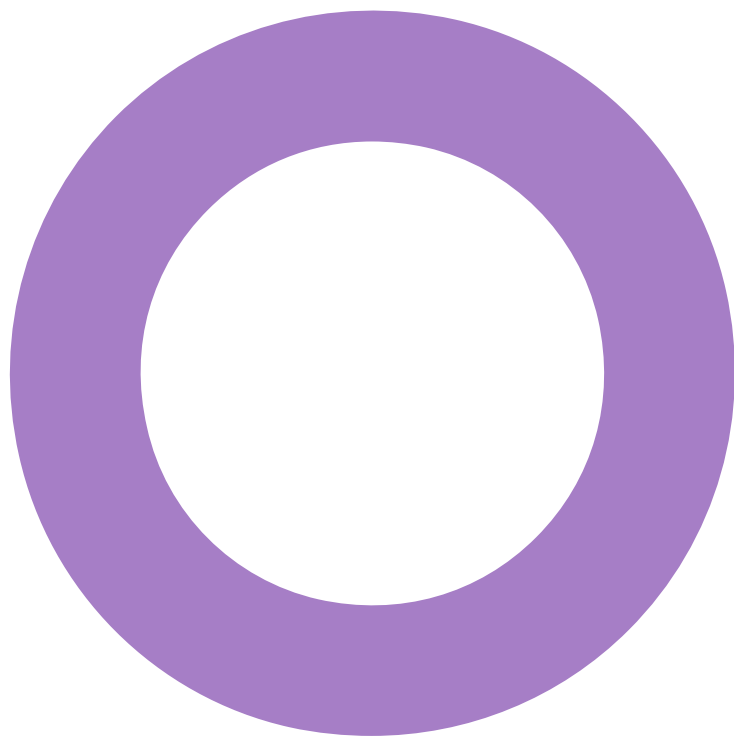


Arundel Street. Manchester. Logik Developments.

SUSTAINABILITY
ENERGY STRATEGY

REVISION 02 – 01.04.2022



Audit sheet.

Rev.	Date	Description of change / purpose of issue	Prepared	Reviewed	Authorised
01	16.03.2022	Draft issue for comment	LR	J. Nuttall	J. Ford
02	01.04.2022	Updated in response to Comments	LR	RCM	J. Ford

This document has been prepared for Logik Developments only and solely for the purposes expressly defined herein. We owe no duty of care to any third parties in respect of its content. Therefore, unless expressly agreed by us in signed writing, we hereby exclude all liability to third parties, including liability for negligence, save only for liabilities that cannot be so excluded by operation of applicable law. The consequences of climate change and the effects of future changes in climatic conditions cannot be accurately predicted. This report has been based solely on the specific design assumptions and criteria stated herein.

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Executive summary

This energy strategy has been prepared on behalf of Logik Developments in support of the development proposals for the Arundel Street, Manchester project, hereafter referred to as the Proposed Development.

This strategy summarises the relevant regulatory and planning policies applicable to the Proposed Development and sets out how the Proposed Development will address and achieve the relevant policy targets. The strategy responds to the UK planning and regulatory framework, and specifically to the Manchester Core Strategy policy documentation.

In 2019 consent was obtained for the scheme and Logik Developments is now seeking alterations via a non-material amendment.

1.1 Planning Policy

The Manchester Core Strategy Policy EN6 states that applications for residential development of 10 or more units and all other development over 1,000m² will be expected as a minimum to meet the following targets *(unless this can be shown not to be viable)*:

Target	% Minimum Requirement
Target 1; Network Development Area	CHP / District heating anchor or connection or where not feasible a 15% increase on Part L 2010
Target 2; Electricity Intense Buildings	+ 15% increase on Part L 2010
Target 3; Micro Generation Area	+ 15% increase on Part L 2010

Table 1 Domestic CO2 Emission Reduction Targets, Manchester Core Strategy

Each of the above targets require a 15% increase (increase is understood to be a reduction over the target) on Part L 2010 emission rates. Between the Part L 2010 Building Regulations and the Part L 2013 Building Regulations the target emission rates were improved by the following levels;

- Domestic buildings 6% improvement from 2010 to 2013
- Non-Domestic building 9% improvement from 2010 to 2013

1.2 Approach

This report evaluates the Proposed Development against the energy hierarchy; be lean, be clean and be green. The building fabric performance was informed by the Part L1A 2013 target Fabric Energy Efficiency (TFEE) criteria. In the latest edition of the Building Regulations, dwellings must demonstrate that the fabric efficiency is equal to or better than the ‘notional’ building. The Energy Strategy has been developed using a ‘fabric first’ approach.

