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One Park Place Manchester Energy Statement



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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 Plan, in which the new development falls, adopted 12th July 2012 and Guide to Development in Manchester Supplementary Planning Document (April 2007). The site is located within the Great Ducie Street Strategic Regeneration Framework (2018).

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 CO₂ 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 & L2A. The policies advise that a carbon emissions reduction of 15% greater than Part L of the Building Regulations (2010) shall be achieved.

The baseline energy emissions have been developed, producing a preliminary SAP calculation for the building. The fabric first approach has been prioritised with these passive measures being adopted across the building including vast improvements to the thermal performance and air tightness.

The improvements made beyond current Building Regulations Part L1a are identified in the adjacent table indicating a 25-44% improvement on U-values and a 63% improvement on air permeability.

Construction Element	Building regulation Part L Limiting U-Values for fabric elements	Development Specification
Floor	0.18 W/m ² K	0.10 W/m ² K
External Wall	0.26 W/m ² K	0.15 W/m ² K
Roof	0.16 W/m ² K	0.10 W/m ² K

Window	1.6 W/m ² K	1.20 W/m ² K
Air Permeability	8 m ³ /h/m ²	3.00 m ³ /h/m ²

In addition to the fabric first passive design measures, active building services are to be designed to minimise direct energy consumption and CO₂ emissions, with particular emphasis on the following;

- Increased Hot Water Generating Efficiencies;
- Reduced Standing Losses from Pipes and Cylinders;
- Energy Efficient LED Lighting;
- Improved Lighting Controls;
- Low Energy Motors in Pumps and Fans;
- Efficient Heat Recovery in relevant systems and,
- Enhanced heating controls – Wi-Fi enabled,
- Combined natural and mechanical ventilation systems

The carbon emissions on this proposed development apartments have been calculated to be compliant with the 15% reduction below Part L 2010 which is therefore in line with the local Manchester energy policy (Supplementary Planning Document 2009).

Section 2 – Introduction

Futureserv have been commissioned by Benjamin Property Ltd to develop an Energy Statement for the new proposed residential-led mixed use scheme at One Park Place, Manchester M4 4FY.

This Energy Statement addresses the planning requirements of Manchester City Council as set out in Manchester's Core Strategy Development Plan, adopted 12th July 2012.

The strategy proposed for this development is to utilise 100% efficient electric panel heaters, with a mix of heat pump Domestic hot water cylinders/direct electric hot water cylinders and mechanical ventilation with heat recovery (MVHR) to meet Manchester City Council's desire for carbon reduction using Low or Zero Carbon Technology. The scheme will also benefit from a PV array to offset grid dependence.

The strategy is essentially based on the reduction of energy consumption by use of passive construction measures, fabric first approach alongside active energy efficient equipment in conjunction with renewable energy generation from a Photovoltaic array.

Section 3 – Development Proposals

The development shall consist of Demolition of existing building and erection of a part 25 and part 15 storey residential building comprising 154 units with ground floor commercial units (Use Class E), associated residents amenity space, cycle parking, substation, servicing, and associated landscaping works.



Typical residential floor plan

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 CO₂ 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.

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;

The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.

Local Policies

The proposed development is within Manchester City Centre. This means that both Manchester Local Development Framework Core Strategy Development Plan apply to this development.

In addition to Building Regulations compliance the performance of the buildings will be such as to provide additional carbon savings in line with Policy EN 4 & EN 6 of the Core Strategy.

