

Cardiff East Park & Ride Development

Energy Report – Energy Efficient & Low
Carbon Strategies

For Curtis Hall

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CARDIFF EAST PARK & RIDE DEVELOPMENT– ENERGY EFFICIENT & LOW CARBON STRATEGIES

1. INTRODUCTION

The intended works to take place consists out of the demolition of existing structures and redevelopment of the site to provide commercial floorspace (Use Classes B2, B8, E(b)) and/or ancillary Class E), associated drive-thru and car parking; the re-provision of the park and ride; a bridge across the Rhymney River; site wide landscaping and associated works.

Detailed below are the Energy Efficient & Low Carbon Strategies that are we are aiming to incorporate into the Developers Base Build works. In addition, we provided a list of optional further enhancements for incoming tenants to consider. The document refers to the site as shown in Henry Main Partnership Ltd drawing number 528-MEIN-XX-XX-DR-A-SL_20067 Indicative Site Layout Rev. 3

During the compilation of this report the policies below were reviewed for guidance:

1.1 One Planet Cardiff Strategy:

From the strategies below, our intention to support the council in it's goal to be carbon neutral by 2030. We intend to use proven energy efficient technologies and to offset part of the carbon emissions by the installation of photovoltaic power generation systems.

1.2 Future Wales: The National Plan 2040:

1.2.1 Policy 16 – Heat Networks

The policy places and onus on planning authorities to consider the use of heat networks, especially with missed used developments. During our energy modelling we will evaluate the viability of opportunities available to us and present our findings as part of our Energy Report. However, at this stage we aim to use individual heating systems for each building. The strategy is to use roof mounted solar panels, to pre-heat hot water supplies which is then enhanced by Air-Water Heat Pumps and Immersion Element Boilers.

1.2.2 Policy 17 – Renewable and Low Carbon Energy and Associated Infrastructure

As part of our energy report, we will evaluate the viability of offsetting a certain percentage of the individual buildings carbon emissions, by installing Photovoltaic Power Generating panels on the roofs of the individual buildings. These systems will be independent from each other. We will consult with Western Power Distribution, in order to determine the capability of their infrastructure to support these systems.

1.3 National Building Regulations (Wales)

We will be using the guidance provided in Approved Document L2A: New buildings other than dwellings 2014 edition incorporating 2016 amendments, as the basis for our energy modelling and evaluation.

1.4 Cardiff Local Development Plan 2006 - 2026

1.4.1 Policy KP5 Good quality and sustainable design:

1.4.1.1 vi. Maximising renewable energy solutions;

We will evaluate the size of the intended photovoltaic installations against practical and financial constraints in order to maximise the opportunities available to us.

1.4.2. Policy KP 6 New Infrastructure:

Our design will allow for sufficient electrical and water utility supply. There will be no gas installation to limit carbon emissions. Services will be buried in the ground where possible and a sufficient amount of connection points shall be allowed for in order to futureproof the development against future expansion.

1.4.3 Policy KP15 Climate Change

By not installing gas utilities, installing photovoltaic panels and incorporating solar water heating panels, rain water harvesting, ultra-efficient LED lighting, we are supporting this policy in the reduction of carbon emissions. Sufficient energy metering will be install in order to enable the end user to effectively manage their energy consumption.

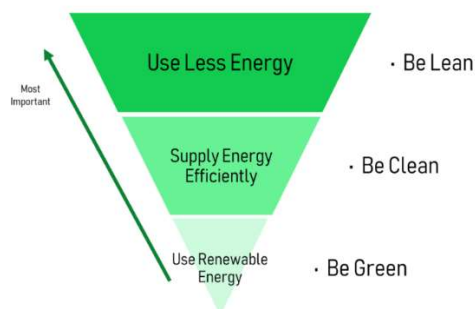
1.4.4 Policy EN12 Renewable Energy and Low Carbon Technologies:

“An independent energy assessment investigating the financial viability and technical feasibility of incorporating such schemes will be required to support applications.”

In an effort to comply with the requirements of this policy, we will conduct an energy modelling exercise and evaluated the impact and viability of the implementation of the technologies listed below:

1.5 Energy Hierarchy:

The below figure, sets out the energy hierarchy, which we will follow during our design.



2. BASE BUILD

Unless otherwise specified the below are applicable to all plots:

Ultra-high efficacy Internal LED Lighting with PIR/Dimming controls

The Office lighting shall be ultra-high efficiency LED within excess of 100 lumens/circuit watt. this is combined with presence detection. For buildings with large office areas, such as Plots 4, 5, 6a, 6b & 8, automatic daylight dimming controls (for two rows near windows) will be installed. The life expectancy of the LED fittings is in excess of 50,000 Hours.

Ultra-high efficacy External LED Lighting

The external lighting shall be ultra-high efficiency LED within excess of 110 lumens/circuit watt. The fittings shall be fixed to the building and on Lighting columns (8/10mm AFFL.). Each fitting shall be fixed in Horizontal plane with max 5-degree tilt with upward spill in compliance with ILE Dark skies policy. Each LED fitting will have a life expectancy of over 50,000 hours.

