



Apex Tower Manchester

Residential Development Planning Report Energy Strategy Statement

2nd Floor, Queens Chambers

5 John Dalton Street

Manchester

M2 6ET

Web: www.kingassociates.uk

Submitted and Prepared by: Jack Dixon

Project number: 3356-KIN-ES-RP-001

Issue: P1

Date: 02.12.2021



Document History

Issue	Date	Purpose	Author
P1	02/12/2021	Preliminary	Jack Dixon

Approvals

This document requires the following approvals.
Signed approval forms are filed in the Management section of the project files.

Name	Signature	Title	Date of Issue	Version
Craig Woods	C. Woods	Director	02/12/2021	P1

Distribution

Name	Organisation	Role
Nikki Sills	Zerum	Divisional Director



Contents Page

1.0	Introduction.....	1
2.0	Study Area.....	2
3.0	Legislative Policy and Good Practice	3
4.0	Energy Hierarchy.....	7
4.1	Passive Design- Thermal Elements.....	7
4.2	Passive Design- Glazing, Daylighting and Solar Gain	8
4.3	Future Homes Standard.....	8
5.0	Energy Strategy	9
5.1	Predicted Future Baseline (2021 and 2023).....	10
6.0	Appendix I – SAP Assessment Summary	12
7.0	Appendix II – SBEM Assessment Summary.....	13



1.0 Introduction

The following statement outlines the energy and climate change strategy for the proposed Residential development at Apex Tower, the site is bounded by Great Bridgewater St, Albion St, and Trumpet St.

The development is a residential scheme consisting of two blocks, Block A contains 72 apartments and with amenity spaces and Block B contains 4 apartments with amenity and commercial office accommodation.

This outline statement has been prepared to demonstrate that the Apex Tower residential development meets the requirements of Part L1A of the English Building Regulations 2013 and the Manchester City Council Climate Change Action Plan, which sets a commitment to reduce CO₂ emissions by at least 50% by 2025, via a 13% year on year reduction from buildings.

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



2.0 Study Area

Sample plots of differing orientations and sizes were assessed using the Standard Assessment Procedure (SAP) to show the predicted compliance of this development, based on a calculated area weighted average. Both commercial units in Block B were also assessed using the Simplified Building Energy Model (SBEM) to show as designed compliance.

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



3.0 Legislative Policy and Good Practice

The current legislative framework sets out the requirement to comply with Part L1A of the English Building Regulations 2013 and the Manchester City Council Climate Change Action Plan, which sets a commitment to reduce CO₂ emissions by at least 50% by 2025, via a 13% year on year reduction from buildings.

Manchester Core Strategy

Manchester's Core Strategy (CS) was adopted on 11th July 2012 and is the key Development Plan Document in the Local Development Framework (LDF).

CS Policy DM 1

Development Management requires all development to have regard to a number of development principles. Subject to scheme viability, developers will be required to demonstrate that new non-domestic development to achieve a BREEAM Rating of 'Very Good' or for domestic development to achieve the Code for Sustainable Homes (CfSH) standard. It should be noted that the CfSH is no longer accepted as an assessment methodology for domestic properties and has been withdrawn.

CS Policy EN 4

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

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

CS Policy EN 6

Target Framework for CO₂ Reductions from Low or Zero Carbon Energy Supplies requires applications for residential development of 10 or more units and all other development over 1,000m² to meet, as a minimum, the targets shown in the tables below, unless unviable.

Target	% Minimum Requirements
Target One: Network development area	CHP/District heating anchor or connection or where not feasible a 15% increase on Part L 2010



Target Two: Electricity intense buildings	+15% increase on Part L 2010
Target Three: Micro generation area	+15% increase on Part L 2010

The emission reductions targeted within policy EN6 relate to Building Regulation Part L 2010. As a consequence of the reduction in emission rates required by current building regulations (Part L 2013) relative to Part L 2010, the revised equivalent target CO2 emission reductions for the residential and non-domestic elements of this scheme are presented below:

- Residential - 9% dwelling emission rate reduction over Part L 2013; and,
- Non-domestic - 6% building emission rate reduction over Part L 2013.

