

Manchester International Office Centre, Styal Road

Energy & Environmental Standards Statement

Prepared in the name of Infinity MIOC LLP

September 2020

Document Control Sheet

Project Title	Manchester International Office Centre
Document Title	Energy & Environmental Standards Statement
Revision	2
Status	Information
Control Date	25 September 2020

Record of Issue

Issue	Status	Author	Date	Check	Date	Authorised	Date
1	Information	P Guyers	22.09.20	N Seasman	22.09.20	C Ashley	24.09.20
2	Information	P Guyers	29.09.20	N Seasman	29.09.20	C Ashley	29.09.20

Distribution

Organisation	Contact	Copies
Pozzoni	Steven Kirk	1e

Contents

1.	Executive Summary	**4**
2.	Introduction	**7**
3.	Policy Framework	**8**
4.	Energy Statement	**11**
5.	Electric Vehicle Charging Points	**16**
	Appendix A	**17**

1. EXECUTIVE SUMMARY

This Energy & Environmental Statement sets out the approach to minimising energy demands and supplying clean, low carbon power to the proposed development of the Manchester International Development Office, located at Styal Road, Manchester. The assessment has been developed by NECO Services Design prepared in the name of Infinity MIOC LLP in support of an application for Planning permission which will be submitted to Manchester City Council.

The development provides approximately 2,220m² of office space, across 3 storeys and is designed to accommodate single or multiple tenants. This report summarises the proposed energy strategy for the development and demonstrates how the building will achieve compliance with national, regional and local planning policy relating to energy and carbon Performance. The statement has been written in compliance with and in response to National Planning Policy, and Manchester City Council's Core Strategy. A technical feasibility study has been completed covering a number of renewable energy technologies. The study has concluded that heat pumps and photovoltaic panels are suitable for use in the development. In addition, 3No. electric vehicle charging points are to be included as part of the development.

1.1 Regulation and planning policy context

The following policies and regulations have been reviewed to establish the developments planning energy and sustainability targets.

- National Planning Policy Framework
- Building Regulation Part L
- Manchester City Council's Core Strategy

1.2 Proposed Energy Strategy

The energy strategy for the building has been developed using the following energy hierarchy:

Be Lean: Design the building fabric and services (heating, ventilation and lighting) to be energy efficient

Be Clean: Where feasible, use heating systems which are low carbon. This includes consideration of combined heat and power (CHP) and heat pumps

Be Green: Where feasible, integrate renewable energy. This includes consideration of technologies which compliment the heating and cooling strategy and includes photovoltaic panels (PV), biomass heating, solar hot water panels and wind turbines.

The following summarises the proposed measures that will be included in the development:

Energy Efficient Design (Be Lean):

- Specification of high efficiency LED lighting
- Presence detection lighting controls throughout the building
- Daylight switching in perimeter areas of open plan office
- Low energy, variable speed fans
- Heat recovery integrated into supply and extract ventilation systems

Low Carbon Heating Systems (Be Clean):

1. **Connection to existing heating or cooling network** – While this is a valid consideration, no existing networks have been found within 500 metres of the development that can be connected to.
2. **Site wide CHP network** – Another valid consideration for the scheme, but deemed unfeasible due to the low domestic hot water demand anticipated for the development.
3. **Enabling future connection to district heating** – During the detailed design, consideration will be given to providing capped flow and return pipework which could be connected to a future heat network.

Renewable Energy (Be Green):

- A technical feasibility study has been completed covering a number of renewable energy technologies. The study has concluded that heat pumps and photovoltaic panels are suitable for use in the development

1.3 Energy Strategy Performance – Summary

The design team has made a commitment that the 15% betterment over and above Part L2A minimum requirements will be achieved.

2. INTRODUCTION

This Energy & Environmental Standards Statement has been developed in support of the planning application for a proposed new office development on Styal Road, Manchester.

The development provides approximately 2,220m² of office space, across 3 storeys and is designed to accommodate single or multiple tenants.

The site is located on Styal Road within an area defined by larger and medium scale commercial buildings, as well as a number of residential estates within the wider context. To the West of Styal Road and to the South of the Manchester Airport link road lies a number of airport and private pre-pay parking lots. The site is well served by public transport links, with close proximity to bus stops along Styal Road, Heald Green train station approximately 1km away and a nearby tram stop on Shadowmoss Rd. Manchester airport is also within 1km of the site allowing for international and domestic connectivity.