Main Office Rainwater Harvesting Systems

For Plot 4 only - External below ground rainwater harvesting systems shall be provided to the main office The water will be utilised for Urinal and WC flushing greatly reducing Tenants Water usage on these items by approximately 30-40%.

Sensor Taps/Low Flush WC's

Sensor taps shall be provided to the Offices toilet facilities for further water savings. Low flush WC's (4/6 Litres) shall also be provided which when combined with rainwater harvesting systems will mean lower water usage.

Major water leak detection

Each incoming water position to the buildings, shall be monitored with alarm links to the BEMS, picking up any out-of-range readings/leaks. This is an early warning system prior to visual leak detection.

Air source heat pump for heating/cooling

The Main Office's heating and cooling shall be provided by Air Source Reverse cycle heat pump VRV/VRF High Efficiency heat recovery systems.

The Air source heat pumps shall as a minimum have the following excellent efficiencies: -

Heating SCOP 4.5

Cooling SEER 5.5

Variable speed drives on Pumps/fans

Variable speed drives will be installed on pumps and fans to match the fan/pump flow rates with the actual requirements. This saves on electricity usage and CO₂ emissions.

Heat Recovery Air Handling Units

Heat recovery air handling units will be installed for all fresh air ventilation requirements in the occupied spaces with a minimum 73% heat recovery efficiency and provide 12 litres/sec/person of air which is better than building regulations requirements. The Specific Fan Power shall be in accordance with Part L2 of the Building regulations & The Non-Domestic Building Services Compliance Guide 2013 of 1.9 watts/l/s, all air handling units, and fans to be ErP 2018 compliant.

Solar thermal

A Solar thermal system with panels on the roof will be provided to pre-heat the water for the building's hot water system. The hot water systems would consist out of Air to Water Heat Pumps combined with emersion element boilers where applicable.

Energy submeters linked to Building management system

All energy meters shall be linked to the Tenants BEMS installation to monitor entire site gas/water/electric usage and drill down into the smaller detail of electrical/gas fired equipment usage. This will identify any abnormal usage patterns which can then be investigated/rectified by the Tenants facilities manager.

Excellent Airtightness of building - in excess of building regulations requirements

The building shall obtain an excellent air tightness which greatly exceeds 5 m³/(m²·h) @50 Pa requirement of building regulations. This will reduce the warehouse heating costs.

15% Roof lights

The warehouses will be provided with 15% GRP rooflights which will be evenly distributed on the North/South facing roof slopes. This will provide an excellent daylight factor of approx. 3%

which when combined with daylight controls reduces the electricity usage and CO₂ emissions of the Warehouse lighting installation.

In addition to the rooflight, translucent panels will be provided above the dock doors to further enhance the natural light available.

Dyson Air-blade V Hand Dryers

The Male/Female and Ambulant toilets shall be fitted with Dyson Air-blade V hand dryers which are 80% more energy efficient than standard driers. They are also 35% quieter and dry the hands in 12 seconds.

Electric car chargers

Up to 5% of car parking spaces will be provided with Electric Vehicle Charging stations in the staff car park of each unit excluding Plot 7. Duct/Power infrastructure shall be installed to facilitate extension by the Tenant to meet the projected increase in Electric vehicles on the road forecast in the next 20 years.

3. FUTURE TENANT ENHANCEMENTS

Ultra-high efficiency warehouse lighting with Daylight/Presence detection

The Warehouse lighting will be LED with efficiencies in excess of 150 lumens per circuit watt. The warehouse lighting will benefit from daylight control and presence detection to greater enhance the energy savings and reduce building CO₂ emissions. The LED fittings will have a life expectancy of over 50,000 Hours

4. FURTHER TENANT ENHANCEMENT OPTIONS – NOT CURRENTLY INCLUDED IN THE SCHEME

The following options have been considered but have not been included in the scheme. Should calculations show that further measures are required to comply with the net-zero carbon condition, the efficacy of the following measures will be assessed and included where required.

Large scale roof mounted Photo Voltaic system

The roof structure will be enhanced to facilitate the fitting of a large-scale roof mounted Photo Voltaic system. The PV system would be sized to match the Tenants Electricity usage profile for maximum efficiency. There are funded and non-funded options up for consideration. This would significantly reduce the extent of the building electricity usage and provide a large CO₂ saving.

CO₂ sensors for meeting rooms

Installing CO₂ sensors for large meeting rooms and training facilities would mean that the air required would match the actual occupancy of the room. The greater the CO₂ the larger the air volume. Additional motorised dampers would need to be fitted to each room which would be controlled via the readings from the CO₂ sensors.

External Lighting Control Air Lux

The external lighting installation is generally controlled via timeclock and photocell. This is basic and does not give the Tenant much flexibility or the opportunity for further energy savings.

The Control Air Lux is a mesh based system where each individual fitting is controllable from a Tablet/Phone. The Tenant can then set the required Lux levels to match shift patterns whilst enabling much greater control (individual luminaires/groups). The Mesh system also provides performance data for each fitting/hours run etc.

Greater electricity savings can be realised by dimming individual fittings.

----:The End:----