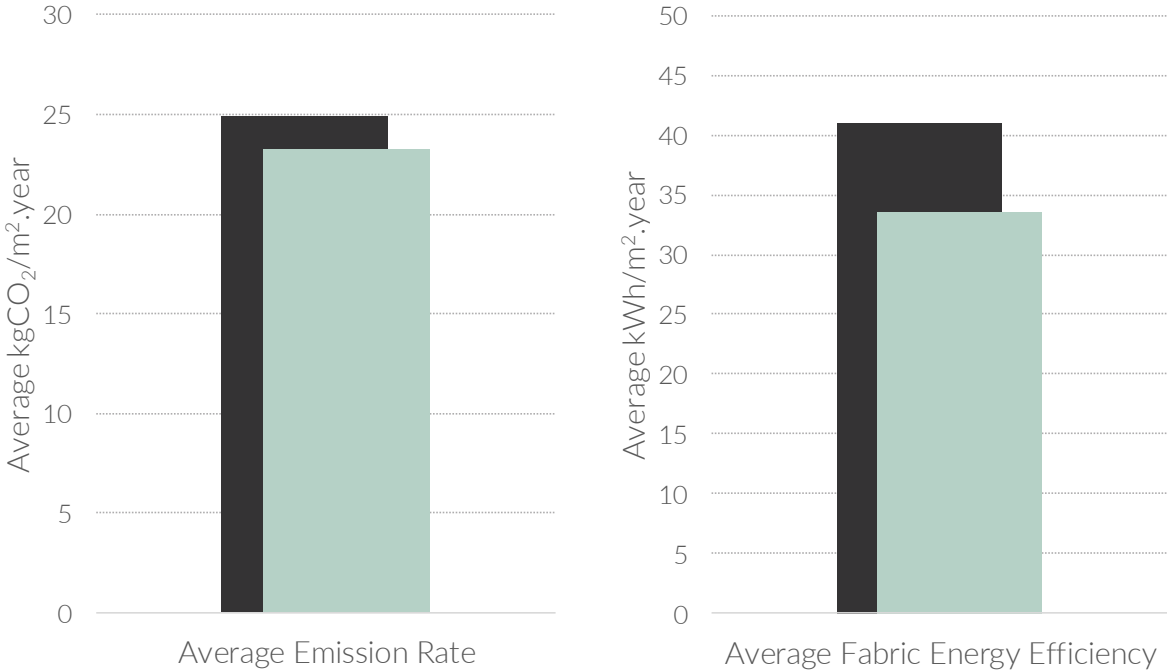


Figure 1 Regulated Annual Carbon Emissions and Fabric Energy Efficiency

1.3 Proposed Development

The Proposed Development consists of a mixture of residential and retail development and the DOT Building consists of a mix of speculative office space and a gym.

As Figure 1 shows, the Proposed Development demonstrates that the annual regulated carbon dioxide emissions for the whole site (including retail and DOT building) are approximately 6.3% less than the Part L 2013 Target Emission Rate (TER) and the Fabric Energy Efficiency (FEE) for the residential areas is approximately 21.7% better than the Target Fabric Energy Efficiency (TFEE).

1.4 Results

Combining the residential areas with the retail areas and the DOT building results in a site-wide reduction in annual regulated carbon emissions of approximately 6.3% over the Part L 2013 benchmark. This correlates to an approximate 15.3% improvement over the Part L 2010 benchmark (shown in Figure 3).

