



DESIGN ENGINEER SUSTAIN

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# New Cross, Manchester

Bendix Street

Energy Statement

## QA

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## Section 1 – Executive Summary

This Energy Statement addresses the planning requirements of Manchester City Council as set out in Manchester's Local Development Framework, Core Strategy Development Plan Document, adopted 11th July 2012.

This report relates to Bendix Street. Reports in relation to Oldham Road and Goulden Street are submitted separately in support of the relevant planning applications.

This Energy Statement has been prepared to illustrate the environmental aspects of the proposed development highlighting the Energy/Carbon emission profile and, assess the options available for reducing energy consumption and associated CO<sub>2</sub> emissions in accordance with Manchester City Council's policies and guidelines.

A number of planning policies both national and local that apply to the proposed development have been reviewed together with the Building Regulations Approved document part L1A.

The baseline energy emissions have been developed, producing preliminary SAP calculations for the dwellings. Passive fabric measures across the building including improvements to the thermal performance and air tightness above Part L requirements of the Building Regulations have been incorporated.

| Construction Element | Building Regulation Specification        | Development Specification               |
|----------------------|------------------------------------------|-----------------------------------------|
| Floor                | 0.25 W/m <sup>2</sup> k                  | 0.22 W/m <sup>2</sup> k                 |
| Wall                 | 0.30 W/m <sup>2</sup> k                  | 0.18 W/m <sup>2</sup> k                 |
| roof                 | 0.20 W/m <sup>2</sup> k                  | 0.18 W/m <sup>2</sup> k                 |
| Window               | 2.0 W/m <sup>2</sup> k                   | 1.5 W/m <sup>2</sup> k                  |
| Air Permeability     | 10m <sup>3</sup> /h/m <sup>2</sup> @50Pa | 5m <sup>3</sup> /h/m <sup>2</sup> @50Pa |

In addition to the Passive design measures, Active Building Services are to be designed to minimise direct energy consumption and CO<sub>2</sub> emissions, with particular emphasis on the following;

- Improved Boiler Efficiencies.
- Reduced Standing Losses from Pipes and Cylinders.

- Increased Hot Water Generating Efficiencies;
- Energy Efficient LED Lighting;
- Improved Lighting Controls;
- Heat Recovery Ventilation;
- Low Energy Motors in Pumps and Fans;
- Efficient Heat Recovery in other systems and,
- Enhanced panel heater controls

Renewable and Low Carbon technologies have been considered and of the available solutions, it is recommended that the proposed scheme implements a combined heat and power system.

The original energy strategy included the provision for a Combined Heat and Power unit (CHP) to act as a lead boiler. Due to the increase in carbon efficiency of air source heat pumps the client request a change in the design principle from a gas central solution to utilize air source heat pump technology.

Therefore, the stage 3 report has been rewritten and the emission outputs changed to reflect the provision of 8No Mitsubishi CAHV500 external air source heat pumps and associated interconnecting pipework which will provide both heating and hot water to the entire development.

The Energy Model has been calculated to take account the selected renewable energy technologies proposed for this proposed development.

The anticipated carbon emissions for the apartments are **2128.02 kg/CO<sub>2</sub>/m<sup>2</sup>.**

This is a total carbon reduction of **293.58 kg/CO<sub>2</sub>/m<sup>2</sup>** from the baseline emissions of **2421.60 kg/CO<sub>2</sub>/m<sup>2</sup>.**

Therefore, the CO<sub>2</sub> reduction due to utilising the energy hierarchy on this proposed development has been calculated to be **21.1 %** on Part L 2010 and therefore in line with Manchester City Council Core Strategy Development Plan Document.

## Section 2 – Introduction

This report relates to Bendix Street. Reports in relation to Oldham Road and Goulden Street are submitted separately in support of the relevant planning applications.

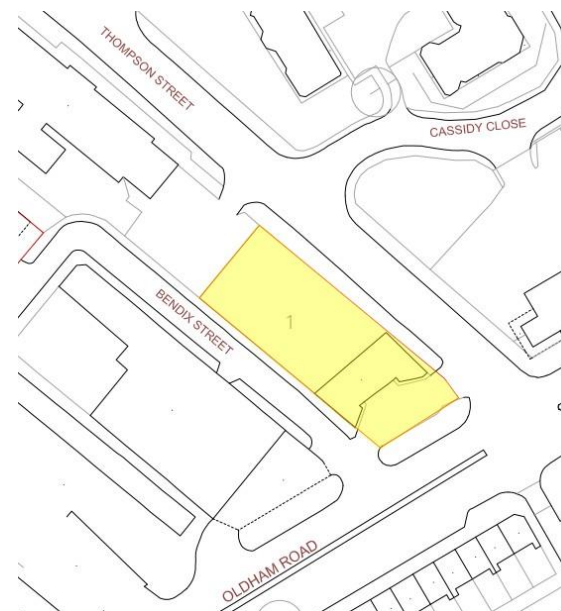
Futureserv Ltd have been appointed to produce an Energy Statement to demonstrate the uplift in energy efficiency between the original energy strategy which utilized CHP as the form of carbon reduction to the proposed solution which is to utilise ASHP for the Bendix Street development. The development consists of 161 residential apartments with a mixture of 1Bed, 2Bed and 3Bed accommodation.