Within these documents, specific policies highlight carbon emissions reductions and the impacts of climate change. These are as follows;



Manchester's Local Development Framework

Core Strategy Development Plan Document

Adopted 11th July 2012

Published by Manchester City Council
planningstrategy@manchester.gov.uk



Manchester Local Framework

Policy EN 4: Reducing CO2 Emissions

Policy EN 4

Reducing CO₂ Emissions by Enabling Low and Zero Carbon Development

The Council will seek to reduce fuel poverty and decouple growth in the economy, growth in CO₂ emissions, and rising fossil fuel prices, through the following actions:

- 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
- Wherever possible new development and retrofit projects, including energy generation plant, must be located and designed in a manner that allows advantage to be taken of opportunities for low and zero carbon energy supplies.
- Where possible new development and retrofit projects will be used as a mechanism to help improve energy efficiency and provide low and zero carbon energy supplies to existing buildings.
- Where appropriate new development and retrofit projects will be required to connect to and/or make contributions to low or zero carbon energy schemes and/or to incorporate provision to enable future connection to any existing / potential decentralised energy schemes.
- The use of building materials with low embodied carbon in new development and refurbishment schemes.

Policy EN 6: Target Framework for CO2 reductions

Policy EN 6

Target Framework for CO₂ reductions from low or zero carbon energy supplies

Applications for residential development of 10 or more units and all other development over 1,000 sq m will be expected as a minimum to meet the target shown in Tables 12.1 or 12.2, unless this can be shown not to be viable. This should be demonstrated through an energy statement, submitted as part of the Design and Access Statement. Such a statement will be expected to set out the projected regulated energy demand and associated CO₂ emissions for all phases of the development.

Developments smaller than the above threshold, but involving the erection of a building or substantial improvement to an existing building will also be expected to meet the minimum target, where viable, but will not be expected to submit an energy statement.

The target framework relates to three broad development locations and their potential for low and zero carbon, decentralised energy. The areas are defined as follows

As the application for residential development is of 10 or more units and generally, over 1,000 sqm will, as a minimum, the development will meet the Core Strategy targets shown in Tables 12.1 regarding domestic CO₂ emissions, and 12.2 regarding non-domestic CO₂ emissions.

Development must follow the principles of the Energy Hierarchy, being designed:

- to reduce the need for energy through design features;
- to reduce the need for energy through energy efficient features; and
- to meet residual energy requirements through the use of low or zero carbon energy generating technologies.

New residential development of 10 units or more, to achieve **carbon emissions reduction standards 15% greater than Part L of the Building Regulations (2010)** depending on the type and location of the scheme, unless this can be shown not to be viable.

Building Standards

1. New development should be designed and constructed to meet the relevant Building Regulations, as a minimum, with a view to:
 - a) Maximising energy efficiency and the use of low carbon energy
2. In meeting the carbon reduction targets set out in Building Regulations, the Council will expect development to be designed in accordance with the following energy hierarchy:
 - a) Reduce energy demand through energy efficiency measures
 - b) Supply energy through efficient means (i.e. low carbon technologies)
 - c) Utilise renewable energy generation

To reduce a **building's carbon footprint**, it is important that a **simple energy hierarchy** is used.



Renewable Energy Generation

1. Proposals for the installation of renewable and low carbon energy technologies, including both building-integrated and standalone schemes will be promoted and encouraged, provided that:
 - a) any significant adverse impacts can be mitigated;
 - b) where biofuels are to be utilised, they should be obtained from sustainable sources and transportation distances are minimised;
 - c) any energy centre is suitably located and designed to a high quality such that it is sympathetically integrated with its surroundings; and
 - d) all proposals are consistent with any relevant Policies in this Plan.

Renewable energy can be supplied at a national level from sources such as large offshore wind farms, solar farms or hydroelectric schemes. Although not a source of renewable energy, nuclear power is a major low carbon source. Locally, smaller and on-site renewable energy schemes include solar photovoltaic, solar thermal, ground source and air source heat pumps and, where fuelled by biomass or biogas, district energy schemes and combined heat and power plants (CHP). Due to the lack of large areas of open space within the city, on-site and neighbourhood-scale renewable energy schemes are the most effective way for Manchester to contribute to renewable energy targets set out by the Government.

Although wind turbines are a good example of a renewable energy source, around 90% of Manchester is unsuitable for wind turbines due to the density of development.