This report summarises the proposed energy strategy for the development and demonstrates how the building will achieve compliance with national, regional and local planning policy relating to energy and carbon performance. The statement has been written in compliance with and in response to National Planning Policy and Manchester City Council's Core Strategy.



CGI of Proposed Development

NECO SERVICES DESIGN

3. POLICY FRAMEWORK

This section summarises the national and local planning policy and regulations applicable to the development at the Manchester International Office Centre.

3.1 National Policy

National Planning Policy Framework

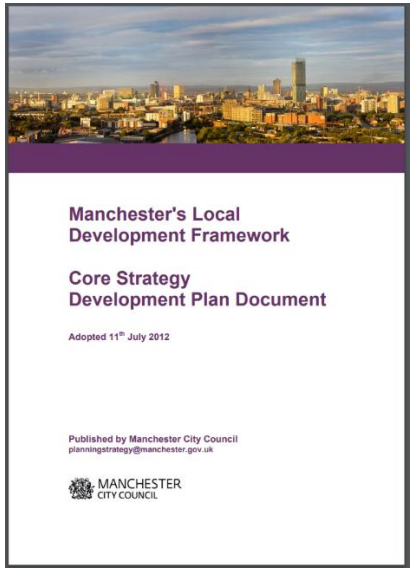
The revised National Planning Policy sets out government's planning policies for England and how these are expected to be applied.

3.2 Local Policy

The development falls within the area covered by Manchester City Council, therefore Manchester City Council's Core Strategy (adopted 11th July 2012) has been considered as the basis for this energy and sustainability statement.

3.2.1 MCC Core Strategy

The Core Strategy Plan describes Manchester today and outlines the Council's vision for Manchester in 2027 along with the planning policies which will be used to deliver that vision.



MCC Core Strategy

Key requirements in terms of energy are established in the proposed policies below:

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 developments 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;

EN 6: Target Framework for CO2 reductions from low or zero carbon energy supplies

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:

- Target 1 Network development areas: Locations where the proximity of new and existing buildings, the mix of uses and density of development provide the right conditions to support district heating (and cooling).
- Target 2 Electricity intense areas: Locations where the predominant building type has an all-electric fit-out such as retail units and leisure complexes.
- Target 3 Micro-generation areas: Locations where lower densities and a fragmented mix of uses tend to mean that only building scale solutions are practical.

Non-domestic CO_2 emissions reduction targets

Table 12.2

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 (Applies to commercial uses with a high proportion of emissions from electricity use (>45 kg CO2/m2))	+10%increase on Part L 2010
Target 3: Micro generation area	+15% increase on Part L 2010

Table 12.1 from MCC Core Strategy

3.3 Summary of Energy Targets

The table below summarises the key energy requirements applicable to the development.

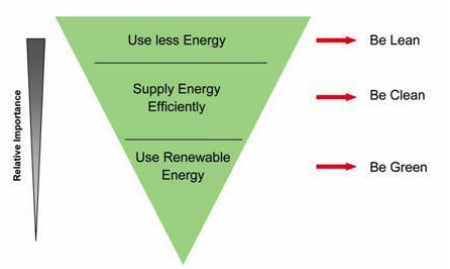
Environmental issue	Requirement
Energy Efficiency	Follow the energy hierarchy to reduce the need for energy through design features that provided passive heating, natural light and cooling through implementing energy efficiency measures. The building is in a micro regeneration area and therefore Target 3 applies. Manchester's Core Strategy target is to achieve a 15% increase on Part L 2010 Building regulations.
Decentralised energy networks and CHP	Where feasible and viable, the development will be required to connect to a decentralised energy network or include CHP
Renewable Energy	Consider the feasibility to install on-site renewable source of energy. No specific target has been established.

4. ENERGY STATEMENT

4.1 Approach to the Energy Strategy

This section summarises the considerations made and technologies proposed to reduce the energy consumption of the building and to minimise carbon emissions associated with the development's operational energy.

The strategy has been developed following a 'Be Lean', 'Be Clean', 'Be Green' energy hierarchy which ensures that sustainability is integrated within the building design rather than achieved via 'add on' features and systems. In addition to this, consideration has also been made of the influence of the behaviour patterns and operation of the building on it 'in use' performance and measures have been proposed to minimise the 'performance gap' between predicted and actual energy consumption.



Energy Hierarchy

4.2 Demand Reduction (Be Lean)

4.2.1 Passive Design

Passive design measures will be incorporated as part of the design development.