The site is bound by Thompson Road and Oldham Road.

This Energy Statement addresses the planning requirements of Manchester City Council as set out in Manchester's Local Development Framework, Core Strategy Development Plan Document, adopted 11th July 2012.

The strategy proposed for this development is the use of a Central Energy System incorporating renewable and Low Carbon techniques to meet Manchester City Council's desire for carbon reduction using Low or Zero Carbon Technology.

The strategy is essentially based on the reduction of energy consumption by use of passive construction measures, active energy efficient equipment and Low Carbon technology.



## Section 3 – Development Proposals

Futureserv Ltd have been appointed by Mulbury Homes Ltd to produce an Energy Statement in support of a planning application for the construction of a high-quality new build apartment development at Bendix Street, Manchester.

The development shall consist of 161 residential apartments with a mixture of 1Bed, 2Bed and 3Bed accommodation. The building will also incorporate an element of commercial unit (Class A1/A2/A3 and B1), front of house reception, plant and refuse areas and cycle spaces.



This Energy Statement has been prepared to illustrate the environmental aspects of the proposed development highlighting the Energy/Carbon emission profile and, assess the options available for reducing energy consumption and associated CO<sub>2</sub> emissions in accordance with Manchester City Council's policies and guidelines.

Futureserv Consulting Engineers have collaborated with the design team in order to provide a holistic solution for the building that will provide an efficient envelope and contain intelligent building services reducing the environmental impact of the development whilst providing comfortable living accommodation.

The site is brownfield in nature and will be developed following the demolition of the existing commercial unit and car parking illustrated in the below image.



## Section 4 – Policy and Legislation

There are a number of planning policies both national and local that apply to the proposed development.

The UK government has signed up to a legally binding agreement to reduce Carbon emissions by 34% based on 1990 levels before 2020 and by 80% before 2050, this responsibility is being discharged using the Climate Change Act 2008.

The National Planning Policy Framework (NPPF), offers specific guidance which highlights the UK's aspiration to support a transition to a Low Carbon future in a changing climate and in particular, to encourage the use of renewable resources such as Renewable Energy and states;

*Planning authorities should ensure that development plans contribute to global sustainability by addressing the causes and effects of climate change through policies which reduce energy use and emissions, promote development of renewable energy resources, and take climate change impacts into account in the location and design of development.*

### **Local Policies**

The proposed development is located at Bendix Street within Manchester City Centre, with the local policies adopted by Manchester City Council outlined within Manchester's Local Development Framework Core Strategy Development Plan 2012 – 2027.

Within this document specific policies highlight carbon emissions reductions and the impacts of climate change. These are as follows;

### **Core Strategy Policy EN4 – Reducing CO<sup>2</sup> Emissions by Enabling Low and Zero Carbon Development**

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO<sub>2</sub> emissions, and rising fossil fuel prices, through the following actions:



## **Manchester's Local Development Framework**

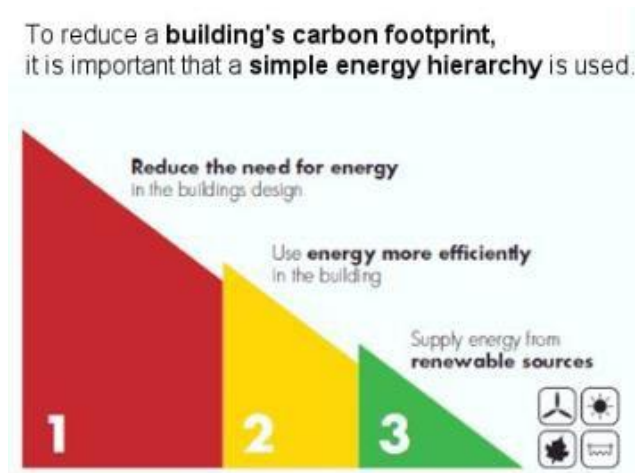
## **Core Strategy Development Plan Document**

Adopted 11<sup>th</sup> July 2012

Published by Manchester City Council  
[planningstrategy@manchester.gov.uk](mailto:planningstrategy@manchester.gov.uk)



- All development must 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
  - to meet residual energy requirements through the use of low or zero carbon energy generating technologies



Reduction in CO<sub>2</sub> emissions is seen as a major component in mitigating climate change. In this regard, areas of Government policy give rise to the following three national and regional targets:

- A national reduction in CO<sub>2</sub> emissions by 34% in 2020 and by 80% in 2050, (from a 1990 baseline) to which buildings will need to make a proportionately higher contribution, as set out in the Climate Change Act 2008.
- 'Zero' carbon targets for all new housing by 2016 and for all new non-residential development by 2019, for which preparation will be required (See table 12.3).

