



# Neath Town Centre Leisure and Retail Development

## Energy Statement

*For Neath Port Talbot County Borough  
Council*

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## 1. EXECUTIVE SUMMARY

This report provides an analysis of the potential energy strategy for the proposed Neath Town Centre Leisure and Retail Development, although this report focusses only on the Leisure Centre.

The report also outlines the key policy drivers and provides a summary of the energy modelling completed for the development.

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 leisure centre is a Combined Heat and Power (CHP) system in concurrence with a series of high-efficiency gas boilers, along with VRF heating and cooling systems for the Café, Gym, and Multipurpose rooms.

Modelling dictates that there is no further requirement for on-site renewable energy generation at this stage of design.

This report should be read in conjunction with Hydrock's Low & Zero Carbon Feasibility Study (C-13354-HYD-XX-XX-RP-ME-0002).

## 2. INTRODUCTION

Hydrock have been appointed on behalf of Neath Port Talbot Council to prepare a report detailing the proposed energy requirements of Neath Leisure Centre as part of the Stage 3 package of works.

The unit will be required to comply with Building Regulation Part L2A Wales criteria. A Dynamic Simulation Model (DSM) calculation has been performed for the development to assess compliance.

### 2.1 Site Context

The current layout of the leisure centre consists of 2No. swimming pools, a gym, 2 multipurpose rooms, and a café/lobby area, along with a number of changing room and toilet facilities. The total floor area of the building is approximately 3000m<sup>2</sup>.

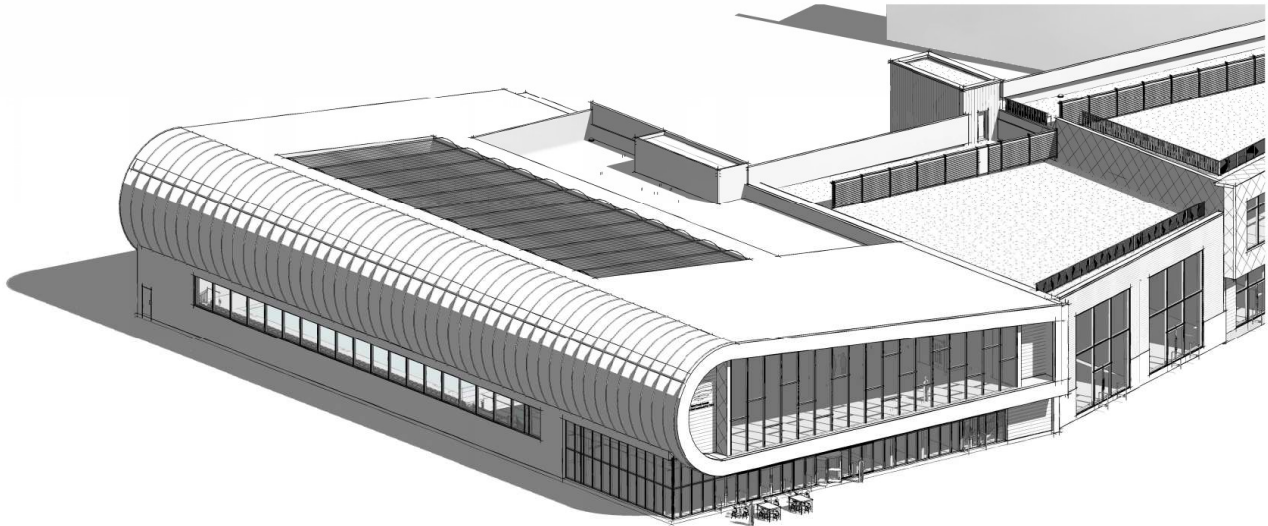


Figure 1: Proposed Leisure Centre Axonometric View

### 3. BUILDING REGULATIONS AND PLANNING POLICY

#### 3.1 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 National Policies

##### 3.2.1 *National Planning Policy Framework*

The National Planning Policy Framework (NPPF) 2018 sets out the overarching planning policy objectives for the delivery of sustainable development through the planning system. In order to achieve the goal of sustainable development, NPPF places emphasis on the following:

- Pursuing development in an integrated manner, promoting outcomes in which environmental, economic and social objective are achieved together over time; and adopting a holistic spatial planning approach (Sections 2,3).
- Promoting high quality and inclusive design in the layout of new developments over the lifetime of the development; and including clear comprehensive and inclusive access policies that consider people's diverse needs and aims to break down unnecessary barriers and exclusions (Section 8).
- Addressing the causes and potential impacts of climate change, including via the promotion of renewable and low carbon energy, as well as taking passive design measures into account from inception to reduce greenhouse gas emissions (Section 14).