Climate Emergency

A Climate Emergency was declared by Manchester City Council on the 10th July 2019 in response to the findings of the Intergovernmental Panel on Climate Change (IPCC) report. The City Council believe that there is serious risk to Manchester's people of climate change affecting economic, social and environmental well-being, supply chains – including food security, financial systems and local weather, among many others. Therefore, the target for becoming a zero-carbon city has been accelerated by 12 years, setting 2038 as the new target for the city. The council has agreed the following:

- To deliver the 2038 target and determine if an earlier target can be possible.
- Encourage involvement in all wards by April 2020 through meetings as part of the Our Manchester strategy.
- Review all policies, processes and procedures to ensure the council can become carbon neutral. Present an action plan by March 2020 detailing how the city can stay within its carbon budget.
- Make climate breakdown and the environment, an integral part of activity throughout the council, including all decision making, ensuring key decisions take into account the impact on achieving the zero-carbon target.
- Investigate measures to ensure future procurement is carbon neutral. Increase the percentage of social value with an additional environmental element.
- Work with suppliers to green their supply chains and support local production.
- Investigate and introduce measures to help reach domestic zero carbon levels including addressing fuel poverty and retrofitting existing homes.
- Investigate ways to ensure that future local plans place a mandatory requirement for all new development to be net zero carbon by the earliest possible date.



Manchester Climate change Framework 2020 – 25

This document is Manchester's high-level strategy for meeting their commitment on climate change that builds on the Draft Manchester Zero Carbon Framework 2020-38, which was published in February 2019 and Manchester City Council's (MCC) declaration of a climate emergency in July 2019.

This was endorsed by MCC at the Executive meeting in March 2020 and will develop over the next five years, in line with changes in policy, climate science, rate of progress and other factors. The framework has set out four objectives to facilitate this:

Objective 1 – Staying within our carbon budgets: This requires taking action in the following relevant areas:

- Direct CO₂ emissions: staying within our 15 million tonne carbon budget for 2018-2100, including reducing the CO₂ emitted from our homes, workplaces and ground transport by at least 50% during 2020-25.
- Indirect CO₂ emissions: understanding and taking action on the things that we consume and which generate greenhouse gases through their production, transportation and disposal.

Objective 2 – Climate adaptation and resilience: will require the adaption of the city's buildings, infrastructure and natural environment to the changing climate and increasing the climate resilience of our residents and organisations. This includes:

- Increase the amount of urban green infrastructure cover, aiming for a 10% increase by 2038 from 2018 levels, in line with the Greater Manchester aim.
- Respond to these risks by incorporating adaptation and resilience within our plans and strategies, and acting to make necessary changes to our buildings, infrastructure and our natural environment.

Objective 3 – Health and wellbeing: aims to improve the health and wellbeing of everyone in Manchester through actions that also contribute to our objectives for CO₂ reduction and adaption and resilience:

- Adapt the city's built and natural environment and prepare our residents to become more resilient to these changes. Increasing the amount and quality of green space to enable residents to benefit from the improved physical and mental health that will come as a result.
- Improving the energy efficiency of the city's homes and providing access to affordable, secure supplies of renewable energy are essential help get 38,000 Manchester households out of fuel poverty.

Objective 4 – Inclusive, zero carbon and climate resilient: economy looks to ensure that Manchester establishes an inclusive, zero carbon and climate resilient economy where everyone can benefit from playing an active role in decarbonising and adapting the city to the changing climate.



