



ENERGY STATEMENT
FOR
PLANNING
AT
MANCHESTER METROPOLITAN UNIVERSITY -
00412 ROBOTICS LIVING LABORATORY
(PHASE 2)

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1.0 INTRODUCTION

This report has been prepared by the Pettit Singleton Associates Ltd on behalf of Bennetts Associates to accompany the planning application for the proposed development at Manchester Metropolitan University, Cavendish Building, Robotics Living Lab Phase 2.

The proposal comprises of alterations to an existing landscape in an external courtyard and new timber frame pavilion building for exhibition and teaching spaces.

This report reviews the proposed energy and carbon reduction strategy for the development within the context of local and national planning policy.

2.0 PLANNING POLICIES

The following documents were considered when formulating the report:

National Policy - The climate change Act 2008 is a legally binding target within the UK and abroad of a least 80% cut in greenhouse gas emissions by 2050, with a reduction of at least 34% by 2020.

The UK government has committed to achieving the EU Directive 2009/28/EC to generate 15% of UK electricity from renewable sources by 2020. With all of the countries commitments the EU as a whole shall achieve at least 20% of energy from renewable sources.

The National Planning Policy Framework now replaces all planning policy statements (PPS) so that it all comes under a single document. Section 10 "*Meeting the challenge of climate change, flooding and coastal change*" identifies the key areas that local and regional policy makers must encourage in their policies.

Building Regulations Part L2 2021 – Approved Document L2 2021 Conservation of Fuel and Power in buildings other than dwellings sets minimum energy efficiency and fabric efficiency standards for all new non-domestic buildings.

Manchester City Council Manchester Core Strategy 2012 to 2027 – This information was provided to PSA by planning and building control & licensing department, Manchester City Council.

Appendix A lays out the proposed requirements and policy approach for EN6.

It shall include information about how the development takes account of passive solar gain or how renewable and low-carbon energy technologies will be incorporated into the development, as an integral part of the development's design. An Energy Statement should present technical data while remaining easy to read and to understand.

As part of this Energy Statement, as a minimum, it addresses the following key issues (although this is not an exhaustive list:

- Proposed insulation standards for walls, windows and doors (with comparison against current Building Regulations and passivhaus (or equivalent) standards)
- Management of Solar Gain
- Provision of ventilation and heat recovery systems
- Reduction of thermic bridges (i.e. areas of heat loss)
- Provision of solar panels
- Provision of energy storage (batteries) connected to the building
- Provision of non-CO2 generating sources of heat and cooling (e.g. ground source or air source pumps)
- Consideration of the use of a combined-heat-and-power or district heating system
- Approval of renewable technology

3.0 LOCAL PLANNING POLICY

This section will detail how the key issues listed in the Manchester City Council Care Strategy have been addressed on this project.

As part of the proposals the Architectural design has been approached with a focus on environmental considerations, sustainability, energy use and carbon reduction, such design principles include:

Building Orientation - The site is predominantly overshadowed by the Cavendish Building on the east and south sides. Consequently, the building is orientated with the primary glazed façade facing northwest. Further glazing is situated on the southern corner of the building with further rooflights set along the southeast side of the plan. As such, the building has minimal glazing where it will catch the sun and cause heat gains for most of the year whilst offering plenty of daylight throughout the day.

Thermal Principles - The pavilion is designed as an open space that is afforded flexibility with the use of curtains to divide the space during different functions. Thermally, user comfort has been agreed with the provision of a natural ventilation system that will use principles of passive cooling during warmer periods of the year. This will be aided by the underfloor heating and cooling system that will reverse in winter to provide additional heating. This is intended to keep energy usage to a minimum.

Fabric first approach - The design of the thermal envelope of the building is designed with a fabric first approach, ensuring the thermal insulation of the building is specified to minimise heat loss and therefore reliance on mechanical heating systems. The design of the pavilion looks to cutting edge technologies to provide the thermal insulation through regenerative, low-carbon materials such as straw insulation. These materials not only help maintain heat in the building, but lock away carbon that would otherwise be lost to the atmosphere and contribute to climate change.

Proposed Insulation Standards

The building fabric, the building services and the management of a building broadly determine the energy use of a building. In understanding this, design teams can take measures to advance sustainable design from the earliest stages of a development. However, sustainability is not limited to issues concerning energy consumption.

U-Values better than Building Regulations will be utilised on the project. Improved U-Values are shown in the table below.