- A national increase in renewable energy capacity by 15% by 2020 as set out in the UK Renewable Energy Strategy, which will require an uplift in current levels.

### **Core Strategy Policy EN6 - Target Framework for CO<sub>2</sub> reductions from low or zero carbon energy supplies**

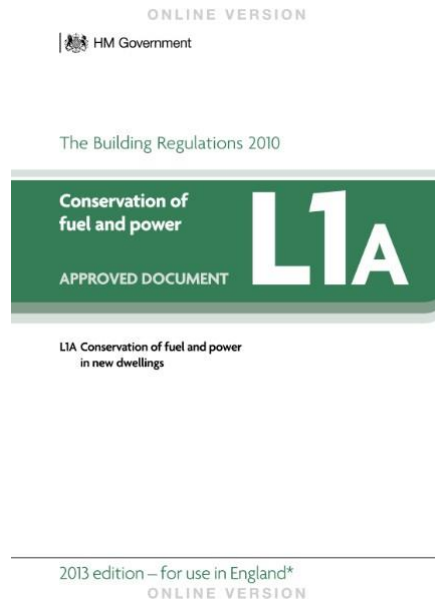
This policy requires applications for residential development of 10 or more units and all other developments over 1000sq m will be expected as a minimum, to meet the targets shown in the table below;

| Domestic CO <sub>2</sub> emissions reduction targets |                                                                                               |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------|
| Table 12.1                                           |                                                                                               |
| Target                                               | % Minimum requirement                                                                         |
| Target 1: Network development area                   | CHP/district heating anchor or connection or where not feasible a 15% increase on Part L 2010 |
| Target 2: Electricity intense buildings              | +15% increase on Part L 2010                                                                  |
| Target 3: Micro generation area                      | +15%increase on Part L 2010                                                                   |

## **Building Regulations Part L1A (2013)**

The proposed development is being designed to comply with the Building regulations approved document Part L1A, 2013 edition. This approved document takes effect from 6<sup>th</sup> April 2014.

- The notional dwelling used to determine carbon dioxide and fabric energy efficiency targets is the same size and shape as the actual dwelling, constructed to a concurrent specification. The Part L 2013 specifications have been strengthened to deliver 9 per cent carbon dioxide savings relative to part L 2010.



The main changes in this approved document from the previous revision are that;

- A new requirement has been introduced that requires new dwellings to achieve or better a fabric energy efficiency target in addition to the carbon dioxide target.

## Section 5 – Energy Strategy

### 5.1 - Baseline Energy Assessment

Futureserv Ltd have conducted analysis for this stage of the development on a number of chosen apartments to show compliance with the Building Regulations Part L1A:2013 therefore setting a reference baseline. This was carried out in order to understand the developments Carbon emissions without any Carbon Emission mitigation measures.

This baseline energy assessment has been developed, producing preliminary SAP calculations for the dwellings. The baseline model has been created to provide Target Emission rates (TER). The SAP calculations then in turn produce Dwelling Emission rates (DER) which are equal to or lower than that of the TER.

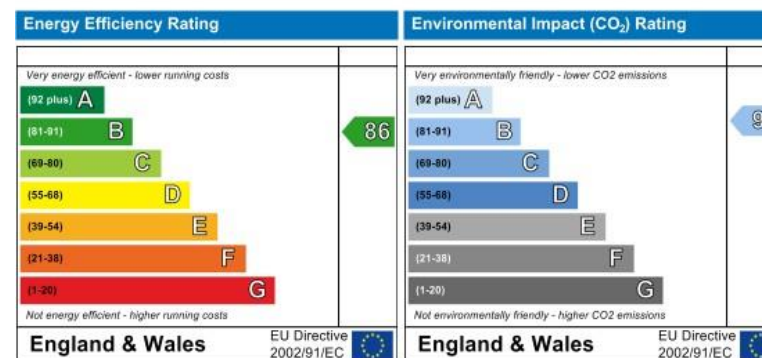
SAP is the government's standard assessment procedure for calculating the energy aspects of a dwelling. SAP is a measure of fuel costs for heating, hot water and lighting for a dwelling generated by the SAP engine within the software.

#### Predicted Energy Assessment

Dwelling type: Mid floor flat  
Date of assessment: 24/03/2017  
Produced by: Ryan Stocks  
Total floor area: 70.2m<sup>2</sup>

This is a Predicted Energy Assessment for a property which is not yet complete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, an Energy Performance Certificate is required providing information about the energy performance of the completed property.

Energy performance has been assessed using the SAP 2012 methodology and is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO<sub>2</sub>) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.

The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO<sub>2</sub>) emissions. The higher the rating the less impact it has on the environment.

