



Report

Pioneer House , School ENERGY STRATEGY STATEMENT

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Contents Page

1.0	Introduction	1
2.0	Study Area	2
3.0	Legislative Policy and Good Practice	2
4.0	Energy Hierarchy	6
4.1	Passive Design- Thermal Elements	
4.2	Passive Design- Glazing, Daylighting and Solar Gain	
5.0	Energy Strategy	7
6.0	SBEM Assesment	8

1.0 / Introduction

The following statement outlines the energy strategy for the proposed new build development of additional teaching accommodation at the Pioneer House High School, 200 Yewtree Ln, Wythenshawe, Manchester M23 0FF

This outline statement has been prepared to demonstrate that the development meets the requirements of Part L2A of the English Building Regulations

Additionally, this approach reviews the opportunities for passive design measures, energy efficiency measures and feasible low and zero carbon technologies, in keeping with an 'Energy Hierarchy' approach. Building Regulations Part L is used as the assessment methodology in determining CO₂ emissions.

2.0 Study Area

Passive design, which aims to improve the fabric of the development, as well as energy efficient measures, will be investigated to reduce the overall energy demand within the development, with the 'best case' parameters being established.

3.0 Legislative Policy and Good Practice

The current legislative framework sets out the requirement to comply with Part L2A of the English Building Regulations 2021.

Reducing CO2 Emissions by Enabling Low and Zero Carbon Development requires all development to follow the principle of the Energy Hierarchy, being designed:

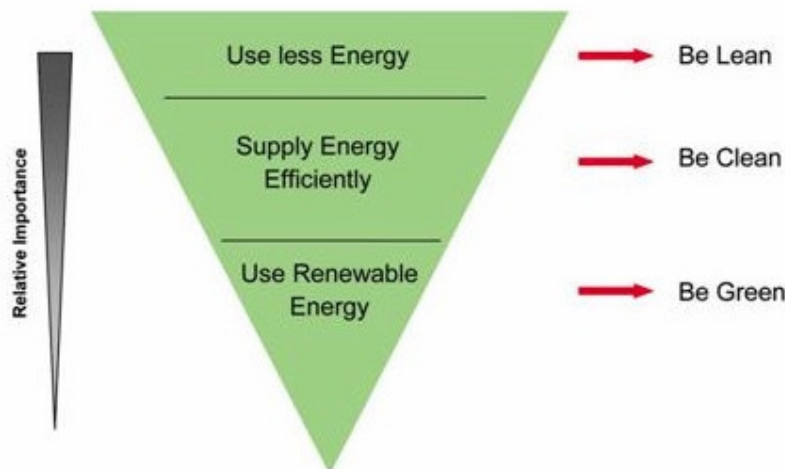
- To reduce the need for energy through design features that provide passive heating, natural lighting and cooling;
- To reduce the need for energy through energy efficient features such as improved insulation and glazing; and,
- To meet residual energy requirements through the use of low or zero carbon energy generating technologies.

4.0 Energy Hierarchy

The development of the design adopts a hierarchy approach to the design by reviewing passive design methods to reduce energy and provide a high level of energy efficiency.

The Energy Hierarchy states that, in order to design an energy efficient development, the development must first be designed to use less energy through passive measures, such as improved fabric and glazing, low energy lighting and being more air tight. The second stage is to use 'Clean' energy, such as a CHP, Air Source Heat Pumps etc... The third and final stage is to assess whether other Low and Zero Carbon (LZC) technologies can be incorporated, such as Photovoltaic panels, solar thermal heating or wind turbines.

This design process has been followed throughout the design and shall continue through detailed design.



4.1 Passive Design- Thermal Elements

To facilitate the development, the following elements have been considered through the design process from both an energy efficiency and thermal comfort perspective:

- Fabric insulation levels – balancing thermal performance and internal temperatures
- Building air permeability – this is a constraint due to the nature of the building
- Thermal mass – exploiting the properties of the constructions to benefit the internal environment
- Glazing strategy – optimising the use of the sun as a natural resource o Ventilation strategy – optimising the use of heat recovery ventilation systems

4.2 Passive Design- Glazing, Daylighting and Solar Gain

There are three key criteria when considering the glazing strategy for the development. These are energy efficiency, natural daylighting factors and summertime internal temperatures. They are intrinsically linked and should be considered holistically to determine the optimum strategy to achieve a comfortable, productive and healthy environment in all weather conditions, whilst making best use of the sun as a natural heating source.

The main factors in optimising the above are the size, orientation and specification of the glazing in relation to the occupancy and usage patterns of the buildings.

Through the modelling exercise the effect of high external temperatures will be assessed and measures taken to minimise the heat gain and temperature rise within the building. Solar control finish applied to the glazing, secondary glazing, ventilation and free cooling, thermal massing strategies (e.g. leaving existing thermal mass exposed to exploit its properties) shall be considered to minimise the need for cooling, particularly within the Student Residential studios.

This strategy also has the benefit that the insulation will keep vital heat in during the colder winter months which will minimise the heat input required.

5.0 Energy Strategy

The proposed M&E installation has been designed to minimise energy usage within the planned new building, no gas appliances are to be installed to meet the 2025/2035 carbon reduction targets. The following services have been included within the scheme to ensure energy usage is kept to efficient levels and to meet the Part L 2021 criteria:

- An air source heat pump is to be installed to cater for the buildings domestic hot water usage.
- VRF heating and cooling will be installed in occupied areas to maximise the electricity being used, VRF units will have a minimum SEER rating of 5 in accordance with 2021 building regulations.
- Heat recovery units are to be installed to all teaching spaces to ensure the correct ventilation levels are achieved, but also to ensure minimal heat is being discharged from the building.
- All new lighting will be low energy LED fittings with automatic controls where feasible to avoid usage lights being left on when they are not needed.

6.0 Appendix – SBEM Assessment Summary

The CO₂ emission and primary energy rates of the building must not exceed the targets

Target CO ₂ emission rate (TER), kgCO ₂ /m ² .annum	4.62
Building CO ₂ emission rate (BER), kgCO ₂ /m ² .annum	4.53
Target primary energy rate (TPER), kWh/m ² .annum	48.91
Building primary energy rate (BPER), kWh/m ² .annum	48.06
Do the building's emission and primary energy rates exceed the targets?	BER =< TER BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	U _a -Limit	U _a -Calc	U _i -Calc	First surface with maximum value
Walls*	0.26	0.17	0.17	0_000002_W1
Floors	0.18	0.14	0.14	0_000002_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.16	0.16	0_000002_C
Windows** and roof windows	1.6	1.3	1.3	0_000002_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	-	-	No external personnel doors
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

U_a-Limit = Limiting area-weighted average U-values [W/(m²K)]

U_i-Calc = Calculated maximum individual element U-values [W/(m²K)]

U_a-Calc = Calculated area-weighted average U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m ³ /(h.m ²) at 50 Pa	8	3

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	12.17	10.71
Cooling	3.01	2.63
Auxiliary	6.37	5.32
Lighting	4.07	6.45
Hot water	5.98	9.66
Equipment*	9.54	9.54
TOTAL **	31.6	34.78

* Energy used by equipment does not count towards the total for consumption or calculating emissions.

** Total is net of any electrical energy displaced by CHP generators, if applicable.