Building Element	Proposed Building U-Value	Limiting Part L2 U-Values	Notional Building U-Values
Floor	0.18W/m ² k	0.18W/m ² k	0.18W/m ² k
Roof	0.11W/m ² k	0.18W/m ² k	0.18W/m ² k
External Walls	0.14W/m ² k	0.26W/m ² k	0.26W/m ² k
Windows	1.2W/m ² K	1.6W/m ² K	1.6W/m ² K

Reduction of infiltration Losses and Improved Thermal Performance

Building air leakage or 'infiltration' can create further heat losses via cold draughts into the building. The Building Regulations outlines the test requirements for air permeability, and calls for a minimum of 10m³ / m² / hour at a pressure differential of 50Pa.

The project will achieve an air permeability of 5m³ / m² / hour against 50Pa

Management of Solar Gain

To minimise the risk of overheating, glazing throughout will be specified with a G-Value of 0.18 in accordance with the notional building.

Provision of Ventilation and Heat Recovery Systems

Natural Ventilation

An enhanced single sided natural ventilation strategy will be utilised. The system is designed to work in conjunction with automatically opening roof lights and manually opening windows at low level. During cooler periods windows should remain closed with a tempered minimum fresh air supply being delivered through the roof ventilation units alone maintaining good indoor air quality.

This system eliminates cold draughts without the use of preheating radiators/heating batteries and hence has major energy saving benefits.

The system installed in the room is designed to meet BB101 2018 and CIBSE TM52 summer overheating criteria.

Mechanical Ventilation

There is no mechanical ventilation proposed for this scheme.

Variable Speed Drives

Where appropriate, it is proposed to make use of variable speed drive (VSD) technologies for fans and pumps installed within the building.

Reduction of Thermic Bridges

Thermal bridging will be minimised by means of comprehensive Architectural detailing during stage 4 design, vigorous checking of subcontractors' drawings during stage 5 and implementation of adequate on-site management inspection / quality checks to ensure installation is being undertaken in line with project drawings. The design detailing though stage 4 will be undertaken in line with Approved Document L2 ensuring the principles of thermal continuity between differing building elements are maintained such as junctions with floors, walls, roof and windows.

In relation to thermal bridging, the RIBA Stage 4 Architectural design will focus on robust detailing, utilising products by industry specialists such as Kingspan for example with use of technical data sheets and test data, ensuring the building envelope and subsequent interface junctions are addressed in detail to reduce thermal bridging.

The architectural design team have a library of interface details that can be utilised which have been developed over a number of projects and that have been reviewed at various stages with Building Control with the overall aim of achieving best practice industry standard in the area of thermal bridging amongst others.

Our elements of focus on the Manchester Metropolitan University, Cavendish Building, Robotics Living Lab Phase 2 will be at key interface junctions such as:

- Floor/External wall junctions
- External Wall to roof junctions
- Modular joint lines – Roof/Floors/External & Internal Walls

Provision of Solar Panels

Photovoltaic (PV) systems

Photovoltaic (PV) systems are not considered a requirement of any of the foregoing planning conditions.

Provision of Energy Storage

Energy storage is not to be included in the scheme or a requirement of any foregoing planning conditions.

Provision of Non-CO2 Generating Sources of Heat and Cooling

The client has aspirations for the building to be as low carbon as possible. Therefore, it has been determined that the building shall be heated and cooled via underfloor heating cooling operating linked to a reverse cycle air source heat pump set at 35 deg C flow in heating mode and 18 Deg C flow in cooling mode therefore maximising the output of the air source heat pump in both modes and reducing the risk of condensation on the summer periods.

CHP and District Heating

As the building has a very low base load the use of combined head and power and connection to district heating have been disregarded.

4.0 OTHER CONSIDERATIONS

Lighting

It is proposed that for the lighting solution, LED's will be utilised throughout the development. The proposed average lighting efficacy represents an increase in efficiency over Building Regulation standard.

Lighting Controls

Lighting controls will be installed throughout the extension for saving energy. Daylight controls will be used in classrooms and workshops.

Metering

The consumption of fuel from an electric source shall be metered in accordance with the relevant building regulations. Lighting, power and mechanical energy shall be metered.

SBEM

An SBEM (Simplified Building Energy Model) and EPC (Energy Performance Certificate) are the approved national calculation methods used to assess and compare the energy performance and environmental impact of new commercial buildings. An initial design stage SBEM has been produced and is attached to this report.