## 5.2 - Passive Design Improvements

On the completion of the model and establishment of the Target Emission rates (TER), the dwelling emissions have been reduced through judicious passive design. This has involved an assessment of non-energy consuming design decisions to create a fabric first approach to energy efficiency. This is through;

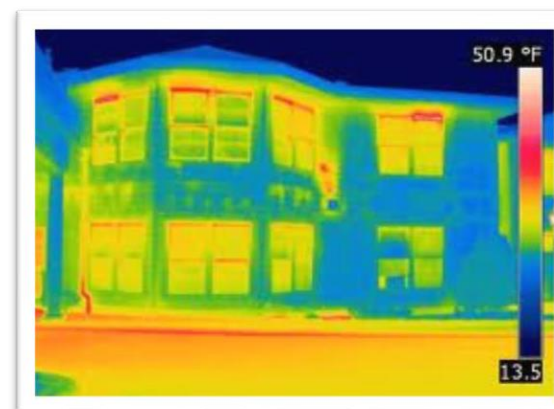
- Improved air permeability performance
- Better thermal Insulation

Passive fabric measures across all the building include improvements to the thermal performance and air tightness above Part L requirements of the Building Regulations and this effectively allows the building envelope to attenuate external conditions without recourse to active Building Services.

The table to the right presents the proposed material specification that will be incorporated within the building design to limit heat losses and ensure efficient operation of the proposed dwellings at Bendix Street.

An airtightness of 5m<sup>3</sup>/hr/m<sup>2</sup> @50Pa is targeted for this development in order to minimise uncontrolled ventilation. An improved air tightness reduces heat losses and energy demand of the apartments.

| Construction Element | Building Regulation Specification        | Development Specification               |
|----------------------|------------------------------------------|-----------------------------------------|
| Floor                | 0.25 W/m <sup>2</sup> k                  | 0.22 W/m <sup>2</sup> k                 |
| Wall                 | 0.30 W/m <sup>2</sup> k                  | 0.18 W/m <sup>2</sup> k                 |
| roof                 | 0.20 W/m <sup>2</sup> k                  | 0.18 W/m <sup>2</sup> k                 |
| Window               | 2.0 W/m <sup>2</sup> k                   | 1.5 W/m <sup>2</sup> k                  |
| Air Permeability     | 10m <sup>3</sup> /h/m <sup>2</sup> @50Pa | 5m <sup>3</sup> /h/m <sup>2</sup> @50Pa |



## 5.3 - Energy Efficiency Improvements

In addition to the Passive design measures described in the preceding Section to improve the building envelope performance, the Active Building Services are to be designed to minimise direct energy consumption and CO<sub>2</sub> emissions, with particular emphasis on the following;

- Improved Boiler Efficiencies;
- Reduced Standing Losses from Pipes and Cylinders;
- Increased Hot Water Generating Efficiencies;
- Energy Efficient LED Lighting;
- Improved Lighting Controls;
- Heat Recovery Ventilation;
- Low Energy Motors in Pumps and Fans;
- Efficient Heat Recovery in other systems and,
- Enhanced panel heater controls

It is currently proposed for the apartments heat energy for Domestic Hot Water to be generated using gas fired centralised plant and a combined heat and power plant installation complete with metered distribution to each individual apartment.

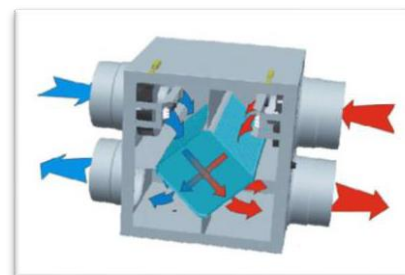
Highly efficient electric heat emitters would be provided complete with time and thermostatic control provisions, to minimise wasted energy when areas are unoccupied.

The apartment ventilation systems will be designed to operate continuously at low-speed air volumes created by energy efficient fans. This will allow the construction of a tightly sealed and correctly ventilated environment reducing thermal heat loss through reduced infiltration, whilst at the same time improving air quality and reducing the occurrence of moisture and mould.

Waste heat from the apartments will be recovered by high efficiency mechanical ventilation with heat recovery (MVHR) systems. This type of ventilation will help to reduce heat demand and provide filtered air to the apartments thus promoting healthy living conditions for the occupants.

All internal lighting installations will make use of low energy technologies combined with presence and absence detection in conjunction with timed setbacks. 100% low energy lighting provision within the apartments. Photo switching and automatic dimming will be specified to the communal area of the building in order to improve the efficiency of the lighting system.