4.2.2 Building Envelope

Improving the thermal performance of the building envelope reduces the heat losses and gains through the façade resulting in a lower energy demand for heating and cooling.

Improved U Values and air permeability from those specified in Part L2A will be targeted. Below is a summary of the proposed specifications for each building element:

Building Element	Part L2A (new buildings) maximum values	Proposed U Values
External walls (W/m²K)	0.35	0.26
Floor (W/m²K)	0.25	0.22
Roof (W/m²K)	0.25	0.18
Windows and glazed doors (W/m²K)	2.2 (whole window inc. frame)	1.6 (Whole window inc. frame)
Windows and glazed doors (g-value)	-	0.4
Air Tightness (m³/m².hr @50Pa	10	5

4.2.3 Air Tightness

The building has been designed to be air tight to limit heat loss in winter and heat gain in summer. An air tightness target of $5m^3/m^2.hr$ @ 50Pa has been set which will be achieved by designing out air leakage paths through the building envelope.

4.2.4 Ventilation

Controlled minimum fresh air ventilation will be provided to all occupied spaces using new centralised air handling units located at roof level. All ventilation systems will comprise low pressure ductwork, variable speed drives, heat recovery with a minimum efficiency of 65% and low specific fan powers.

The heater battery shall be piped to an external Air Source Heat pump ensuring that no gas boilers are required to provide heating flow and return to the heater battery.

4.2.5 Lighting

Energy efficient internal LED lighting will be specified for all retail areas, which will significantly exceed the minimum luminaire efficacy of 60 luminaire lumens per circuit watt required by Building Regulations. Occupancy sensing will be provided in all areas of the building and daylight switching in perimeter zones.

All external lighting (except safety and security lighting) will be automatically switched off between 11pm and 7am. The average luminaire efficacy of the external lighting will be no less that 60 luminaire lumens per circuit watt.

4.2.6 Heating, Cooling & Domestic Hot Water

Variable Refrigerant Flow (VRF) heat pumps are proposed to supply heating to the development.

VRF systems consist of outdoor condensing units piped to multiple indoor units. A VRF system allows for simultaneous heating and cooling in different zones/rooms to ensure that a constant acceptable indoor climate is maintained.

The strategy assumes the use of high efficiency VRF systems.

The whole life emissions of the systems should be significantly lower than an equivalent gas fired boiler system as a result of the expected reduction in the carbon intensity of grid supplied electricity over the lifetime of the system.

By designing the system based around electric heat pumps, local emissions from the site will be significantly reduced.

Hot water for wash hand basins and kitchenette sinks will be supplied from local under sink electric water heaters. These will do away with the need for hot water storage and secondary circulation pipework from centralised heating plant, reducing standing losses which can be significant in large buildings such as this.

4.3 Energy Efficient Supply (Be Clean)

According to Policy EN 4 of the Manchester Core Strategy Development Plan, where appropriate, new development 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 exiting/potential decentralised energy schemes.

4.3.1 Connection to existing district heating networks

No existing networks have been found within 500m of the development that would be feasible to be connected on to, therefore this cannot be achieved.

4.3.2 Enable future connection to district heating networks

During the detailed design, consideration will be given to providing capped flow and return pipework which could be connected to a future heat network

4.3.3 On Site CHP

Combined heat and power (CHP) is the term used to describe the process of generating electricity whilst producing heat as a by-product. Electricity is generated using an engine and heat is recovered from the exhaust gases and cooling system.

The process of burning fuel still releases carbon but the by product of heat as a result of the primary function offsets the emissions and the production of electricity on site is far more efficient than an average power station increasing from typically 40% to 80% efficiency.

The use of CHP is most appropriate to buildings which have a constant year round base load demand for heat and can operate at a minimum of 4000 to 5000 hours each year. Units are available to match any output, but systems can be employed in parallel with traditional heating boilers thus satisfying the requirement to supply a certain percentage of renewable resources.

The demand for heat during the summer in an office building such as this will diminish leaving a limited hot water requirement which is insufficient to satisfy the economies expected to efficiently run a CHP system.

Therefore it can be concluded that the installation of an on site CHP system is not a technically or financially viable design solution for this development.

4.4 Renewable Energy (Be Green)

4.4.1 Feasibility of renewable technologies

A feasibility study has been undertaken to evaluate the viability of incorporating a number of different renewable technologies into the development.

