the air quality in the vicinity of the area.

There are associated logistical issues associated with Biomass Boilers. The system requires significant space for both the Biomass boiler and fuel storage required.

**Biomass Boilers are therefore not considered to be a recommended technology, and no further investigation will be carried out.**

## 6.7 Renewable Summary

Following a review of renewable and low carbon technologies, this proposed scheme will adopt a fabric first approach as the foundation for reducing carbon emissions and energy demand. This ensures that all dwellings achieve high levels of thermal efficiency before the integration of renewable technologies.

To build upon this approach, the following technologies will be incorporated:

- Heat Pumps will be adopted across the site for all heating and hot water requirements. This technology reduces reliance on traditional systems and delivers significant emissions reductions, while aligning with future decarbonisation of the electricity grid.
- Waste Water Heat Recovery Systems (WWHRS) will also be installed across all dwellings on site to recover heat from shower waste water, further improving energy efficiency and reducing hot water demand.
- Photovoltaic (PV) arrays will be installed on the pitched roofs of the social rental houses. This renewable solution has been installed on this house type to achieve a client requirement of EPC A. They are not required on any other house type and therefore will just be included on the social rental homes.

By combining these measures, the development ensures that all homes benefit from reliable, efficient, and low carbon technologies. This strategy provides a robust balance between practicality, affordability, and long-term sustainability while future-proofing the scheme for Net Zero objectives.

Table 3: Low Carbon & Renewable Technologies proposed for adoption

Low Carbon & Renewable Technologies to be adopted			
Element		Details	Comments
Heating and Hot Water	Heating System	All Homes	ASHP
	Hot Water System	All Homes	Cylinder linked to ASHP
	WWHRS	All Homes	Connected to showers
Photovoltaics			PV design to be finalised across site for social rent units to ensure compliance with EPC A is achieved

# 7. Site Wide CO<sub>2</sub> Emissions

Sample SAP calculations have been produced for the proposed development site as a means of determining the carbon emissions of the site.

These have been completed using the approved modelling software Elmhurst Design SAP 10.2. Each house type within the proposed site redesign has been assessed to provide an overview of the predicted carbon emissions from the site compared with the Welsh Part L 2022 baseline.

The predicted development performance is outlined below in table 4.

Table 4: Summary of Emissions (Regulated) of Proposed Assessment

Dwelling	Type	m <sup>2</sup>	TER	DER	% Pass	Annual Emissions KgCO <sub>2</sub> /Year	No. Dwellings	Total Emissions KgCO <sub>2</sub> /Year	Indicative EPC rating
1B2P FF	Det	57.76	12.7	1.23	90.31	71.04	2	142.09	92 A
1B2P GF	Det	45.99	13.85	1.3	90.61	59.79	2	119.57	92 A
2B4P	EoT	80.98	10.47	1.13	89.21	91.51	10	915.07	92 A
3B5P	Semi	91.28	9.71	1.17	87.95	106.80	8	854.38	92 A
4B7P	Semi	113.68	8.91	0.81	90.91	92.08	3	276.24	93 A
Fairhaven	Semi	61.52	12.33	4.67	62.12	287.30	18	5,171.37	83 B
Lansdown	Semi	83.16	10.42	4.15	60.17	345.11	11	3,796.25	83 B
Milford	Det	90.98	10.94	4.27	60.97	388.48	3	1,165.45	82 B
Newbury	Det	94.04	11.06	4.27	61.39	401.55	11	4,417.06	82 B
Ramsey	Det	104.32	10.45	4.11	60.67	428.76	3	1,286.27	82 B
Redbourne	Det	117.52	9.58	3.87	59.6	454.80	7	3,183.62	82 B
Rochester	Det	112.06	11.23	4.21	62.51	471.77	6	2,830.64	81 B
<b>Total</b>							<b>84</b>	<b>24,158.02</b>	

The incorporation of ASHP and WWRS for homes across the proposed site, including the PV panels on the social rental units (to enable these house types to achieve EPC A), provides a predicted reduction in site wide carbon of **53, 505.26 kgCO<sub>2</sub>/Year** compared with the sitewide Part L 2022 Target Emission Rate (TER).

$$\frac{(\text{Target Emissions} - \text{Proposed Emissions})}{\text{Residual Emissions}} \times 100 = \% \text{Improvement}$$

$$\frac{(77,663.27 - 24,158.02)}{77,663.27} \times 100 = \mathbf{68.89\%}$$

The estimated Part L TER emissions for the site are estimated to be **77, 663.27 kgCO<sub>2</sub>** per annum whilst the Part L DER predicted site redesign emissions are estimated to be **24, 158.02 kWh** per annum. This equates to an **68.89%** reduction in emissions mandated by Part L across the site.

# 8. Conclusion

The new development site proposed at Carmarthen West, just north of Maes Pedr, Carmarthen, Wales, has been assessed against national and local energy and sustainability requirements through detailed SAP calculations and consideration of a range of energy efficiency and low carbon measures.