All fans, motors and pumps shall be specified to incorporate ECA accredited technology and appropriate controls.



| Construction Element | Specification                                 |
|----------------------|-----------------------------------------------|
| Ventilation          | MVHR                                          |
| Lighting             | 100% Low Energy Fittings                      |
| Space Heating        | Electric Panel Heaters                        |
| Heating Control      | Programmer and room thermostats               |
| Water Heating        | Indirect Hot water cylinder fed from CHP unit |

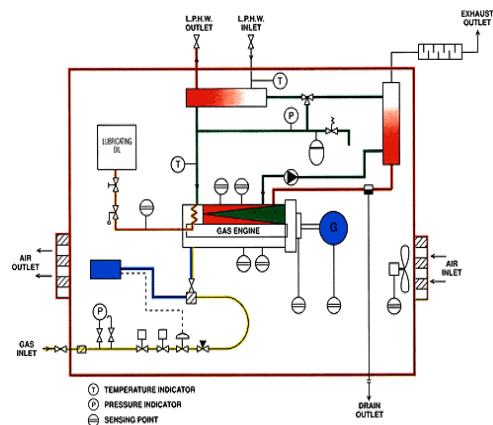
## 5.4 - Renewable Energy Improvements

In order to comply with Manchester's Local Development Framework Core Strategy Development Plan which requires that the development's Carbon emissions are reduced by 15% when compared to a building meeting Part L of the Building Regulations 2010, renewable and/or low or zero carbon emission systems have been targeted.

All currently acknowledged and commercially available technologies have been considered and assessed with the conclusions summarised below;

### Combined Heat and Power (CHP)

On-site generation of electricity and the utilisation of waste heat from this process within a building can create a beneficial arrangement whereby the transmission losses of grid supplied electricity can be omitted. The use of CHP tends to require a steady and continuous heat demand therefore the large quantities of domestic hot water associated with apartment accommodation would satisfy this requirement.



Diagrammatic layout of small scale CHP unit

It has been established that the dominant energy requirement within apartment accommodation results from domestic hot water generation, the use of an accurately sized CHP solution can dramatically reduce the energy and Carbon intensity of this type of development.



Typical CHP Unit

The original energy report utilized a CHP engine of **50kW<sub>th</sub>** and **20kW<sub>e</sub>** and identified that this unit would reduce emissions by 293.58 kg/CO<sub>2</sub>/m<sup>2</sup> from the baseline emissions however utilizing air source heat pumps has increased the carbon reduction further therefore this is now considered the preferred solution

## Solar Thermal Collectors

The use of flat plate & evacuated tube thermal panels has been identified as a potential method of harnessing renewable solar energy by pre-heating domestic hot water provision.

The recent introduction of the renewable Heat Incentive may further improve the financial viability for the technology.



Example of Solar Thermal unit

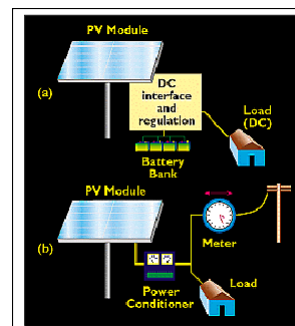
However, there is a fundamental conflict between Solar Thermal Collectors and the proposed Combined Heat and Power technology as both systems would be attempting to deliver to the same heating systems and thus would effectively de-rate each other.

For this reason, we have not considered the use of solar thermal collectors on this development.

## Solar Photovoltaic Panels

The option to utilise roof mounted or Building Integrated Photovoltaic panels to generate electrical energy is a renewable energy method of generating Carbon free electrical power.

Due to the density in occupancy within apartments, there is likely to be a fairly constant base electrical load prevalent on the building which may be mitigated in part by the use of Solar PV.



PV System components

However, the flat roof areas of the building are relatively limited and payback periods for Photovoltaic panels can be onerous, in addition to this the external roof area is required for the external roof mounted air source heat pumps which reduces the available area for PV for this reason we have not considered the use of Solar Photovoltaic Panels.

## Wind Turbines

Wind energy can be a cost-effective method of renewable power generation and turbines can produce Carbon neutral electricity with outputs ranging from watts to megawatts.

The most common design is for three blades mounted on a horizontal axis, which is free to rotate into the wind on a tall tower. The blades drive a generator either directly or via a gearbox (generally for larger machines) to produce electricity.

The electricity can either link to the grid or charge batteries. An inverter is required to convert the electricity from direct current (DC) to alternating current (AC) for feeding into the grid.

There are a variety of wind turbines on the market ranging from smaller turbines that can be attached directly to a buildings structure to larger stand-alone turbines.

City center and sub-urban locations generally experience poorer yields for electricity output from small and medium scale wind turbines, due to obstructions and variations in local topography.



Wind Turbine Installation

Also considering the visual impact and unwanted noise in an environment with sleeping accommodation the use of wind turbines is discounted from inclusion at this development.

## Ground Source Heat Pumps

The ground below buildings remains at a constant temperature of around 10°C to 12°C offering the ability to extract energy in the winter and discharge energy in the summer from cooling with the energy exchange being achieved via open or closed loop systems linked to heat pumps.