The indications from the evidence base identify there will be a greater need to encourage and support a wider spectrum of renewable energy technologies to help deliver the energy supply that would be placed on the grid as a result of the levels of growth planned for the city. Therefore, as part of the strategic sites detailed in this Plan, any proposed development schemes will be expected to

consider and incorporate, where viable, renewable energy generation technologies as part of the overall suite of energy supply.

Building Regulations Part L (2021) Compliance

The proposed development is being designed to comply with the Building regulations approved document Part L1A & L2A, 2021 edition. These approved documents took effect from 15th June 2022.

The scheme will comply with the criteria of Building Regulations (2021) Part L1A for residential and Part L2A (2021) for the non - residential units.

The main changes in these approved documents from the previous revisions are that;

- The notional building used to determine carbon dioxide targets is the same size and shape as the actual building, constructed to a concurrent specification. The Part L2a 2021 specifications have been strengthened to deliver 27 per cent carbon dioxide savings across the new non-domestic building mix relative to part L 2010. The Part L1a 2021 specifications have been strengthened to deliver 30 per cent carbon dioxide savings across the new domestic buildings relative to part L 2010.

Summary of Requirements.

- 1. Residential = Reduce carbon emissions by 30% over Part L1a 2010**
- 2. Non – Domestic areas = Reduce carbon emissions by 27% over Part L2a 2010**



Section 5 – Energy Strategy

5.1 - Baseline Energy Assessment

Futureserv Ltd have conducted analysis for this stage of the development on the current design of the building, to show compliance with the Building Regulations Part L1A & L2A:2021, therefore setting a reference baseline. This was carried out in order to understand the development's Carbon emissions without any Carbon Emission mitigation measures.

This baseline energy assessment has been developed, producing a preliminary SAP calculations (Standard Assessment Procedure) for the building. The baseline models have been created to provide Target Emission rates (TER). The calculations then in turn produce Building Emission rates (BER) & Dwelling Emission rates (DER) which are equal to or lower than that of the TER.

SAP is the standard assessment method for the carbon emission levels of a building. This considers the fabric properties of the building, the method of heating/cooling/ventilating/hot water etc and produces an estimate of carbon emissions.

If the building does not pass the Part L criteria, then it is an iterative process to add renewable/low carbon technologies, to lower the overall carbon emissions.

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.

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.

5.2.1 – Fabric First Approach

A 'fabric first' approach to building design involves maximising the performance of the components and materials that make up the building fabric itself, before considering the use of mechanical or electrical building services systems. This can help reduce capital and operational costs, improve energy efficiency and reduce carbon emissions. A fabric first method can also reduce the need for maintenance during the building's life.

Buildings designed and constructed using the fabric first approach aim to minimise the need for energy consumption through methods such as:

- Maximising air-tightness.
- Using Super-high resistance insulation.
- Optimising solar gain through the provision of openings and shading.
- Optimising natural ventilation.

Focussing on the building fabric first, is generally considered to be more sustainable than relying on energy saving technology, or renewable energy generation, which can be expensive, can have a high embodied energy and may or may not be used efficiently by the consumer.

Having energy efficiency integrated into the building envelope can mean occupants are required to do less to operate their building and not have to adjust their habits or learn about new technologies. This can result in less reliance on the end user regarding the buildings energy efficiency.

Fabric first building systems can be constructed off site, resulting in higher quality and so better performance, reduced labour costs and an increased speed of build.

5.2.2 - Fabric Values

The table below shows the proposed material specification that will be incorporated within the building design to limit heat losses and ensure efficient operation of the proposed development.

An airtightness of 3.0 m³/hr/m² @50Pa is targeted for this development in order to minimise uncontrolled ventilation. An improved air tightness reduces heat losses and energy demand of the development.

Construction Element	Building Regulation Specification	Development Specification	Improvement over Part L1a Building Regulations
Floor	0.18 W/m ² K	0.10 W/m ² K	44% improved
External Wall	0.26 W/m ² K	0.15 W/m ² K	42% improved
Roof	0.16 W/m ² K	0.10 W/m ² K	38% improved
Window	1.6 W/m ² K	1.20 W/m ² K	25% improved
Air	8 m ³ /h/m ²	3.00 m ³ /h/m ²	63% improved

These values comply with the requirements of Part L requirements.