The suitability of each has been evaluated on technical viability, allowing for constraints of the proposed building envelope, development suitability, energy demand profile and potential for carbon emission savings.

Appendix A provides details of each technology and the appropriateness to the development. The following were evaluated:

- Photovoltaic Panels
- Solar Hot Water
- Heat Pumps
- Wind Turbines
- Biomass Heating & Biomass CHP

Technology	Technical Feasibility	Recommended?
Photovoltaic panels (PV)	PV panels could be installed on the project owing to the available roof space and their ability to produce electricity annually to reduce carbon emissions	**Yes**
Solar Hot Water	Whilst there is sufficient roof space to install solar panels, the low requirement for hot water in the building would equate to prohibitive payback period making it economically unviable	No
Heat Pumps	Air source heat pumps could be used to provide heat to the air handling unit heater battery. A VRF system could be used to heat and cool the office spaces. Both of these systems provide significant carbon reductions and eliminate the need for a gas fired boiler system	**Yes**
Wind turbines	Due to the site's proximity to Manchester Airport, and flight path, wind turbines would be unable to be installed	No
Biomass heating	Biomass boilers and their associated NOx emissions	No

	would impact local air quality. As biomass relies on regular deliveries of fuel, specifying a boiler would increase local traffic and negatively impact air quality	

4.5 Development Performance

The carbon emissions performance of the building is to be tested using government compliant energy modelling software which is accredited for assessing non-domestic buildings against Building Regulation Part L2A.

The design team has made a commitment that the 15% betterment over and above Part L2A minimum requirements will be achieved.

5. ELECTRIC VEHICLE CHARGING POINTS

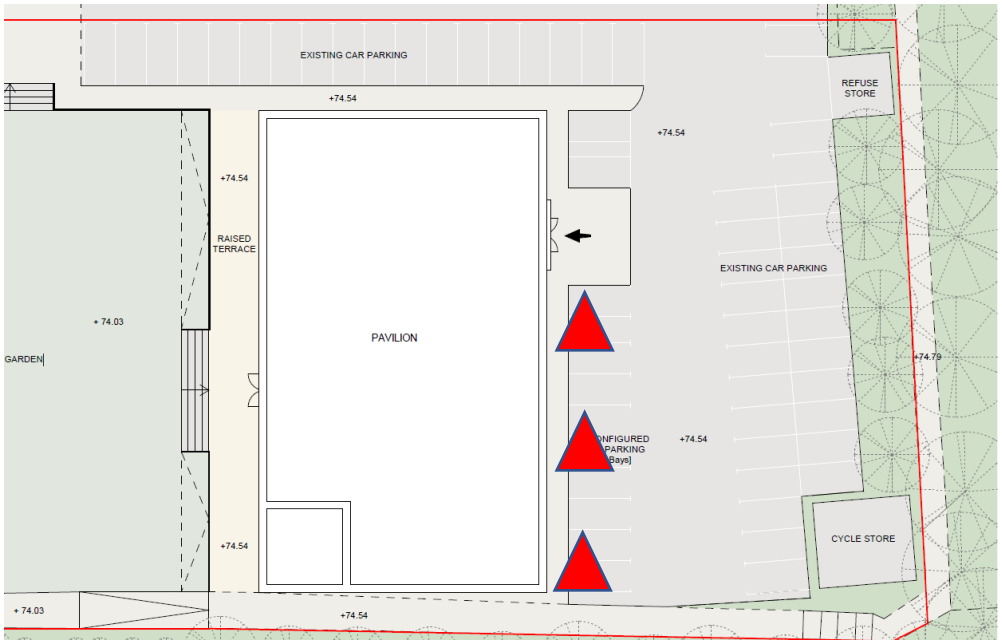
In order to help Manchester City Council, deliver a sustainable, high quality, integrated transport system to encourage modal shift away from car travel to public transport, cycling and walking the development must consider method to achieve this. Therefore in order to support the needs of residents and businesses and to prepare for carbon free modes of transport, **the development will include at least 3No. electric vehicle car charging points**.

This will help support policy T1 of the Manchester City Council Core Strategy which, in part, states '… that council will support proposals that… **Facilitate modes of transport that reduce carbon emissions e.g by incorporating charging points for electric vehicles, subject to their appropriate design and location.'**

The proposed specification of this car charging point is a Rolec BasicCharge:EV 2 x 22kW (32amp) Type 2 Sockets (Product Code: EVCL2018)



Rolec BasicCharge:EV



Indicative location of Electric Vehicle Charging Points (Red Triangle)

NECO SERVICES DESIGN

APPENDIX A: RENWABLE TECHNOLOGIES

Photovoltaics

Solar energy emitted by the sun can be harnessed using solar cells to convert sunlight into electricity. Each cell has one or two layers of semi-conducting material which respond to light to create an electric field across its layers causing electricity to flow.