The proposed strategy follows a fabric-first approach, delivering significant reductions in operational energy use and carbon emissions through high-performance insulation, airtightness, thermal detailing, and glazing.

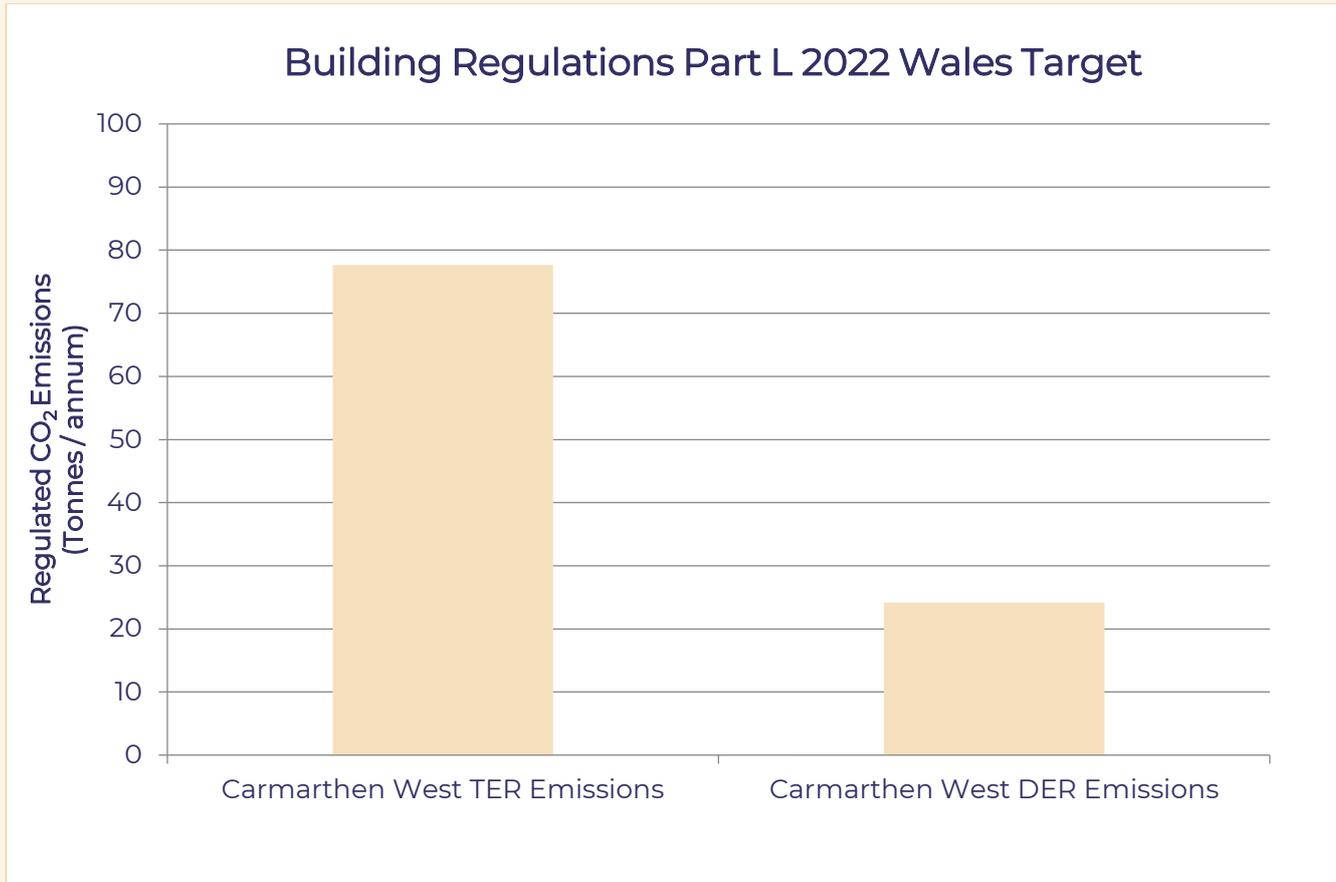
This robust baseline is further strengthened by the inclusion of renewable and low carbon technologies, with ASHP and WWHRs proposed for all homes with PV proposed on the affordable social rent homes. Together, these measures predict that the redesigned scheme will exceed the requirements of Approved Document Wales Part L (2022) by **69.63%**.

This means that these homes are almost **70%** more energy efficient and emit less carbon emissions than a dwelling in compliance with current building regulations. This contributes to a home that is better for the environment and more cost effective to live in.

The approach aligns with national and local policy requirements, including Planning Policy Wales and Carmarthen County Council Local Development Plan (2006 – 2021) policies SP1, SP2, SP11, GP1.

In conclusion, the newly proposed site demonstrates a clear and measurable commitment to sustainability and energy efficiency, achieving compliance while supporting Carmarthen's wider objectives for low carbon development.

Predicted Site Wide Carbon Emissions



Graph 3 – Predicted Annual Site Wide Carbon Emissions

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