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 CO₂ emissions, with particular emphasis on the following;

- Increased Hot Water Generating Efficiencies;
- Reduced Standing Losses from Pipes and Cylinders;
- Energy Efficient LED Lighting;
- Improved Lighting Controls;
- Low Energy Motors in Pumps and Fans;
- Efficient Heat Recovery in relevant systems and,
- Enhanced heating controls with Wi-Fi enabled

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 will be included within the development. Photo switching and automatic dimming will be specified to the communal areas 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.

Non-domestic areas –

It is currently proposed that the domestic hot water demand will be met using a mix of approaches for different areas of the scheme.

The commercial units will use an ASHP system and residential landlord back of house areas will use local electric hot water heaters.

Commercial units will have VRF heating and cooling residential landlord back of house areas will make use of electric panel heaters.

Commercial units will have heat recovery units and the residential landlord back of house areas will have a combination of natural and local mechanical extract with natural inlet air as required.

Construction Element	Specification
Ventilation	Natural Ventilation with a mix of mechanical ventilation and MVHR
Lighting	100% low energy fittings
Space Heating	Mix of Electric Panel Heaters, ASHP and VRF heating / cooling
Heating Control	Thermostatic and time controlled
Water Heating	ASHP and local electric heaters

Apartments –

Apartments are suggested to have pressurised hot water cylinders with a mix of standard direct electric cylinders and integral heat pump cylinders.

The space heating will be via electric panel heaters or similar in all residential areas of the building. These will be complete with thermostatic and time controllers. These units will also have enhanced central Wi-Fi enabled controls.

The ventilation will be via whole dwelling Mechanical Heat Recovery Ventilation (MVHR) units in each apartment. These will provide extract ventilation to kitchens and bathrooms, and balanced supply ventilation to all occupied rooms. Purge ventilation will be via openable windows, giving the occupants the final control over the environment in their homes.

Construction Element	Specification
Ventilation	Natural Ventilation supplemented with MVHR
Lighting	100% low energy fittings
Space Heating	Electric Panel Heaters
Heating Control	Thermostatic and time controlled with Wi-Fi enabled
Water Heating	Mix of Direct Electric Hot Water Cylinders and Heat pump hot water cylinders

5.4 - Renewable Energy Improvements

In order to comply with Manchester's Local Plan, which aims to utilise renewable or low carbon technologies, there are a number of options to consider. All currently acknowledged and commercially available technologies have been considered and assessed with the conclusions summarised below.

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, the likely yield, peak load demand and cost feasibility, we have discounted Ground Source Heat Pumps at this development in favour of better performing suitable technologies.

Air Source Heat Pumps

Air source heat pumps provide an accepted solution for using renewable energy taken from ambient air to provide heat for heating or hot water.

For the apartments individual heat pump cylinders within each apartment have been selected for further consideration as a highly efficient method for hot water production. A heat pump hot water cylinder is similar to an electric hot water cylinder, it heats up and stores the hot water for use in the apartment. A heat pump cylinder has an electric immersion as per a direct electric hot water cylinder but also incorporates a built-in heat pump. It consists of a ducted supply air & exhaust air from the top of the unit to an external louvre similar to a MVHR inlet & exhaust. The heat pump collects energy from the air and converts this into heat, which is then transferred to the water within the cylinder.



Typical Heat Pump Cylinder

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 the development, 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.



