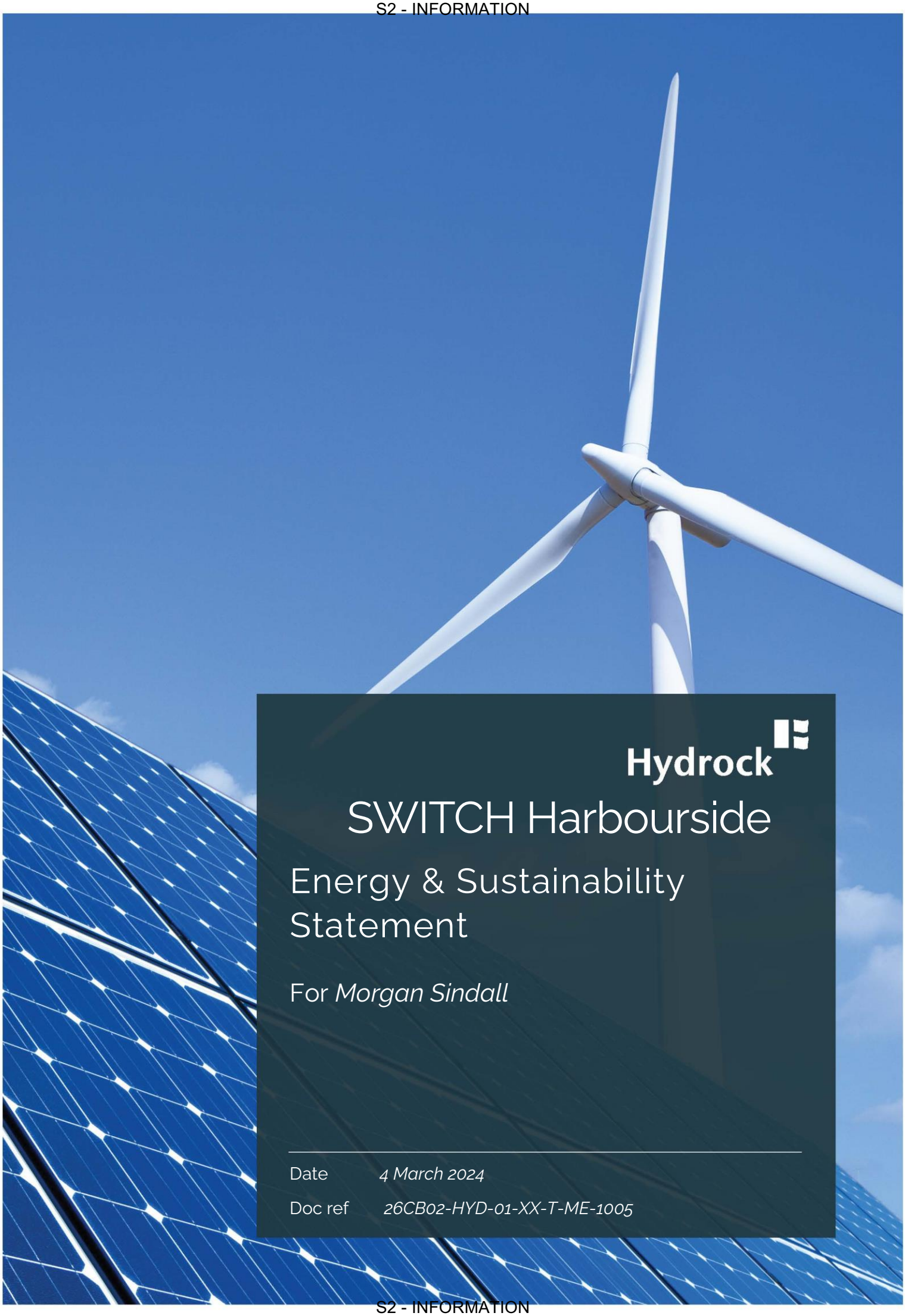

Hydrock

SWITCH Harbourside

Energy & Sustainability Statement

For *Morgan Sindall*

Date *4 March 2024*

Doc ref *26CB02-HYD-01-XX-T-ME-1005*

Document control sheet

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Client	Morgan Sindall	
Project name	SWITCH Harbourside	
Title	Energy & Sustainability Statement	
Doc ref	26CB02-HYD-01-XX-T-ME-1005	
Project number	26279	
Status	S2	
Date	04/03/2024	

Document production record		
Issue number	P01	Name
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Document revision record

Issue number	Status	Date	Revision details
P01	S2	04.03.2024	PAC Issue

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Contents

1. Introduction

1.1 Purpose of the Report

This document will form part of the formal planning application for the SWITCH Harbourside building, whilst informing the design team of the energy and sustainability strategy, and how this strategy will address local and regional planning policy.