Priority Areas

Six priority areas have been established in order to help meet the above objectives and include:

1. Buildings (existing and new)
2. Renewable energy
3. Transport and flying
4. Food
5. The things we buy and throw away
6. Green infrastructure and nature-based solutions

Urgent Actions Identified to Help Meet the Commitments:

- New Buildings – To ensure that new developments in the city do not eat into the limited carbon budgets and add to the already significant retrofit challenge.
 - Developments need to be built and operated to zero carbon standards as soon as possible.
 - The ideal way to do this is through UK Government establishing a national zero carbon definition and methodology for its implementation, and for Manchester City Council to implement this standard as quickly as possible through the local planning system.
 - This should include applying zero carbon standards to all developments where the Council has additional influence, with a view to all new development needing to be zero carbon from 2023 at the latest.
- Renewable Energy – The National Grid has been decarbonising in recent years; we need this to continue but at an accelerated rate, with a view to being fully decarbonised as soon as possible.
 - At least 50% of all homes should have the equivalent of 16m² of solar PV panels by 2024.
- Gas – The following actions are needed to help reduce the reliance on natural gas:
 - Improve the energy efficiency of our buildings as far as possible to reduce our demand for gas.
 - Replace our natural gas-based heating systems with renewable energy-based heating technologies as soon as possible
 - Work with Government to ensure that moving to electricity-based heating systems is affordable and does not push even more people into fuel poverty.

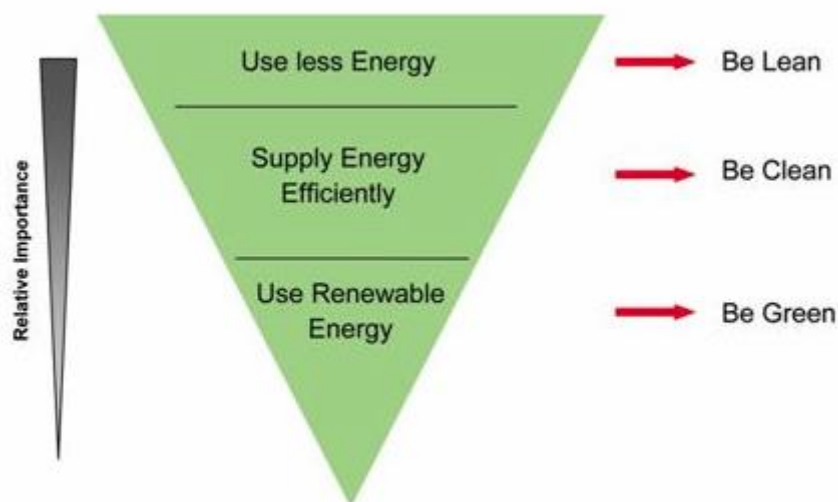


4.0 Energy Hierarchy

The development of the design will adopt a hierarchy approach to the design by looking at passive design methods to reduce energy and provide a high level of energy efficiency.

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

This design process will be followed throughout the design development.



4.1 Passive Design- Thermal Elements

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

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



4.2 Passive Design- Glazing, Daylighting and Solar Gain

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

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

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

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

4.3 Future Homes Standard

It is intended that the Future Homes Standard will come into effect in 2025 with the objective of future proofing all new homes/dwellings, in England, with low carbon-heating systems and high levels of energy efficiency, albeit the final details of the standard are yet to be confirmed. With the second part of the two-part consultation process closing on 13th April 2021.



5.0 Energy Strategy

Below is the summary of the parameters which were inputted during the energy assessments.

The process of evaluating the most appropriate and effective energy strategy has considered a number of options, including but not limited to:

- Photovoltaic (PV) panels
- Solar Hot Water (SHW)
- Air Source Heat Pumps
- Waste-water Heat Recovery Systems
- Heat Pump Hot Water Cylinders
- Heat recovery ventilation systems (MVHR)
- High levels of thermal insulation
- Low air permeability
- Maximising solar control to mitigate overheating risks

The third and final iteration of the energy assessment keeps with the 'fabric first' approach, however, takes an alternative approach with minimising reliance upon Low and Zero Carbon technologies and improving the efficiency and operation of the heating, ventilation and hot water systems.