There are three basic types of solar cells and these are:

- *Monocrystalline:* These have a typical efficiency of 15% and are the most expensive.
- *Polycrystalline:* These have a typical efficiency of 13%.
- *Thin Film:* These are generally applied to other materials such as glass or metals and have a typical efficiency of 7%.



A collection or an array of these cells are linked together, and their total output is normally installed in parallel to the grid. Current glazing technologies are seeking to combine PVs within standard glazing elements which in time will become more economically viable.

To maximise output PVs are best located at an angle of 30- 40° south facing. Shaded areas will seriously reduce output and should be avoided. Systems are completely silent in operation and have minimal local impact but may require planning approval from a visual perspective.

Applicability to development

PV panels could be installed on the project owing to the available roof space and their ability to produce electricity annually to reduce carbon emissions. Therefore, the installation of PV panels is feasible for this project.

Solar Hot Water

Solar energy emitted by the sun can be harnessed using specifically designed systems which use solar collectors to absorb the sun's energy and provide heat for hot water.

The heat energy absorbed by the collectors is transferred through interconnecting pipework linking an internal storage vessel which enables the demand to match availability.

The circulation of heat can either be by passive means i.e. relying on the natural convection to circulate the water through the system or by active means which uses a circulation pump often powered by a small built in photovoltaic collector to run the pump.

There are several types of hydronic solar collectors but the two most common are:

- *Flat plate collectors*: These are simple but effective devices containing a dark plate within an insulated box with a glass or plastic cover.
- *Evacuated tube collectors*: These are more sophisticated devices offering higher efficiencies under a wider range of conditions but are more expensive.

To maximise output solar collectors are best located at an angle of 45° and facing south.

Systems are supplemented by secondary energy supplies from traditional means, but solar collectors can provide up to 50% of the annual hot water demand. Typically, the performance of collectors range from 800 kWh in the North to 1200 kWh in the South for a panel of approximately 3m². Systems are completely silent in operation and have minimal local impact but may require planning approval from a visual perspective.



Applicability to development

Whilst there is sufficient roof space to install solar panels, the low requirement for hot water in the building would equate to prohibitive payback period making it economically unviable. Therefore, the installation of Solar Hot Water is not feasible for this project.

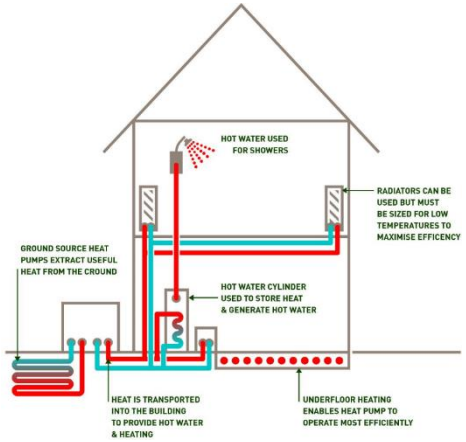
Heat Pumps

A heat pump is a device that is able to transfer heat from one fluid which is at a lower temperature to another fluid at a higher temperature.

Heat pumps are categorised as follows depending on their source of heat:

Ground Source Heat Pumps

The principle operation of a heat pump is the use of refrigerant gases and an electrical compressor to take heat from a source and deliver it to an output. For many years this process has been used by refrigerators to remove heat from a product and to remove heat from a building. This process can be used in reverse to add heat to a building by converting the energy available into useful energy as heat.



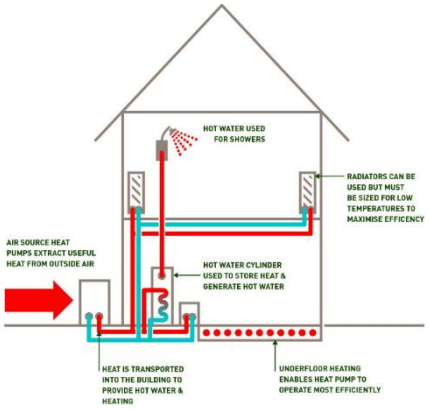
The ground acts as a vast solar collector and thermal store which has a relatively all year round stable temperature and a good source of energy for this process to tap in to.