This includes following the energy hierarchy, by first looking to reduce the need for energy, then looking to ensure energy is supplied in the most efficient manner possible, and lastly the use of renewable energy sources.

The proposed building is required to comply with Building Regulations Part L2 Wales criteria. Further to this, SWITCH Harbourside shall go above and beyond Part L2, by operating as 'energy positive'.

In practical terms this means that the building shall export more energy to the National Grid when compared to the amount it consumes, over the course of a year.

This is excluding process energy usage.

A Dynamic Simulation Model (DSM) calculation has been performed to assess 'energy positive' performance.

2. Policy Context

2.1 National Policy

This section sets out a summary of current national guidance and policy in relation to sustainable development.

2.1.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) for Wales includes the following documents: Planning Policy Wales (PPW), Technical Advice Notes (TANs), Minerals Technical Advice Notes (MTANs) and Policy Clarification Letters (PCLs). The primary objective of these documents 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.

All planning decisions must align with the above documents and decisions must seek to promote sustainable development and support the well-being of people and communities across Wales.

Planning Policy Wales defines five Key Planning Principles:

- Growing our economy in a sustainable manner
- Making best use of resources
- Facilitating accessible and healthy environments
- Creating & sustaining communities
- Maximising environmental protection and limiting environmental impact

Every development plan must take forward the national sustainable placemaking outcomes and use them to develop an overarching set of outcomes. Each development plan will consider the scale at which they will contribute, through policies and allocations, to achieving an outcome. Collectively, the focus on achieving these outcomes across all development plans will ensure the planning system plays its role in delivering sustainable places.

Ideally all developments in Wales should have the following outcomes: meet appropriate development densities, generate their own renewable energy, promote clean air and reduce overall pollution, promote physical and mental health and well-being.

2.1.2 Practice Guidance (Planning for Sustainable Buildings)

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 NPPF.

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 polices 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.

PPW (4.4.3, 4.7, and 4.12) sets out the Welsh Government's land use planning policies in respect of planning for sustainable buildings in development plans and development management. It does not establish a higher national building standard than Building Regulations, but encourages local planning authorities (LPAs) to seek opportunities to do so on strategic sites. TAN 12: Design, is the primary guide to achieving good quality sustainable design.

2.1.3 *Technical Advice Note 12 – Objectives of Good Design*

TAN 12 defines five key Objectives of Good Design: Access, Character, Community Safety, Environmental Sustainability, Movement. Environmental Sustainability is defined as "achieving efficient use and protection of natural resources; enhancing biodiversity; designing for change". To achieve Environmental Sustainability in design TAN 12 suggests that developments seek to minimise energy demand and carbon emissions through the implementation of energy hierarchy and zero carbon standards.

2.1.4 *Recent Changes to Part L*

A new Part L regulation for use in Wales was released in 2022.

Wales is also adopting the SAP 10 methodology which greatly benefits fully electrified sites. However, new buildings such as student accommodation have to cut emissions by an average of 27% when compared to the previous version.

The Government's aim is to reduce building carbon emissions by 75-80% compared to 2014 baselines by 2025. The first step towards this goal has come into effect since 2022 when the required 37% CO2 emissions decrease constitutes the halfway point on the road map to 2025.

This can be met through a combination of low carbon heating, on-site low / zero carbon energy technology with higher levels of passive design solutions (e.g. double glazing).

2.2 Local Planning Policies

2.2.1 *Neath Port Talbot's Local Development Plan (2011-2026) - Policy RE2*

Policy RE2 states that for developments that possess on-site renewable and low carbon energy generation, an Energy Assessment should be carried out to determine the feasibility of incorporating such technologies. This is the case for developments with a total floor area of 1000m^2 or greater.

This report will aim to cover the required criteria for the Energy Assessment, as discussed in Appendix C of Neath Port Talbot's Local Development Plan (2011-2026).

2.3 *Planning Policy Summary*

Both local and national policy aims to ensure the delivery of sustainable and well-designed homes and other buildings which mitigate and adapt to the impacts of climate change.