Ground Source Heat Pump Installation

The footprint of the development and the surrounding site conditions do not have the potential to deliver an element of space available for closed loop heat exchange, due to this and the conflict with the CHP heat sink, the likely yield, peak load demand and cost feasibility, we have discounted Ground Source Heat Pumps at this development in favor of better performing technologies.

## Air Source Heat Pumps

Air source heat pumps provide an accepted solution for using renewable energy taken from ambient air to heat a building in the winter and discharge heat from cooling in the summer.



Typical External Condenser Unit

The baseline building carbon emissions have been compared to the carbon emissions of a district heating system utilizing an air source system to provide both heating and hot water and it has been demonstrated that the air source system provides a greater carbon reduction than either CHP or PV.

This is due the seasonal coefficient of performance of the air source system and the fact that the system is used to offset carbon against both the heating and hot water systems throughout the development which are the largest sources of carbon reduction.

For these reasons this air source heat pumps have been proposed as the preferred renewable technology.

## Biomass

Some success on other projects has been made with the implementation of wood fuelled energy equipment forming a Carbon Neutral heat source however these projects have tended to be light density Sub-Urban or even rural in their location. The relatively constrained nature of this site, together with limited storage space and potential delivery issues due to the congestion on Oldham Road reduces the opportunity to take advantage of a Biomass solution for this development.



Plantroom Biomass Installation

In addition, flue emissions and the requirements the Clean Air Act has led to a dismissal of this technology for this particular scheme.



## Total Assessments

The central Building Services Systems will be supplemented by Renewable and Low Carbon technologies to further reduce the associated Carbon emissions.

Of the available solutions considered, it is therefore recommended that the proposed scheme implements the following renewable energy technology:

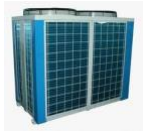
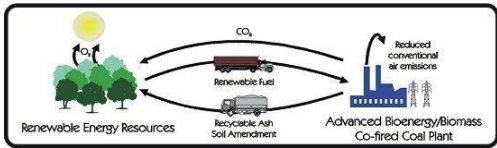
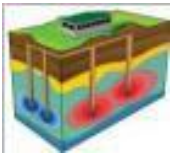
- Air Source Heat Pumps

The baseline building carbon emissions have been compared to the carbon emissions of a district heating system utilizing an air source system to provide both heating and hot water, it has been demonstrated that the air source system provides a greater carbon reduction than either CHP or PV.

This is due the seasonal coefficient of performance of the air source system and the fact that the system is used to offset carbon against both the heating and hot water systems throughout the development which are the largest sources of carbon reduction.

The ASHP will reduce the primary energy use requirement within the development, i.e. the Domestic Hot Water generation.

The Energy Model has been calculated to take account the selected renewable energy technologies proposed for this development.

| Renewable Technology                         | Image                                                                               | Comments                                                                                                                                                                                                                                                                                                                                                                                                          |
|----------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Combined Heat and Power<br><b>DISCOUNTED</b> |    | The integration of Combined Heat and Power technology has been discounted following calculation in preference to an air source solution, this is due to the greater seasonal performance of the air source system when compared to CHP when maintenance is factored into the day-to-day operation.                                                                                                                |
| Solar Photovoltaic<br><b>DISCOUNTED</b>      |    | The flat roof areas of the building are relatively limited and payback periods for Photovoltaic panels can be onerous, for this reason Solar Photovoltaic Panels have been discounted.                                                                                                                                                                                                                            |
| Air Source Heat Pumps<br><b>SELECTED</b>     |    | The use of Air Source Heat Pumps is proposed for the development as they have been shown via calculation to provide a greater seasonal carbon reduction when compared to CHP. This is compounded by the higher maintenance requirements of a CHP system. When the CHP lead boiler is offline the system would need to rely slowly on gas fired boilers which are inefficient and produce higher carbon emissions. |
| Solar Thermal<br><b>DISCOUNTED</b>           |    | There is potential to include flat panel solar thermal collector located at roof level serving the domestic hot water systems. However, this solution would conflict with the selected LZC for heat discharge capacity.                                                                                                                                                                                           |
| Biomass Boilers<br><b>DISCOUNTED</b>         |   | Biomass boiler solutions have been discounted at this location due to potential clean air issues, deliverability logistics and the lack of available storage space for the required quantity of fuel.                                                                                                                                                                                                             |
| Wind Turbines<br><b>DISCOUNTED</b>           |  | Wind turbines have been discounted due to the resulting visual/noise impact from the equipment, and relatively poor performance of the solution when used within Urban and Sub-Urban locations.                                                                                                                                                                                                                   |
| Ground Source Heat Pump<br><b>DISCOUNTED</b> |  | The inclusion of Ground Source Heat Pumps has been discounted within this development due to the conflict with the selected CHP technology, system cost viability and also the site constraints.                                                                                                                                                                                                                  |

### **5.4.1 - Energy Generation and Distribution Systems**

The case for renewable energy systems is clear and we understand that Manchester City Councils current energy policy requires developments to make the fullest contribution to the mitigation of climate change, and to minimise Carbon Dioxide emissions.