The NPPF also advises that developers should consider the opportunity for incorporating renewable energy projects in all new developments. Where renewable energy developments are proposed, account should be taken of a range of issues arising from that development, but also the benefits that it provides. NPPF identifies the following key principles in approaching renewable and low carbon energy:

- Renewable energy developments should be capable of being accommodated in locations where the technology is viable.
- Developers should recognise the full range of renewable energy sources, their differing characteristics, location requirements and the potential for exploiting them.
- Development proposals should demonstrate any environmental, economic and social benefits as well as how any negative environmental and social impacts have been minimised.
- Developers should identify opportunities for developments to draw their supply from decentralised, renewable, or low carbon energy supply systems.

The proposed units will be required to comply with Building Regulations Approved Document L2A 2014 (ADL2A) for Wales.

##### 3.2.2 *Part L2A Wales*

To comply with Building Regulations Approved Document Part L2A (ADL2A) 2014, 5 Criteria must be met. This report details compliance with Criteria 1, 2 and 3. Criteria 4 and 5 will require post construction testing and demonstration.

1. Criterion 1 is a mandatory requirement which must be met by all new buildings. In order to achieve compliance, it must be demonstrated that:

- a. The calculated Building CO2 Emissions Rate (BER) does not exceed the Target CO2 Emissions Rate (TER).
  - b. The calculated Building Primary Energy Consumption (BPEC) rate does not exceed the Target Primary Energy Consumption (TPEC).
2. Reasonable provision has been made to limit heat gains and losses through the fabric of the building, and energy efficient fixed building services with effective controls are provided to all buildings.
3. The building has appropriate passive control measures to limit solar gains and limit or eliminate the need for air conditioning.
4. The performance of the building, as built, is consistent with the prediction made in the BER.
5. The necessary provisions for enabling energy efficient operation of the building are put in place.

### 3.3 Local Policies

The Neath Port Talbot County Borough Councils Local Development Plan (2011-2026) and the Renewable and Low Carbon Energy Supplementary Planning Guidance (July 2017) set out in three policies how the aim to reduce carbon emissions will be applied under the Councils jurisdiction:

#### **Policy SP18: Renewable and Low Carbon Energy**

A proportionate contribution to meeting national renewable energy targets and energy efficiency targets will be made while balancing the impact of development on the environment and communities. This will be achieved by:

1. Encouraging where appropriate, all forms of renewable energy and low carbon technology development;
2. Encouraging energy conservation and efficiency measures in all new major development proposals;
3. Ensuring that development will not have an unacceptable impact on the environment and amenity of local residents.

#### **Policy RE1: Criteria for the Assessment of Renewable and Low Carbon Energy Development**

Proposals for renewable and low carbon energy development will only be permitted subject to the following criteria:

1. Large scale wind farm developments (>25MW) will be expected to be located within the boundaries of the refined Strategic Search Areas.
2. Proposals for wind farms of any size outside the SSAs will only be permitted where it is demonstrated that there will be no unacceptable impact on visual amenity or landscape character through the number, scale, size, design and siting of turbines and associated infrastructure.
3. Small scale wind farm developments (<5MW) will be required to demonstrate that impacts are confined to the local scale.
4. All renewable energy or low carbon energy development proposals will be required to demonstrate that:
  - (a) Measures have been taken to minimise impacts on visual amenity and the natural environment;

- (b) There will be no unacceptable impacts on residential amenity;
- (c) The development will not compromise highway safety;
- (d) The development would not interfere with radar, air traffic control systems, telecommunications links, television reception, radio communication and emergency services communications; and
- (e) There are satisfactory proposals in place for site restoration as appropriate.

#### **Policy RE2: Renewable and Low Carbon Energy in New Development**

Schemes that connect to existing sources of renewable energy, district heating networks and incorporate on-site zero / low carbon technology (including microgeneration technologies) will be encouraged.

The following proposals will be required to submit an Energy Assessment to determine the feasibility of incorporating such a scheme and where viable, would be required to implement the scheme:

- (a) Residential development for 100 or more dwellings;
- (b) Development with a total floorspace of 1,000 sqm or more.