A fluid is circulated via a series of pipework buried in the ground which can either be vertically driven into the ground or if the area permits, horizontally laid out in loops. The length of the pipework is proportional to the extent of energy required to satisfy the design conditions. The fluid is circulated through a heat pump which extracts the energy and converts this into usable heat with temperatures in the region of 40 to 50°C which can be used to heat buildings via underfloor heating or radiant panels.

In order that the process can be considered renewable it is important that the depletion of the heat energy is matched by the rate of heat flow back into the surrounding earth. The process can be used in the summer in reverse and buildings can be cooled by the same technology which assists in maintaining the energy balance.

Air Source Heat Pumps

Air to air source heat pumps have been around for a long time and are used extensively to cool buildings during the summer and heat buildings during the winter.



Air to water source heat pumps are less prominent but use the same technology and instead of heating air within a building they are used to heat water which in turn can be circulated within a traditional low temperature heating system such as underfloor heating.

Water Source Heat Pumps

The principles of water source heat pumps are the same as ground source, but larger systems can use groundwater directly from suitable aquifers which can result in very efficient solutions. Water source heat pumps require careful design and tend to be more suited to larger scale schemes and can come under scrutiny of local authorities in terms of the impact on the aquifer.



Applicability to development

Air source heat pumps could be used to provide heat to the air handling unit heater battery. A VRF system could be used to heat and cool the office spaces. Both of these systems provide significant carbon reductions and eliminate the need for a gas fired boiler system. Therefore, the installation of Heat Pumps is feasible for this project.

Wind Turbines

Wind power can be harnessed by use of turbines which captures the wind energy which generates electricity. The electricity produced can be directly fed back in to the grid or can be stored via battery cells.



In order to operate satisfactorily a minimum wind speed of 3.5 to 5m/s is required and ideally a consistent wind speed of 5 to 6m/s is typically required to generate worthwhile quantities of electricity.

The power output from a wind turbine depends upon wind speed and the swept area of the rotor. The higher the rotors the more opportunity there is to maximise the wind speed and increase the output.

Wind turbines are more suited to rural locations as the size and impact within an urban setting tends to limit outputs to an extent where they are unfeasible. Visually they are likely to require planning consent and noise generated by the rotor blades can be considered a nuisance.

Rotating turbines can also affect electromagnetic radiation and radiological surveys may be required in sensitive areas such as close to airfields.

Applicability to development

Due to the site's proximity to Manchester Airport, and flight path, wind turbines would be unable to be installed. Therefore, the installation of Wind Turbines is not feasible for this project.

Biomass Heating

Heat energy is generated by the burning of organic matter such as trees, crops or animal waste which is harvested and processed to create bio-energy. Liquid fuels can also be generated from plant matter and this is referred to as biofuel.

Whilst biomass produces carbon emissions when used as a fuel, the carbon released during combustion is equivalent to the amount that was absorbed during growth and the technology is therefore considered to be carbon neutral. However, the availability of the fuel is important to consider as there are secondary carbon emissions generated by transport and treatment.

The main types of biomass are:

- *Wood Biomass:* These are wood based which include forest products, short rotation coppice such as willow, hazel, poplar, miscanthus and other wood wastes such as pallets and construction timber waste. Most products require drying out as the moisture content of woody biomass affects the energy content.
- *Biofuel:* Liquid fuel can be created from cellulose and vegetable oil crops such as palm oil and rapeseed which can be processed and used as vehicle fuel and to power engines and generating plant.
- *Animal Residues:* Cattle, chicken and pig waste can be converted into bio-energy by conversion to gas or other fuel types.



The use of biomass as a fuel can be used to generate heat within a specifically designed boiler which can replace traditional boilers or can be used as a lead boiler to deal with the base load in a system thus satisfying the requirement to supply a certain percentage of renewable resources and the comfort of a backup system when employing both technologies.

Ideally the use of biomass boilers is best utilised when a healthy supply of fuel is available locally. Provision should be made to store a sufficient supply of fuel and the overall design of such systems tend to be space hungry in comparison with traditional boilers. Provision must be considered for operational maintenance and the disposal of ash.

Applicability to development

Biomass boilers and their associated NOx emissions
would impact local air quality. As biomass relies on regular deliveries of fuel, specifying a boiler would increase local traffic and negatively impact air quality. Therefore, the installation of Biomass Heating is not feasible for this project.

.