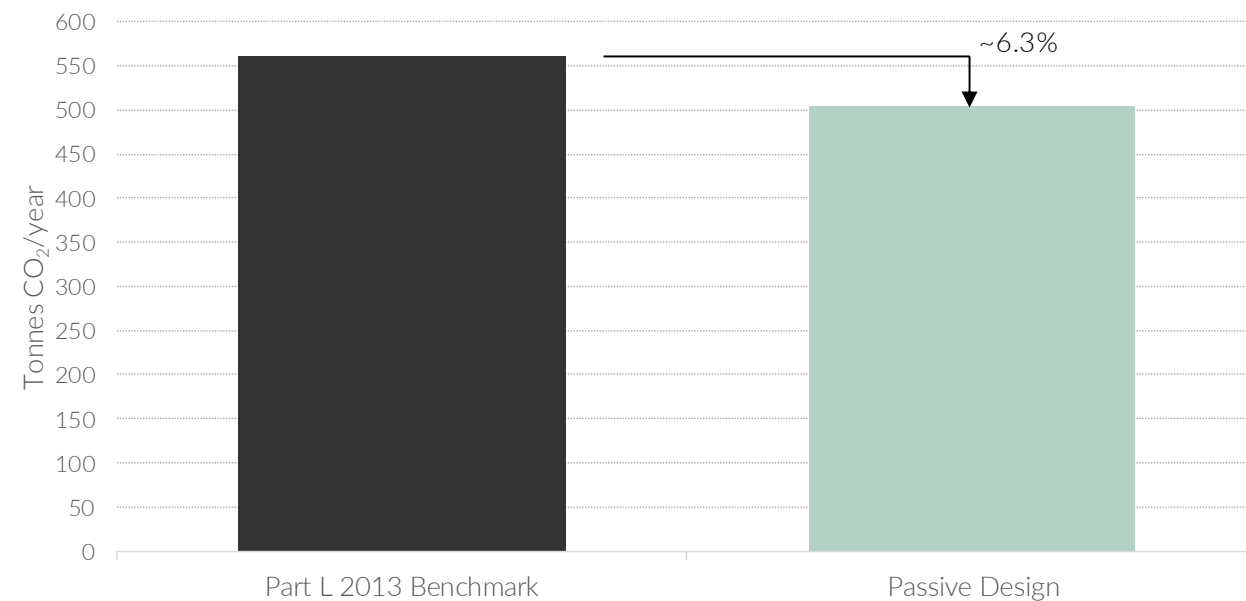


Figure 2 Regulated Annual Carbon Emissions Reduction over Part L 2013 Benchmark

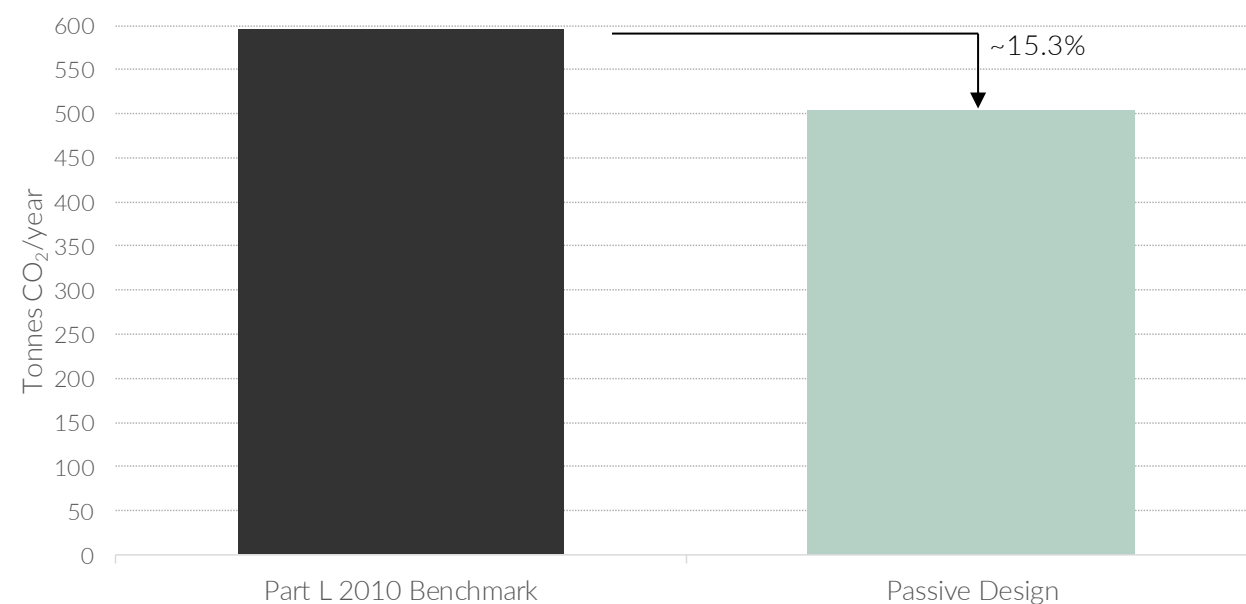


Figure 3 Regulated Annual Carbon Emissions Reduction over Part L 2010 Benchmark

There is potential scope for available roof space to mount a PV array and will be investigated further at the next stage. The inclusion of PV would further better the percentage betterment against the Part L benchmark. A primarily electric strategy does not lend itself to using technology such as Combined Heat and Power (CHP) which is generally the 'go-to' solution for developments which are predominantly residential.

Considering grid decarbonisation, the use of technologies which burn gas to generate thermal and electrical energy will become redundant within the next 5 – 10 years.

1.5 Grid Decarbonisation

The carbon factor of the National Grid, the amount of carbon dioxide released per kilowatt hour of electricity produced and distributed, is recognised in current Building Regulations as being 0.519kgCO₂/kWh.

As the national mix of electricity generation methods progresses towards greener solutions, the Building Regulations Part L 2013 value of the National Grid carbon factor has been shown to be substantially higher than how the grid is performing in reality. This severely impacts the calculated emissions produced by all heat raising plant which use electricity directly or generate it to offset other emissions.

Future projections

The Future Energy Scenarios (FES) document, produced by the National Grid, discusses how the UK's energy landscape is changing. The FES 2021 makes projections of how the mix of generation in the grid is likely to change between now and 2050 – the year by which the Climate Change Act 2008 set the target of reducing the UK's CO₂ emissions by 80% from 1990 levels. This target has now been revised to be Net Zero in light of the Committee on Climate Change's recent report and the declaration of a Climate Emergency. The latest version, FES 2021, discusses these projections in four scenarios and Figure 4 combines these future trajectories with the actual carbon intensity of the National Grid over the past 13 years.