### **3.4 BREEAM Requirements**

As a prerequisite for a project receiving Welsh Government funding, the Leisure Centre must receive a minimum of BREEAM Excellent certification as well as an EPC rating of A.

This report specifically will provide the current credits being achieved as part of the Ene01 credit, which concerns energy efficiency and relates directly to the BRUKL output document, as well as the indicative EPC rating.

## 4. ENERGY STRATEGY

The energy strategy for the proposed scheme has been developed in accordance to 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:

1. Be Lean – Use less energy
2. Be Clean – Use energy more efficiently
3. Be Green – Use renewable energy



Figure 2: Energy Hierarchy

### 4.1 Step 1 – Minimising Energy Consumption – Be Lean

This section of the report 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 CO2 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:

- Location, grouping, orientation and layout;
- Natural ventilation where possible;
- Landscape features and shading
- Thermal mass

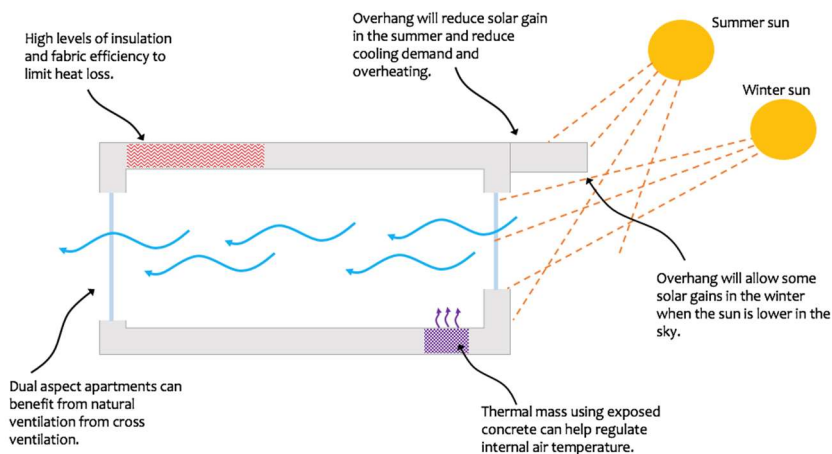


Figure 3: Example of Passive Design Options

The orientation and layout of the unit has been developed where possible to utilise natural light and heat from the sun. The Leisure Centre incorporates large glazed 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.

Neath Leisure Centre will be specified with high efficiency building fabric to minimise heat loss and air leakage, as well as maximising the quantity of glazing to maximise daylighting and solar gains where appropriate to do so.

## 4.2 Step 2 – Supply Energy Efficiently – Be Clean

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.

Spaces requiring both heating and cooling will be served by a series of high-efficiency air source heat pumps. Heat will be transferred to the occupied spaces using air.

The heating hot water demand for the development will be provided through a Combined Heat and Power (CHP) system in concurrence with a series of high-efficiency gas boilers.

The Leisure Centre will also encourage the use of low energy appliances and provide information and guidance on efficient use and operation of the buildings. Appliances will be chosen where practicable to be A/A+ rated under the EU Energy Labelling Scheme.

## 4.3 Step 3 – Utilising Low to Zero Carbon Technologies – Be Green

Due to the passive design and energy efficiency measures proposed for the development, no renewable technologies will be incorporated in to the scheme at this stage. Refer to the Hydrock Low & Zero Carbon Feasibility Study (C-13354-HYD-XX-XX-RP-ME-0002 for further detail.

## 5. CALCULATION METHODS

### 5.1 National Calculation Method (NCM)

The National Calculation Method (NCM) provides the underlying method and the standard data sets necessary to calculate the annual energy use of a proposed building and comparing it with the energy use of a 'notional' building of a similar type, under similar circumstances. This is done by calculating the Target Emission Rate (TER - the CO<sub>2</sub> emission rate for the notional building) and comparing this with the Building Emission Rate (BER) for the proposed building. The BER must not be higher than the TER. The 'notional' building in a Wales Part L 2014 calculation already has an allowance for photovoltaic panels in its calculation so it may be that in order to achieve compliance some renewable technology is required to be adopted.

The building has been modelled using Integrated Environmental Solutions Virtual Environment (IESVE) Compliance, an approved ADL2A 2014 modelling package. IESVE uses dynamic simulation modelling to simulate the performance of the building at hourly intervals for a full test year.

The model geometry has been constructed using floor plan CAD files provided by Holder Mathias Architects.