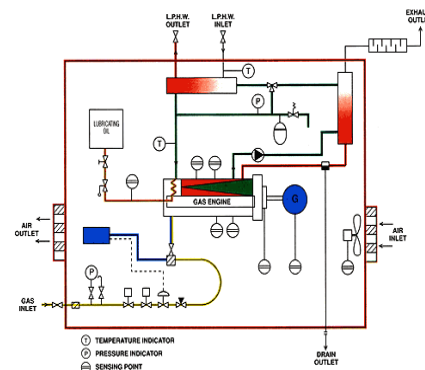
PV System components

The system would help reduce carbon emissions from grid electricity and feed into the grid in low demand periods contributing to the decarbonisation of the grid through grid export capability. This technology has been selected as an option and is being considered to feed into the landlord areas of the development.

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 residential accommodation would satisfy this requirement.



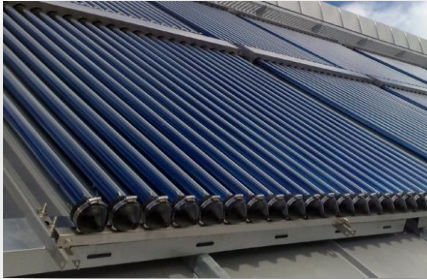
Diagrammatic layout of CHP unit

However, the integration of Combined Heat and Power technology has been discounted due to the city centre location and clean air act implications with the flue discharge alongside the movement to utilise decarbonised grid electricity over traditional fossil fuel heating systems.

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



Example of Solar Thermal unit

However, there is a conflict between the use of local independent water heaters within each apartment and a central solar thermal collector array. Interconnecting solar thermal panels with remote apartment cylinders is not conducive or efficient due to extended distribution losses. Furthermore, the restricted flat roof areas available negate the inclusion of a panel system offering any significant contributions. Therefore, without being able to offer a good contribution of renewable energy alongside the logistic and strategy issues, the installation of solar thermal panels has been discounted for the development.

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 centre 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.

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 city centre location, reduces the opportunity to take advantage of a Biomass solution for this development.

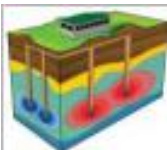


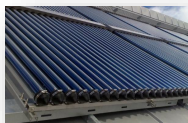
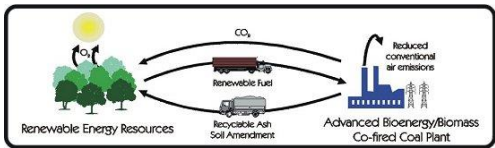
Plantroom Biomass Installation

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

Summary of Systems

The following table provides an overview of the systems and their suitability for this project:

Proposed Technology	Image	Comments
Solar Photovoltaic Selected		The flat roof area of the building could be used to accommodate such a system. Therefore, being able to offer a good contribution of renewable energy the installation of photovoltaics has been considered for the development. This will help to offset emissions from grid electricity.
Air Source Heat Pumps for hot water only SELECTED FOR CONSIDERATION TO APARTEMENTS ONLY		For the apartments only individual heat pump cylinders within each apartment have been selected for further consideration as a Highly efficient method for hot water production. A heat pump hot water cylinder is similar to an electric hot water cylinder, it heats up and stores the hot water for use in the apartment. A heat pump cylinder has an electric immersion as per a direct electric hot water cylinder but also incorporates a built-in heat pump. It consists of a ducted supply air & exhaust air from the top of the unit to an external louvre similar to a MVHR inlet & exhaust. The heat pump collects energy from the air and converts this into heat, which is then transferred to the water within the cylinder.
Ground Source & Water Source Heat Pump DISCOUNTED		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, the likely yield, peak load demand and cost feasibility, we have discounted Ground Source Heat Pumps at this development in favour of better performing suitable technologies.

Solar Thermal DISCOUNTED		There is a conflict between the use of local independent water heaters within each apartment and a central solar thermal collector array. Interconnecting solar thermal panels with remote apartment cylinders is not conducive or efficient due to extended distribution losses. Furthermore, the view is taken that the roof space would better be utilised to offset electricity emissions through the use of a photovoltaic system.
Biomass Boilers DISCOUNTED		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 DISCOUNTED		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.
Combined Heat and Power DISCOUNTED		The integration of Combined Heat and Power technology has been discounted due to the city centre location and clean air act implications with the flue discharge alongside the movement to utilise decarbonised grid electricity over traditional fossil fuel heating systems.