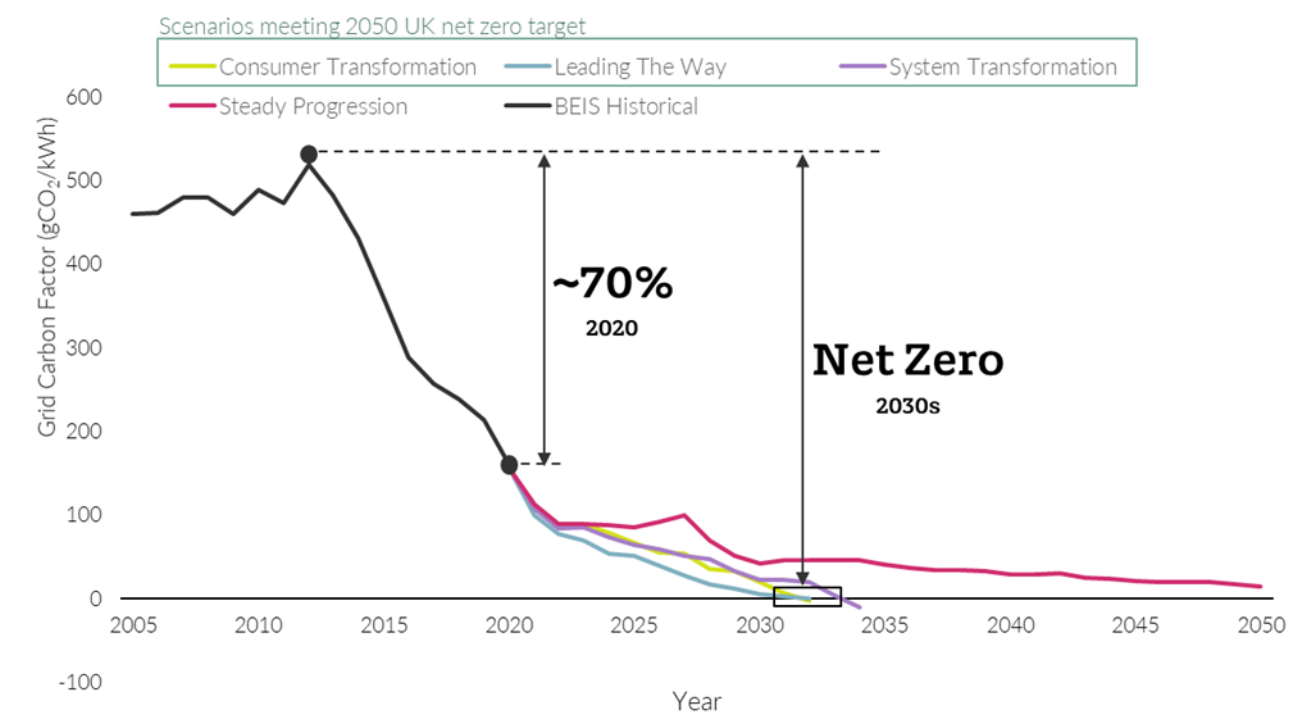


Figure 4 Historic and future projected carbon factor for the National Grid. Sources: BEIS Green Book (historic carbon factors); National Grid Future Energy Scenarios (FES) 2021 (future projected carbon factors).

The proposed changes to Building Regulations Part L suggest a revised carbon emission factor for electricity. If using the draft Standard Assessment Procedure (SAP) 10.1 national grid carbon factor of 0.136kgCO₂/kWh the annual carbon emissions would demonstrate a much greater improvement in annual regulated CO₂ emissions;