Fabric Parameters		
Terrain	Thermal mass	'Low' 250 kJ/m ² K
		Dense urban
	Floors	0.16 W/m ² K
	Walls	0.24 W/m ² K (including spandrel panels)
	Roofs	0.16 W/m ² K
	Windows	1.50 W/m ² K (frame included)
		0.55 g value
		BRFC Certified Glazing
	Doors	n/a W/m ² K (corridors heated)
		Solid wooden door
	Thermal bridging	Calculated (Accredited Construction Details)
	Air permeability	5 m ³ /h.m ² @50Pa

System Parameters - Apartments	
Mechanical ventilation	Mechanical Heat Recovery Ventilation (MVHR)
SFP	K+1 - 0.58 / 88%
	K+2 - 0.55 / 90%
	K+3 - 0.6 / 91%
Heat exchanger efficiency	min. 80% / max. 91%
Ductwork	Insulated
Space heating	Electric Panel Heaters



Heat distribution system	
Controls	Integrated Programmer and thermostat
Emitter	Electric Panel Heaters
Water heating	Self-contained Heat Pump Hot Water Cylinders
Plate heat exchanger	No
WWHRS	No
Water use	< 125 litres/person/day
Renewables	9720 kWh/year PV
Lighting	Low energy LED throughout

System Parameters - Commercial	
Mechanical ventilation	Mechanical Ventilation with Heat Recovery
SFP	1.5
Heat exchanger efficiency	65%
Ductwork	Insulated
Space heating	ASHP/VRF
Controls	Time/Date Programmer & Thermostat
Water heating	Instantaneous point of use
Plate heat exchanger	No
WWHRS	No
Water use	< 125 litres/person/day
Renewables	N/A
Lighting	Low energy LED throughout

5.1 Predicted Future Baseline (2021 and 2023)

The UK government completed the Consultation phase of a revision to the SAP methodology, SAP 10, however, this has not been implemented or passed into legislation.

Part of the revision to the SAP methodology is to reduction in the CO₂ emissions of grid supplied electricity by approximately 45%. This is due to the current and projected electricity generation from wind (both onshore and offshore), solar and nuclear and the reduction in the reliance upon natural gas and coal fired generation plant.

In addition to this the aspiration of Manchester City Councils Climate Change Action Plan would favour the electric air source heat pumps as this offers a significant improvement over Part L, using SAP 2012 methodologies and will take advantage of the reducing electricity grid CO₂ emissions intensity and will remove the combustion of fossil fuels in the city centre, thus reducing the localised carbon emissions resulting in improved air quality.



Revised Carbon Factors

The forthcoming changes and updates to Building Regulations, Approved Document Part L proposes to use SAP 10 as the mechanism to demonstrate compliance.

The carbon factors used in the current methodology, SAP 2012, for grid electricity generation are no longer representative of the current electricity grid decarbonisation. The proposed carbon factors are noted below for both grid electricity and natural gas.

Fuel	Assessment Methodology	Fuel Carbon Factor (kg.CO ₂ /kWh)
Natural Gas	SAP 2012 (current)	0.216
	SAP 10 (proposed)	0.210
Grid Electricity	SAP 2012 (current)	0.519
	SAP 10 (proposed)	0.233

The revised fuel carbon factors for grid electricity applied in the forthcoming SAP 10 are 45% lower than those currently applied in SAP 2012 for building regulations compliance

This reduction in SAP 10 grid electricity fuel carbon factors will result in a reduced block average Carbon Emissions rate of 9.409 kg.CO₂/m² from 20.91 kg.CO₂/m². Which offers a significant progression towards meeting MCC's Climate Change Action Plan and carbon reduction in the city centre.