The Local Development Plan confirms the Council's commitment to the creation of sustainable new developments.

The latest national planning policy and guidance confirm the Government's approach to sustainable development which is being driven through the updates to the Building Regulations to ensure new buildings are well designed and reduce emissions in line with the UK's national carbon targets..

The following sections of this Energy Statement set out the measures which should be incorporated into the MEP design of the SWITCH Harbourside building to ensure the delivery of a sustainable development and to address the relevant requirements of local policy.

3. Energy Strategy

The energy strategy for the proposed scheme has been developed in accordance with local and national policies and is based on the principles of the Energy Hierarchy, a framework that assists progress towards more sustainable energy systems. The basic principles of the Energy Hierarchy are:

- "Reduce" – Use less energy;
- "Efficiency" – Use energy more efficiently;
- "Renewables" – Use renewable energy;
- "Management" - Manage energy effectively.

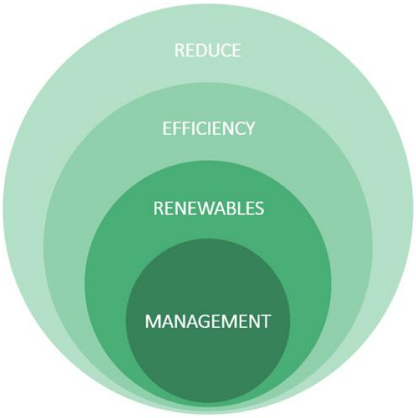

Figure 1: Energy Hierarchy

3.1 "Reduce" – Minimising Energy Consumption

This section looks at the measures that are available to reduce the energy demand for the new development beyond the notional building baseline.

Energy demand reduction provides the largest opportunity for minimising a building's potential CO_2 emissions. Minimising energy consumption for the development will be accommodated by driving down energy demand through passive building design and operational techniques prior to focusing on energy efficient plant and controls.

The first principle therefore relies on energy efficient design and the site characteristics which embody passive designs. Furthermore, the design of the building fabric can reduce energy wastage and associated energy demand.

Passive design can be described as designing a building to take maximum advantage of the light and heat from the sun and natural ventilation to reduce the energy demand of a building. The following passive design measures have been explored during design:

- Improving the performance of the building thermal envelope (reducing fabric U-values and glazing G-values);
- Reducing building air permeability, limiting uncontrolled air (and heat) transfer;
- Maximising daylight where possible to reduce the amount of time artificial light is required;
- Minimising direct solar gain to minimise the loads for air conditioning;
- Maximising control and flexibility of plant installations;
- Maximising the potential thermal mass of the structure to reduce potential overheating.

The orientation and layout of the units have been developed where possible to utilise natural light and heat from the sun. The units incorporate glazed front facades to allow daylight to penetrate into the space, reducing reliance on artificial lighting. High performance glazing will maximise day lighting and winter sun solar gain whilst reducing heat loss through the glazed areas.

The building will be specified with high efficiency building fabric to minimise heat loss and air leakage. The reductions of energy consumption as a result will be quantified via building modelling assessments in accordance with Part L.

3.2 "Efficiency" – Supply Energy Efficiently

Following the implementation of all appropriate passive measures, the integration of energy efficient technologies into the development should be sought.

The second principle places the emphasis on using energy more efficiently. This is on the understanding that low carbon technologies can be cost-effective and can also provide significant carbon savings when compared to conventional technologies.

The unit will also encourage the use of low energy appliances and provide information and guidance on efficient use and operation of the buildings.

The following design strategies have been incorporated to allow the energy produced to be used in the most efficient manner.

- High efficiency heat recovery on the proposed mechanical ventilation equipment;
- High efficiency multi-split / VRF (Variable Refrigerant Flow) systems to provide heating and cooling to selected spaces;
- LED lighting used throughout;
- Use of appropriate lighting control to ensure there is no wasted energy through 'left on' lighting;
- Low velocity pipework and ductwork to reduce fan and pump power consumption;
- Specification of ductwork pressure testing and building permeability testing;
- Central building management control system (BMS) with monitoring of key system parameters;

3.3 "Renewables" - Use of Renewable and Low to Zero Carbon Technologies

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, an allocation of photo-voltaic (PV) panels shall be proposed, orientated to best maximise energy output. The quantities of PV and design yield are discussed later in this report in Section 4.3.