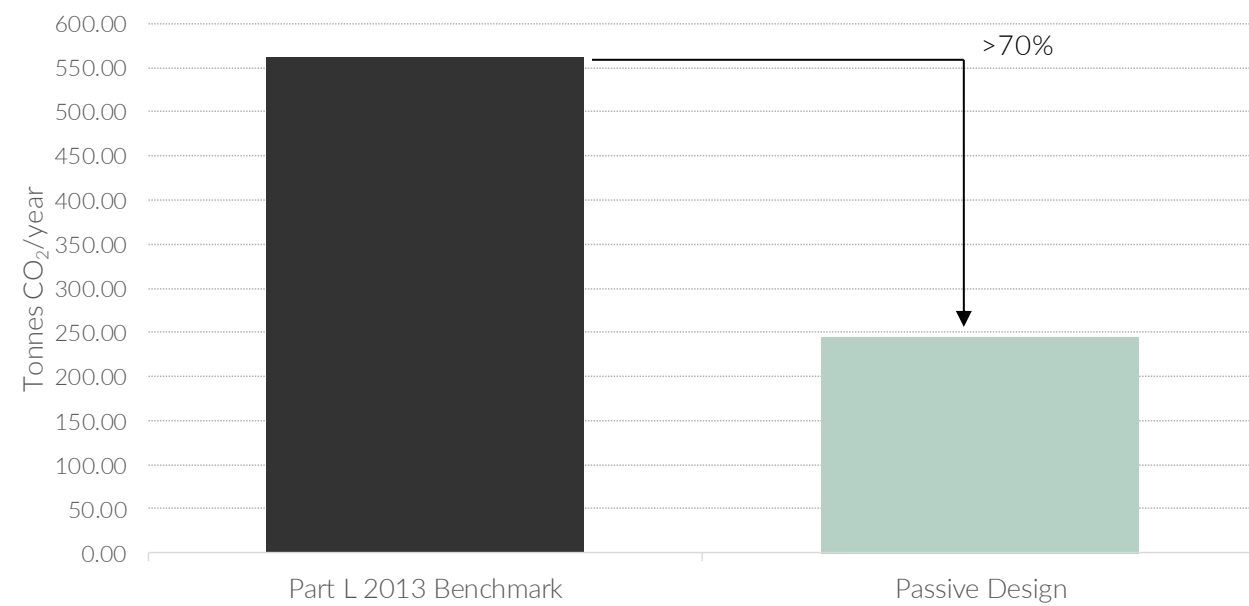


Figure 5 Theoretical Annual Carbon Emissions Reduction using Actual Grid Measured Carbon Factor

Using the proposed SAP 10.1 grid carbon emissions factor of 0.136kgCO₂/kWh would theoretically result in a >70% % improvement over the Part L 2013 benchmark which would surpass the Manchester Core Policy EN6 significantly.

1.6 Summary

Through the use of efficient building fabric and building services, utilising a primarily electric strategy, the Arundel Street development meet the requirements of current Building Regulations Part L 2013. There is potential scope to include a PV array on the roof and this will be investigated further in the next stage. . The inclusion of PV would further better the percentage betterment against the Part L benchmark.

Looking forward towards a 'greener' national grid the Arundel Street development will show, based on proposed and measured carbon factors, improvements in annual regulated carbon emissions over the Part L 2010 benchmark – providing a robust future proofed strategy.

1. Introduction

This strategy has been prepared on behalf Logik Developments in support of the proposed Arundel Street development located in Manchester. This strategy summarises the relevant regulatory and planning policies applicable to the proposed development and sets out how the proposed development will address and achieve the relevant policy targets.

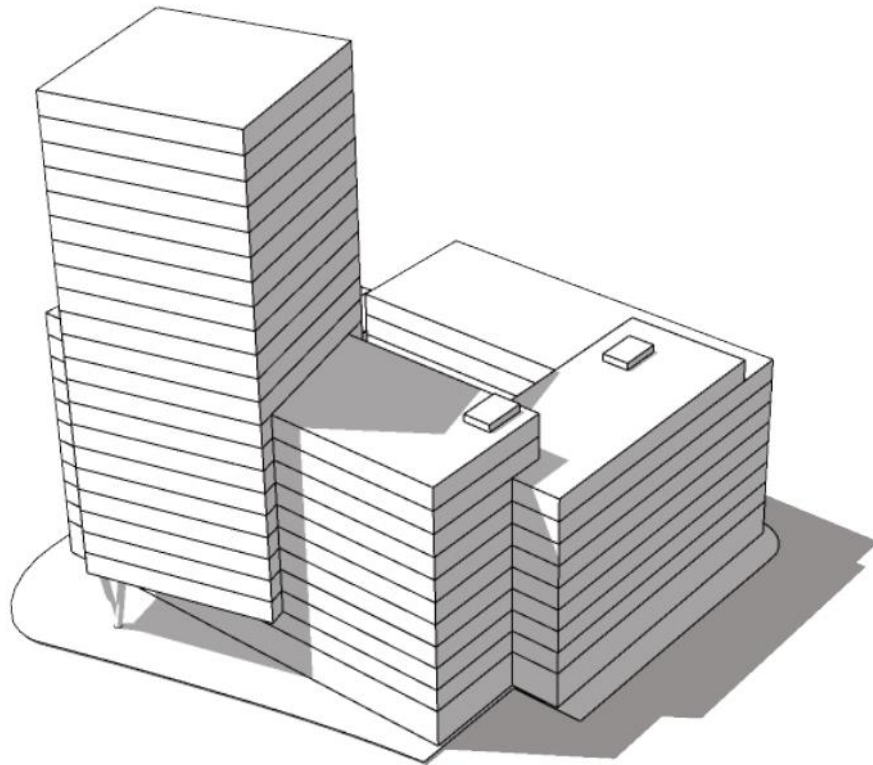


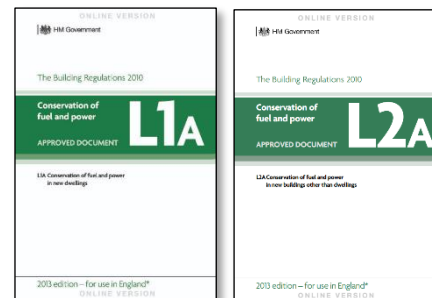
Figure 6 Proposed Development – 3D Architectural Render

The Proposed Development consists of a mixture of residential and retail development. The proposed development includes 355 apartments ~22400m² of residential development and ~195m² of retail development plus ~1000m² of commercial space in the DOT building.

2. Policy and Drivers

The following section outlines the national and local policies and drivers.