As required by ADL2A 2014 building occupancies, room heating set-points, ventilation rates and illumination levels have been modelled according to the National Calculation Method (NCM) as defined by the Department for Communities and Local Government. The NCM enables calculation of the energy consumption required to deliver a defined level of comfort and service provision, based on standardised occupancy conditions.

## 6. MODELLING INPUTS AND ASSUMPTIONS

The calculation was based on a series of data inputs, both received from the Architects and relating to the assumed strategy for the services within the building.

### 6.1 Building Fabric

Following a fabric first approach it is proposed that the building fabric shall be high thermal performance.

Following discussions with the Architect, the following U-values have been agreed.

| Building Fabric      |      |                                  |
|----------------------|------|----------------------------------|
| External Walls       | 0.16 | W/m <sup>2</sup> .K              |
| Roof                 | 0.15 | W/m <sup>2</sup> .K              |
| Ground Floor         | 0.15 | W/m <sup>2</sup> .K              |
| Glazing (rooflights) | 1.4  | W/m <sup>2</sup> .K              |
| Glazing (windows)    | 1.4  | W/m <sup>2</sup> .K              |
| Glazing g-value      | 0.3  | N/A                              |
| Air Permeability     | 4    | m <sup>3</sup> /h/m <sup>2</sup> |

### 6.2 Building Services Systems

All the systems and efficiencies that have been entered into the software for assessment are based on best assumptions and previous experience of similar spaces.

#### 6.2.1 Heating and Cooling

It is assumed that all areas requiring heating and cooling are to be served by Variable Refrigerant Flow (VRF) reversible Air Source Heat Pumps (ASHPs). These will have a minimum SCOP and SSEER of 4.

#### 6.2.2 Heating Only

Spaces requiring heating only will be provided via a Combined Heat and Power (CHP) system in concurrence with a series of gas boilers with a minimum efficiency of 91%.

#### 6.2.3 Ventilation

The modelling has assumed that most internal spaces shall be served via rooftop mounted Air Handling Units (AHUs) which will provide pre-heated fresh air to the occupied space as well as extracting air from the spaces. All AHUs shall be provided with Heat Recovery system with a minimum recovery efficiency of 85%.

#### 6.2.4 *Domestic Hot Water*

The hot water for the centre will be provided via the natural gas CHP system as per the heating demand. The delivery efficiency has been assumed at 95% to allow for losses within the system.

#### 6.2.5 *Lighting Efficiency*

High efficiency LED lighting is proposed for all units. For the purposes of the modelling, a lighting efficiency of 2.5 W/(m<sup>2</sup>.100 lux) has been assumed for all areas at this stage.

Lighting controls have been assigned to each area depending on each room's specific requirements.

## 7. LOW AND CARBON TECHNOLOGIES (LZC)

Due to the requirements of the notional building in Part L2A Wales having a percentage of total floor area as PV panels, it becomes harder to pass the Target Emission Rate (TER) without an inclusion of Low and Zero Carbon (LZC) technologies.

As has been covered suitably earlier on in this report, current modelling suggests there to be no further need for low-carbon or on-site renewable technology over and above the measures already allowed for (i.e. CHP unit and high-specification building fabric).

## 8. RESULTS

The modelling results for Part L2A, BREEAM Ene01, and the EPC rating are all given below:

| Target Emission Rate<br>(kgCO <sub>2</sub> /m <sup>2</sup> .annum) | Building emission<br>rate (kgCO <sub>2</sub><br>/m <sup>2</sup> .annum) | Target Primary<br>Energy Consumption<br>(kWh/m <sup>2</sup> .annum) | Building Primary<br>Energy Consumption<br>(kWh/m <sup>2</sup> .annum) | Result |
|--------------------------------------------------------------------|-------------------------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------|--------|
| 172.3                                                              | 118.5                                                                   | 932.72                                                              | 655.75                                                                | Pass   |

The results above show that the scheme as it stands comfortably passes the Part L2A Wales requirements outlined earlier in the report. These results also correspond and an indicative EPC rating of 'A' as well as currently achieving 7 BREEAM Ene01 credits.

*N.B. These results, along with the corresponding BREEAM credits, are subject to change following any further design development.*

## 9. CONCLUSION

This report has concluded that the building services technologies currently allowed for at this stage of design prove compliance with the various national and local policy drivers that this scheme will adhere to; namely Part L2A (Wales) 2014 and local policies SP18, RE1, and RE2.