6.0 Appendix I – SAP Assessment Summary

Project: Apex Tower (example dwellings)

		R1		R2	
		Block A	Block B	As R1 with changes to Heating	
				Block A	Block B
Average TER		26.45	27.45	26.45	27.45
Average DER		20.46	20.94	24.07	24.98
% improvement over Part L		22.65	23.72	9	9
Average TFE		48.74	58.01	48.74	58.01
Average DFEE		47.85	54.96	47.85	54.96
% improvement over Part L		1.83	5.26	1.83	5.26
Building					
Air Tightness		5	5	5	5
U Values	Wall	0.24	0.24	0.24	0.24
	Roof	0.16	0.16	0.16	0.16
	Floor (exposed)	0.16	0.16	0.16	0.16
	Window (u-value)	1.5	1.5	1.5	1.5
	Window (g-value)	0.55	0.55	0.55	0.55
	Windows BFRC certified?	N	N	N	N
Thermal Mass		Low	Low	Low	Low
Thermal bridging	Accredited construction details implemented?	Y	Y	Y	Y
Ventilation	Whole House Vent?	Y	Y	Y	Y
	Vent details	NIBE F730	NIBE F730	NIBE F730	NIBE F730
	SFP / HR Eff	K+2 - 0.64	K+2 - 0.64	K+2 - 0.64	K+2 - 0.64
	Approved installation?	Y	Y	Y	Y
	Duct Insulation?				
Cooling	Fixed cooling present?	N	N	N	N
Lighting	Number of fittings	TBC	TBC	TBC	TBC
	100% low energy?	Y	Y	Y	Y
Elec Tariff	Economy 7 / standard / other?	Standard	Standard	Standard	Standard
Heating System 1	System type	ASHP	ASHP	Electric panel heaters	Electric panel heaters
	Make/Model	NIBE F730	NIBE F730		
	Efficiency				
	Emitter type	Underfloor	Underfloor		
	Controls	Time & temp control zones	Time & temp control zones	Programmer & appliance stat	Programmer & appliance stat
	Flue type				
	Percentage of Heat	100%	100%	100%	100%
Secondary Heating	Type				
	Efficiency				
	HETAS approved?				
DHW	Type	From main heating	From main heating	NIBE F730	NIBE F730
	Storage	180L	180L	180L	180L
	Standing heat loss (kWh/24hrs)	2.02	2.02	2.02	2.02
	Pipes Insulated				
	Control (cyl stat? time control?)				
Part G	Less than 125l/p/day?	Y	Y	Y	Y
Renewable Technology Detail	PV (kWh/yr)			7220	2499
	WWHR				
	FGHR				
	Wind				
	Solar Thermal				
RISK OF OVERHEATING	Does the development pass the SAP 'risk of overheating' analysis?	Y	Y	Y	Y



7.0 Appendix II – SBEM Assessment Summary

Project: Apex Tower, Block B - SBEM

		R1	
		First Floor Office	Second Floor Office
TER		23	20.4
BER		20.4	19.1
Building			
Air Tightness		5	5
U Values	Wall	0.24	0.24
	Floor (exposed)	0.16	0.16
	Window (u-value)	1.5	1.5
	Window (g-value)	0.55	0.55
	Window (L-solar)	0.8	0.8
	Heated corridors/stairs?	Y	Y
Ventilation	System Type	MVHR	MVHR
	Vent details	TBC	TBC
	SFP/ HR Eff	1.5 / 0.65 (default)	1.5 / 0.65 (default)
Local Extract	Specific fan power (W/l/s)	0.3	0.3
Lighting	Type	LED	LED
	Lumens/W	100	100
	Occupancy sensors?	Y	Y
Space Heating	System type	ASHP / VRF (air-air)	ASHP / VRF (air-air)
	COP	4.5	4.5
	SEER	7	7
	EER	4	4
	Percentage of Heat	100%	100%
DHW	Boiler Type	Instantaneous point of use	Instantaneous point of use
	Storage		
	Standing heat loss (kWh/24hrs)		
	Pipes Insulated		
	Control (cyl stat? time control?)		
Renewable Technology Detail			