2.1.1 Building Regulations Part L (2013)



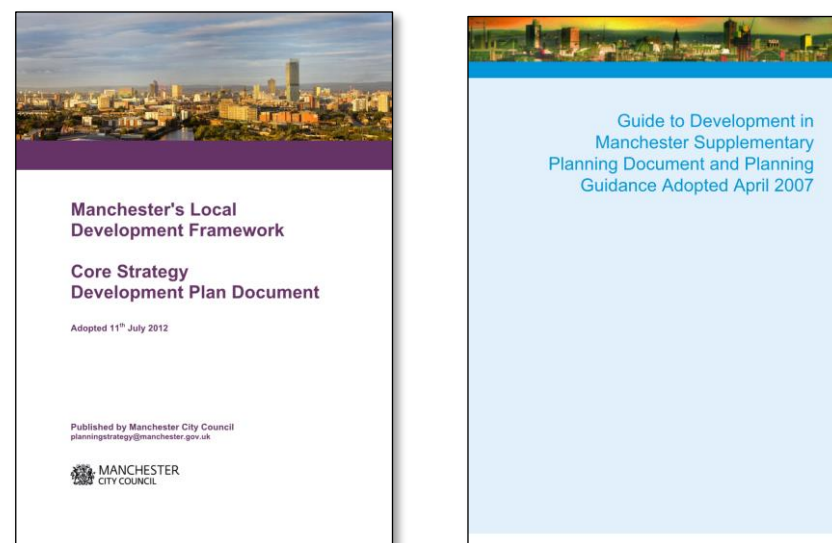
Part L of the Building Regulations is the mechanism by which government is driving reductions in the regulated CO₂ emissions from new buildings. The dwellings will be assessed against Building Regulations Part L1A 2013 and the commercial aspects will be assessed against Building Regulations Part L2A 2013.

All new buildings must meet the requirements of Part L1A or Part L2A of the 2013 Building Regulations.

2.1.2 Local Planning Policy

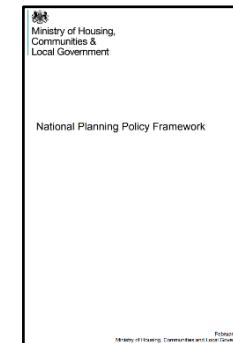
Manchester City Council (MCC) documentation:

- Core Strategy (CS) (July, 2012)
- Supplementary Planning Documentation and Planning Guidance (SPDPG) (April 2007)



This strategy summarises the response of the proposed development's design to the policy framework of the MCC Adopted Core Strategy, and SPDPG documentation that together form the city's policy landscape. The CS documentation supersedes the SPDPG and therefore the CS documentation will take precedence.

2.1.3 National Planning Policy Framework



The updated National Planning Policy Framework (NPPF) was published in July 2021 and has superseded all Planning Policy Statements (PPS) and Planning Policy Guidance (PPG) documents, with the exception of PPS10 (Waste). The NPPF sets out the Government's strategy on the delivery of sustainable development.

The NPPF places responsibility for policy making with the Local Planning Authority, who shall communicate their policies through Local Plans and facilitate the creation of Neighbourhood Plans. The NPPF states that there is a presumption in favour of sustainable development.

The following is extracted from paragraph 11 of the NPPF:

"Plans and decisions should apply a presumption in favour of sustainable development."

For plan-making this means that:

- plans should positively seek opportunities to meet the development needs of their area, and be sufficiently flexible to adapt to rapid change;*
- strategic policies should, as a minimum, provide for objectively assessed needs for housing and other uses, as well as any needs that cannot be met within neighbouring areas⁵, unless:

 - the application of policies in this Framework that protect areas or assets of particular importance provides a strong reason for restricting the overall scale, type or distribution of development in the plan area⁶; or*
 - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole.**

For decision-taking this means:

- approving development proposals that accord with an up-to-date development plan without delay; or*
- where there are no relevant development plan policies, or the policies which are most important for determining the application are out-of-date⁷, granting permission unless:

 - the application of policies in this Framework that protect areas or assets of particular importance provides a clear reason for refusing the development proposed⁶; or*
 - any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in this Framework taken as a whole."**

In respect of energy policy contained within the NPPF, paragraph 155 sets out that:

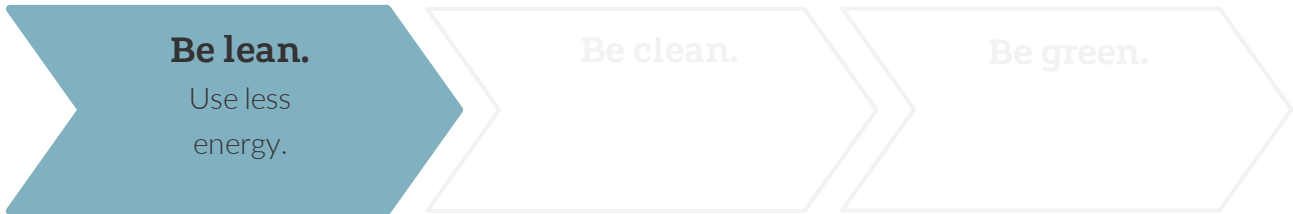
"To help increase the use and supply of renewable and low carbon energy and heat, plans should:

- provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);*
- consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and*
- identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers."*

3. Energy Strategy

3.1 Be Lean

Passive design and energy efficiency measures form the basis for the reduction in overall energy demand and carbon emissions for the proposed development. This energy strategy aims to reduce the energy demand initially by optimising the envelope and building services within the development.