3.4 "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), energy monitoring systems (EMS), and metering strategies.

4. Thermal Modelling Assessment

The SWITCH Harbourside building was modelled using IES VE 2024 under a DSM assessment to assess the early-stage energy performance of the building.

4.1 Building Fabric Properties

The building fabric parameters used for the simulation can be seen in the below table. These values represent a sizeable reduction compared to the limiting fabric properties found within L2 Wales 2022.

Table 1: Building Fabric Parameters for SWITCH Harbourside

Fabric Element	Value	Units
External Walls	0.1	W/m²K
Floor	0.1	W/m²K
Roof	0.1	W/m2K
Glazing **(G Value / Light transmittance)**	1.3 (0.33 / 77%)	W/m2K
Polycarbonate Glazing	0.77	W/m2K
Doors (No glazing, on thermal line)	1.6	W/m2K
Air Permeability	3	m³/(m².hr) @ 50 Pa

4.2 Building Services

The building services which were input into the simulation can be seen below. These systems were selected due to their high efficiency and energy saving potential.

Table 2: SWITCH Harbourside Mechanical Services Strategy and Efficiencies.

System	Performance Efficiencies	Serving
M1 VRF H&C **Mech Ventilation**	SCOP = 4 SEER = 5 Heat recovery efficiency: 75% Specific fan power: 1.4	Circulation and clean rooms
M2 ASHP Heating **Rad panels** **Mech Ventilation**	SCOP = 3 Heat recovery efficiency 75% Specific Fan Power 1.4	Workshop & CAD spaces
M3 Electric Heating **Mech Ventilation**	SCOP = 1 Heat recovery efficiency: 75% Specific fan power: 1.4	Breakout and stores
M4 VRF H&C **Mech Ventilation** **S&E Fans**	SCOP = 4 SEER = 5 Heat recovery efficiency: 70% Supply fan SFP: 0.9 Extract fan SFP 0.5	SINTEC rooms, material processing & Mech testing
M5 DX Cooling only	SEER = 5	Comms room
M6 Electric heating only	SCOP = 1	Switch rooms and stairs
M7 Frost protection heating	SCOP = 1	Plant rooms
M8 Mech Ventilation **No heating or cooling**	Heat Recovery Efficiency = 75% SFP=1.4	WCs
PH1 DHW ASHP	SCOP 3 Served via ASHP Storage:600L Secondary Circulation Loop Length = 140m Losses = 8 W/m Pump Power = 100W	General and WC
PH2 DHW Electric water heaters	Storage = 600L Standing Losses = 0.01 kWh/l/day	Workshop spaces

4.3 Renewable Technologies

For compliance with Part L, an allocation of on-site renewable energy generation is required for the building. This is in the form of photovoltaic (PV) panels, roof mounted. The calculated amount of required PV corresponds to the inputs of the fabric, building services and lighting designs discussed in the previous sections.

The table below illustrates an indicative annual PV output for SWITCH for Part L compliance. This will be developed into a working PV design as the project develops and subsequent appoint of a PV specialist.

Table 2: Solar PV Requirements

PV Area (m^2)	Module Efficiency (%)	Annual PV Generation (kWh/Annum)	Building Area (m2)	Annual PV Energy Generation Intensity (kWh/m^2)
900	19.8	239,000	3729.3	41.7

4.4 Results

Under the criteria outlined in the previous sections, the building is capable of performing to an energy positive standard.

Due to the advanced energy strategy of this building, this design complies with Building Regulations Part L2 2022 Wales, and by a significant margin.

The designed building must not exceed the Target Emissions Rate (TER) or Target Primary Energy Rate (TPER) to comply with Part L2 Wales.

Table 4: Part L2 Compliance Modelling Results

BER ($kgCO_2/m^2$. yr)	TER ($kgCO_2/m^2$. yr)	BPER ($kgCO_2/m^2$. yr)	TPER ($kgCO_2/m^2$. yr)
-0.74	**4.48**	**-18.52**	**34.58**

5. Conclusion

The energy requirements and potential energy sources have been considered and discussed for the proposed development of SWITCH Harbourside.

The relevant local and national policies have been analysed and the assessments carried out show that the requirements of these policies are satisfied, the overarching requirement of which is compliance with Building Regulations Part L.

It has been shown that the implementation of passive design, energy efficient measures and renewable technologies satisfy the energy requirements for the building.