5.2 Energy Generation and Distribution Systems

As a consultant, Futureserv has an over-arching philosophy delivering design of a truly sustainable nature, employing widely recognised methods.

- Be Lean – **Fabric First Approach** - 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 electric heating throughout the apartments, utilising the ever-increasing clean electricity provided from the UK grid and the electricity produced from the PV array to serve the landlord areas.

All plant and equipment would be equipped with energy control measures incorporating variable speed drives, with low energy motors provided on ventilation fans and hydraulic pumps.

The development will utilise sanitary appliances with low water flow devices.

5.3 – Carbon & Energy Performance Calculations

To demonstrate the environmental benefits associated with the energy hierarchy, approved SAP software has been used to generate the proposed carbon reductions for the development.

The carbon emissions on this proposed development apartments have been calculated to be compliant with the 15% reduction below Part L 2010 which is therefore in line with the local Manchester Core Strategy energy policy EN6.

In addition to the carbon calculations completed under the Part L (2010) Building Regulations, an assessment has been undertaken to check compliance with the current 2021 Building Regulations.

Under the current 2021 Building Regulations, it is a requirement for new dwellings to deliver a 31% reduction in carbon emissions (compared to Approved Document L 2013) through technologies and fabric upgrades.

Using SAP10, the initial results indicate the development performs well and is compliant with the new Building Regulations by achieving in excess of a 40% reduction in target carbon emissions over 2021 regulations.

These reductions will improve over time as the UK electricity grid continues to decarbonise in the future.

Energy Performance Calculations

To enable demonstration that the environmental benefits associated with the considered energy hierarchy approach to energy demand and emission reductions at One Park Place, approved SAP software, Elmhurst Design SAP 2010 has been used to generate energy demand calculations for the apartments within the development.

Block compliance (multi dwelling) has been targeted to the apartment accommodation in accordance with Part L1a guidance.

The following presents 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 CO2/m²/annum) and Target Fabric Energy Efficiency and Dwelling Fabric Energy Efficiency (Kwh/m²/annum)

Table 5.3 SAP Calculations Summary

		R1 Planning (SAP 2010)	R2 Planning (SAP 2010)
Average TER		12.06	11.95
Average DER		6.07	2.87
% improvement over Part L		49.67	75.98
Average TFEE		18.71	18.71
Average DFEE		18.48	18.48
% improvement over Part L		1.23	1.23
Average TPER		66.95	66.36
Average DPER		64.97	30.40
% improvement over Part L		2.96	54.19
Total Apartment Floor Area (m²)		9,020.09	9,020.09
Total Delivered Energy (kWh/year)		383,700.66	178,411.37
Total Apartment Energy Requirement (kWh/m²/year)		42.54	19.78
		Initial Run.	As Run 1 with changes to water heating changed from standard cylinders to heat pump cylinders
Building Specification (Red Text Indicates Change to previous run)			
Air Tightness		3	3
U Values	External Walls	0.15	0.15
	Roof	0.1	0.1
	Floor	0.1	0.1
	Windows	1.2 (Frame Factor 0.8)	1.2 (Frame Factor 0.8)
	Roof Lights	-	-
	Doors	-	-
	Block C G Values	NE= 0.63 /SE= 0.4 / SW = 0.40 / NW = 0.40	NE= 0.63 /SE= 0.4 / SW = 0.40 / NW = 0.40
	Heated Corridors	Y	Y
	Thermal Bridging	Accredited Construction Details	Accredited Construction Details