As a consultant, Futureserv has an over-arching philosophy delivering design of truly sustainable energy systems, employing the widely recognised hierarchy;

- Be Lean - Reduce demand wherever possible utilising passive measures.
- Be Clean - Where energy is used, then it should be optimised to operate at the highest efficiencies practical.
- Be Green - Take advantage of renewable options to reduce fossil fuel energy sources.

The proposed development will be designed to be served by a Central Energy System, with Low Temperature Hot Water generated by air source heat pump units located within a roof level plant compound, the LTHW pipework distribution shall be distributed around the Building within ceiling voids and service risers.

The air source heating plant will be designed around a high efficiency heat generator, providing Domestic Water Heating.

The proposed Mitsubishi plant has a seasonal SCOP > 300% and exchanges the energy held in the air with refrigerant within the system in order to produce hot water which in turn then serves the heating and domestic water systems throughout the development.

The main Mechanical and Electrical plant systems are located within purpose designed plant spaces incorporating adequate access for future maintenance and plant replacement.

All plant and equipment has been designed with energy control measures incorporating variable speed drives, with low energy motors provided on ventilation fans and hydraulic pumps.

The development is also provided with a boosted cold water supply system located within the main plant room at ground floor level and all sanitary appliances are to be equipped with low water flow devices.

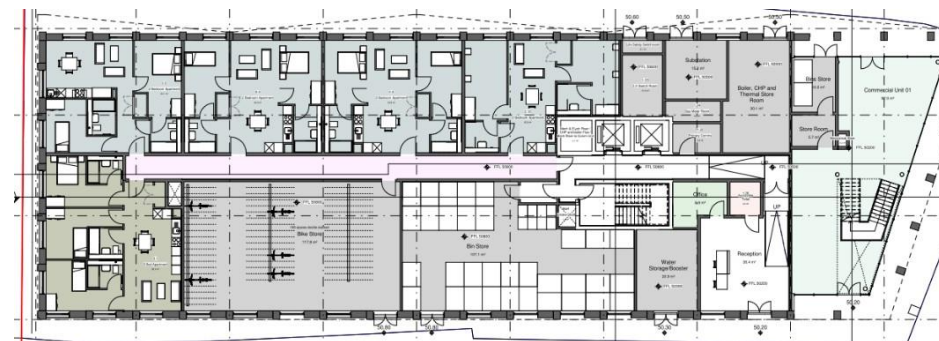
## 5.5 - Energy Performance Calculations

To enable demonstration that the environmental benefits associated with our energy hierarchy approach to energy demand and emission reductions at Bendix Street, approved SAP software, Stroma FSAP 2012 Version 1.0.1.21 has been used to generate energy demand calculations for typical apartments within the development.

Block compliance (multi dwelling) has been targeted to the apartment accommodation in accordance with guidance within approved document L1A.

At this stage of the development typical apartments have been selected for assessment as they are representative of the entire development in terms of their size, layout and orientation.

The below tables present baseline energy demand and emissions and actual energy demand and emissions for the typical apartments in the form of Target Emission Rates and Dwelling Emission Rates (Kg CO<sub>2</sub>/m<sup>2</sup>/annum) and Target Fabric Energy Efficiency and Dwelling Fabric Energy Efficiency (Kwh/m<sup>2</sup>/annum)



### Ground Floor Layout

## BLOCK COMPLIANCE

### Calculation Type: New Build (As Designed)



|                  |                                                                                    |                |            |
|------------------|------------------------------------------------------------------------------------|----------------|------------|
| Block Reference  | Samp                                                                               | Issued on Date | 14/02/2023 |
| Block Name       | Sample                                                                             |                |            |
| Assessor Details | Mr. Alexander Davies, Alexander Davies, Tel: 07710884313, adavies@futureserv.co.uk | Assessor ID    | T854-0001  |
| Client           | Mulbury, MLB                                                                       |                |            |