An initial series of Part L compliance calculations have been undertaken to determine the potential reduction in annual regulated carbon emissions using passive measures such as those indicated in Table 2.

	Fabric performance Part L1A 2013 of the Building Regulations introduced a criteria referred to as the 'FEE'. The Fabric Energy Efficiency (FEE) is influenced by factors such as glazing proportion, solar energy, air leakage and thermal bridges. The FEE accounts for the dwelling's combined annual heating and cooling load. For reference the 'Notional' dwelling uses a glazing ratio of 25% (of the floor area). It should be noted that for FEE compliance, each dwelling does not need to comply on an individual basis, as the assessment can be aggregated over the whole building on an area weighted (average) basis. <table border="1"><caption>Figure 7 Proposed Development Fabric Energy Efficiency</caption><thead><tr><th>Category</th><th>Average kWh/m²/year</th></tr></thead><tbody><tr><td>Notional Dwelling</td><td>40</td></tr><tr><td>Proposed Development</td><td>33.5</td></tr></tbody></table> Figure 7 Proposed Development Fabric Energy Efficiency The proposed architectural design, in some of the dwellings, has large proportions of full height glazing hence the requirement for improved building fabric performance, Based upon on the current architectural proposals, the Proposed Development achieves an approximate 21.7% improvement over the Part L Target Fabric Energy Efficiency (TFEE). Refer to appendix for fabric performance technical data and the Part L 'notional building for reference'.	Category	Average kWh/m²/year	Notional Dwelling	40	Proposed Development	33.5
Category	Average kWh/m²/year						
Notional Dwelling	40						
Proposed Development	33.5						

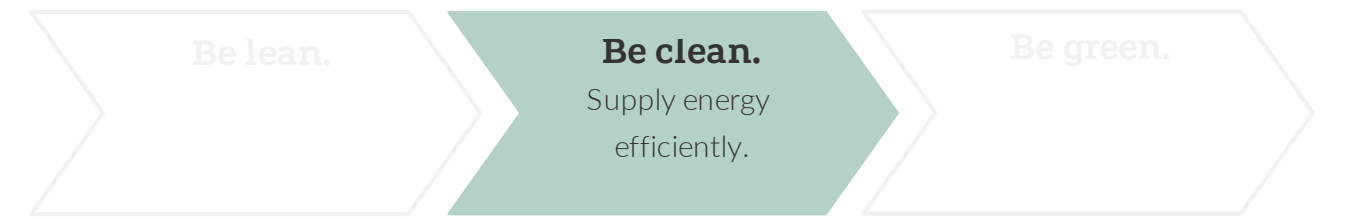
	Space heating The DOT Building will have heating provided by VRF. Apartment heating will be provided by electric panel radiators in each liveable space and electrical towel radiators in each bathroom and en-suite fed from the tenant's electrical distribution board. Each radiator will have thermostatic control for local temperature control. The main heating control of the apartment will be via a 7-day programmable time clock located in the apartment which will enable the tenant to schedule their own heating; the time clock will be of the smart controls type with web-enabled facilities to allow the tenant to control their heating system remotely. Lift lobbies and corridors will generally be unheated unless high levels of heat loss dictate a requirement for heating. Should heating be required, heating will be provided by electrical panel radiators. It is envisaged that any amenity spaces will be heated via electric radiators, electric window trench heaters and/or electric over door heaters or via VRF system. However, these areas will be further developed once the spaces are more defined in the next stage of the design and the brief is known.. Plant Space, Bicycle Parking and Refuse Stores will be provided with heating for frost protection only via electric heaters. Refer to appendix for the system's technical data.
	Space cooling Cooling will not be provided to any of the apartments. The DOT Building will have VRF cooling. Access will be required to fan coil units for cleaning of filter media and general maintenance. Refer to appendix for the system's technical data.
	Mechanical ventilation Each residential apartment shall have dedicated continuous mechanical supply and extract ventilation with heat recovery (MVHR). Extract will be taken from bathrooms, en-suites & kitchens with supply air being distributed to main habitable rooms (living rooms and bedrooms). Ducts will be routed to the façade locally for fresh air intake and for the discharge of exhaust air. The termination detail will be integrated into the façade and shall have limited pressure drop c/w insect mesh to prevent ingress of foreign matter to the apartment. Each MVHR unit shall have integral summer by-pass to limit summertime overheating. MVHR units will be selected in accordance with the energy efficiency requirements of the SAP assessments. The DOT building will also have decentralised MVHR. Apartments will have openable windows/acoustic vents on the external façade to control summertime over heating and purge ventilation. Refer to appendix for the system's technical data.
	Domestic hot water (DHW) system Domestic hot water provision within landlord areas will be provided by local electric water heaters. The DOT building will also have local electric DHW.