Ventilation	Whole House Vent?	Yes, MVHR (Windows Fully Open)	Yes, MVHR (Windows Fully Open)
	Vent details	All apartments - Sentinel Kinetic Advance	All apartments - Sentinel Kinetic Advance
	SFP/ HR Eff	Kitchen + 1 Wet Rooms = SFP: 0.39, MVHR EFF: 93.00 Kitchen + 2 Wet Rooms = SFP: 0.46, MVHR EFF: 92.00 Kitchen + 3 Wet Rooms = SFP: 0.55 MVHR EFF: 91.00	Kitchen + 1 Wet Rooms = SFP: 0.39, MVHR EFF: 93.00 Kitchen + 2 Wet Rooms = SFP: 0.46, MVHR EFF: 92.00 Kitchen + 3 Wet Rooms = SFP: 0.55 MVHR EFF: 91.00
	Intallation	Approved Installation - YES	Approved Installation - YES
Chimneys	Duct Unsulation	MVHR Duct Insulated - YES	MVHR Duct Insulated - YES
	Open Fire in lounge?	N	N
Open Flues	No. Of?	N	N
Lighting	No. of Internal (No. of lights and LEL)	LEL - 8W - 92 Efficacy	LEL - 8W - 92 Efficacy
	External? light & motion Sensors?	Y (all LEL)	Y (all LEL)
Elec Tariff	Economy 7/ standard/ other?	Standard	Standard
Heating System 1	Emitter Type	Electric Panel Heaters	Electric Panel Heaters
	Boiler Type	n/a	n/a
	Boiler eff	100%	100%
	Flue Gas Heat Recovery	n/a	n/a
	Control	Programmer and Appliance thermostat	Programmer and Appliance thermostat
	Flue? Balanced? Fan Assisted	n/a	n/a
	Percentage of Heat	n/a	n/a
	Boiler Type	Electric hot water cylinder - Oso Hot water SX	KERS Weatherby W160 Model Heat Pump Hot Water Cylinder- 1 bed Apts
	Boiler efficiency	100%	KERS Weatherby W230 Model Heat Pump Chot Water Cylinder- 2 bed Apts
	Storage	1 Bed 150L , 2 bed 180L 150L = 1.27 kWh per 24hrs 180L = 1.42 kWh per 24hrs	Flow temperature value 60 1 bed 155L, 2 bed 230L
	Storage Losses	Stat and time control	1 bed = 1.213 kWh per 24 hrs 2 bed = 1.456
	Storage Insulation (type & thickness)		Stat and time control
	Control (cyl stat? time control?)		
	Less than 125l/p/day	Y	Y
DHW	Pipes Insulated	Y	Y
Renewable Technology Detail	PV?	N	N
	Wind?	N	N
	ASHP?	N	N
	Solar Thermal?	N	N
RISK OF OVERHEATING	Does the development pass the SAP 'risk of overheating ' analysis?	Y	Y

Section 6 – Conclusions

This energy statement has summarised the energy hierarchy requirements for One Park Place, Manchester to respond to emission reduction aspirations set out within the Manchester Core Strategy Plan, in particular policies EN4 and EN6, to implement the use of low carbon and/or renewable technologies.

The proposed development will incorporate a fabric first approach using 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 highly 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 approach adopted is to implement energy saving options which reduce the requirement for regulated energy, such as a more efficient building envelope, and utilising those high efficiency low carbon technologies which are feasible and appropriate for this type of building.

Net-zero energy is an ambitious goal for any building, however like the related goal of creating a carbon-neutral building, any net-zero carbon building must first achieve significant load reductions and system efficiencies. This is the “lean”, “clean”, “green” approach as mentioned earlier in the document. The measures adopted by this development do follow this principle. The regulated energy sources are targeted for reduction by means of both passive and active measures in terms of highly improved u-values, reduced air tightness, and energy efficiency MEP systems.

Overall, the Carbon emissions from the proposed development show potential for a total reduction in emissions from baseline set by current Building Regulations Part L1a 2021, in excess of 40% on the residential areas which is in excess of the 15% improvement over Part L1a 2010 required by the planning policy documents.

The strategy improves on the fundamental principles of the Building Regulations and will make a significant contribution to reducing the annual CO₂ emissions of the proposed development.