#### Block Compliance Report - DER

| Block Reference: Samp                                 |            | Block Name: Sample           |                                          |                                          |           |
|-------------------------------------------------------|------------|------------------------------|------------------------------------------|------------------------------------------|-----------|
| Property-Assessment Reference                         | Multiplier | Floor Area (m <sup>2</sup> ) | DER (kgCO <sub>2</sub> /m <sup>2</sup> ) | TER (kgCO <sub>2</sub> /m <sup>2</sup> ) | % DER/TER |
| 02 Apt 214-Run 01-1-1-1-1-1                           | 1          | 68.69                        | 17.89                                    | 22.66                                    | 21.07 %   |
| 02 Apt 213-Run 01-1-1-1-1-1                           | 1          | 68.87                        | 18.11                                    | 21.51                                    | 15.82 %   |
| 02 Apt 211-Run 01-1-1-1-1-1                           | 1          | 48                           | 19.95                                    | 26.60                                    | 25.01 %   |
| 02 Apt 212-Run 01-1-1-1-1-1                           | 1          | 84.23                        | 17.87                                    | 21.16                                    | 15.57 %   |
| 02 Apt 204-Run 01-1-1-1-1-1                           | 1          | 77.81                        | 18.28                                    | 22.45                                    | 18.56 %   |
| 02 Apt 205-Run 01-1-1-1-1-1                           | 1          | 44.58                        | 19.48                                    | 25.58                                    | 23.84 %   |
| 02 Apt 203-Run 01-1-1-1-1-1                           | 1          | 48.84                        | 18.22                                    | 23.96                                    | 23.95 %   |
| 02 Apt 201-Run 01-1-1-1-1-1                           | 1          | 48.84                        | 19.58                                    | 25.82                                    | 24.16 %   |
| 02 Apt 202-Run 01-1-1-1-1-1                           | 1          | 47.65                        | 19.43                                    | 25.04                                    | 22.40 %   |
| 02 Apt 209-Run 01-1-1-1-1-1                           | 1          | 67.76                        | 18.29                                    | 23.52                                    | 22.24 %   |
| 02 Apt 210-Run 01-1-1-1-1-1                           | 1          | 64.61                        | 19.02                                    | 24.42                                    | 22.13 %   |
| 02 Apt 208-Run 01-1-1-1-1-1                           | 1          | 48                           | 19.87                                    | 26.49                                    | 25.00 %   |
| 02 Apt 206-Run 01-1-1-1-1-1                           | 1          | 76.67                        | 20.34                                    | 24.56                                    | 17.19 %   |
| 02 Apt 207-Run 01-1-1-1-1-1                           | 1          | 67.76                        | 18.30                                    | 23.55                                    | 22.30 %   |
| Totals:                                               | 14         | 862.31                       | 264.63                                   | 337.34                                   |           |
| Average DER = 18.81 kgCO <sub>2</sub> /m <sup>2</sup> |            | % DER/TER                    | PASS                                     |                                          |           |
| Average TER = 23.81 kgCO <sub>2</sub> /m <sup>2</sup> |            | 21.00 %                      |                                          |                                          |           |

Selected Dwelling Emissions Rate: 264.63 kg/CO<sub>2</sub>/m²

Selected Target Emissions Rate: 337.34 kg/CO<sub>2</sub>/m²

Result: Pass +21% increase on Part L 2013

The Part L 2013 specifications have been strengthened to deliver 9 per cent carbon dioxide savings relative to part L 2010 therefore the emissions rate is an **29%** improvement on the Part L 2010.

|                                                         |                                    |
|---------------------------------------------------------|------------------------------------|
| <b>Total Target Carbon Emissions for 161 Apartments</b> | <b>4013.74kg/CO<sub>2</sub>/m²</b> |
|---------------------------------------------------------|------------------------------------|

|                                                  |                                     |
|--------------------------------------------------|-------------------------------------|
| <b>Total Carbon Emissions for 161 Apartments</b> | <b>3107.40 kg/CO<sub>2</sub>/m²</b> |
|--------------------------------------------------|-------------------------------------|

|                                                                |                      |
|----------------------------------------------------------------|----------------------|
| <b>Carbon Reduction from Target Emission Rates Part L 2010</b> | <b>29% reduction</b> |
|----------------------------------------------------------------|----------------------|

Therefore, the CO<sub>2</sub> reduction due to utilising the energy hierarchy on this development has been calculated to be **29.0 %** and therefore in line with Manchester City Council Core Strategy Development Plan Document.

## Section 6 - Conclusions

This energy statement has summarised the energy hierarchy requirements for Bendix Street to respond to emission reduction targets set out within the Manchester Core Strategy policies EN4 and EN6.

The proposed development will incorporate passive energy techniques available in the construction industry to reduce its ongoing requirement to consume energy to heat, ventilate and light the building, this is achieved by improved efficient fabric design in excess of the thermal properties set out within the Building Regulations.

The proposed development will incorporate energy efficiency measures in its Building Services to reduce the carbon footprint of the site below the passive improvement stage, using highly efficient heat generation plant, heat recovery systems and energy efficient and highly controllable lighting.

The proposed development will make use of renewable and Low Carbon energy techniques comprising of roof mounted air source heat pumps to offset both the heating and hot water demand (Hot water demand being identified as the dominant energy requirement within the proposed development).

Overall, the Carbon emissions from the proposed Bendix Street proposed development shows a total reduction in emissions from baseline set by current Building Regulations Part L 2010, by **29%**.

The strategy improves on the fundamental principles of the Building Regulations and will make a significant contribution to reducing the annual CO<sub>2</sub> emissions of the proposed development.