	Shower control valves will be of the thermostatic type. All baths to have thermostatic mixing valves to deliver hot water at no more than 48°C in accordance with the Building regulations. It is also recommended that for this tenure of building, each wash hand basin also has a thermostatic mixing valve to limit the hot water temperature. Refer to appendix for the DHW system’s technical data.
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Table 2 - Passive Design Measures

3.2 Be Clean

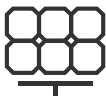
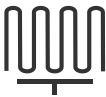
This stage of the energy hierarchy refers to the use of heat networks or on-site Combined Heat and Power (CHP) in order to provide energy and reducing consumption from the national grid and gas networks, through the generation of electricity, heating and cooling on-site.



Combined heat and power (CHP) Due the proposed changes to the carbon emission factors in future revisions of Part L – the use of Combined Heat and Power (CHP) is likely to offer a ‘negative benefit’ within the next five years and therefore has not been explored as part of the energy strategy. It is unknown if the proposed Manchester district heat network will extend to the Proposed Developments location. However – the use of an all-electric scheme would not benefit from connecting the heat network.

3.3 Be Green

The final step of the energy hierarchy explores the feasibility of Low and Zero Carbon (LZC) technologies to allow for the production of renewable energy onsite in order to offer a further reduction in carbon emissions.

	Be lean. Be clean. Be green. Assess 'low or zero carbon' (LZC) energy sources.
	Photovoltaics Photovoltaics (PV) capture energy from the sun and convert it into electricity. Solid PV's are commonly mounted in arrays either on roofs or walls. Each array must be configured to allow air to circulate behind to dissipate heat that is generated in the system. Thin film PVs can be integrated into glazing as laminates and do not require the same level of heat dissipation. The thin film application is less efficient than the solid PV but the number of applications that are suitable are greater as they can be integrated into glazing and used for solar shading. However orientation of glazing and overshadowing from surrounding obstructions need to be considered as it can further reduce the efficiency of the thin film PV's. Suitability to proposed development: There is potential for available roof space to mount a PV array and will be investigated further at the next design stage. The inclusion of PV would further better the percentage betterment against the Part L benchmark.
	Solar thermal A solar hot water system uses solar collectors to trap the thermal energy from the sun in order to heat water for use within the building. The most common application of solar collectors is to provide domestic hot water. The most efficient type of solar collector is the evacuated tube. This type of collector uses a heat pipe to collect solar energy and transfer it to water which is then pumped to a calorifier where it heats domestic hot water for use within the building. Suitability to proposed development: As the building is predominantly electric, there is no proposed hot water distribution system for solar thermal to feed in to. Therefore the proposed design would require significant changes to accommodate this technology and the costs would likely to significantly outweigh the benefits.

	Air source heat pump Air source heat pumps use the air temperature to reject to and extract heat from to provide energy within the building. The ability of the heat pump to transfer heat from the outside air to the building depends on the outdoor temperature. As this temperature drops the ability of the heat pump to absorb heat also drops. In the UK external ambient temperatures do not historically drop to levels that would make air-to-air heat pumps unviable. Suitability to proposed development: Air source heat pumps are being proposed for the commercial areas at ground level and the DOT building to provide both heating and cooling requirements.
	Water source heat pump Water source heat pumps use a local water source temperature to reject to and extract heat from to provide energy within the building. Suitability to proposed development: There is no suitable local water source in close proximity to make this a viable technology for the development.
	Wind turbine There are two basic types of wind turbine, horizontal and vertical axis. Horizontal axis wind turbines are the most common form and they benefit from higher efficiencies than vertical axis machines. However, the horizontal wind turbines must be facing the direction of the prevailing wind and this often requires sensitive tracking devices to orientate the blades into the required direction. In addition, the efficiency of the turbines reduces dramatically in turbulent air, such as is found above and around buildings and therefore may not be the optimum configuration for the project. Vertical axis turbines are less efficient than the horizontal axis type. However, the primary benefit of the vertical axis wind turbines is that they generate energy from any wind direction and in turbulent air flow. The ability to operate in turbulent conditions makes vertical machines ideal for locating on or around buildings. Suitability to proposed development: Locating a wind turbine in an urban environment would be difficult accommodate. This technology also comes with inherent air quality and environmental impacts i.e. light flicker.

Figure 8 Examples of Low and Zero Carbon Technology

5. Part L; Building Regulations Compliance Analysis

A number of sample dwellings were assessed to inform the energy strategy. As described earlier, a fabric first approach was taken to evaluate the Fabric Energy Efficiency (FEE).

Through the use of passive design measures and energy efficiency using a primarily electric space heating and hot water strategy, the Proposed Development shows a site-wide 6.3% reduction in annual regulated carbon emissions compared to the Part L 2013 benchmark.

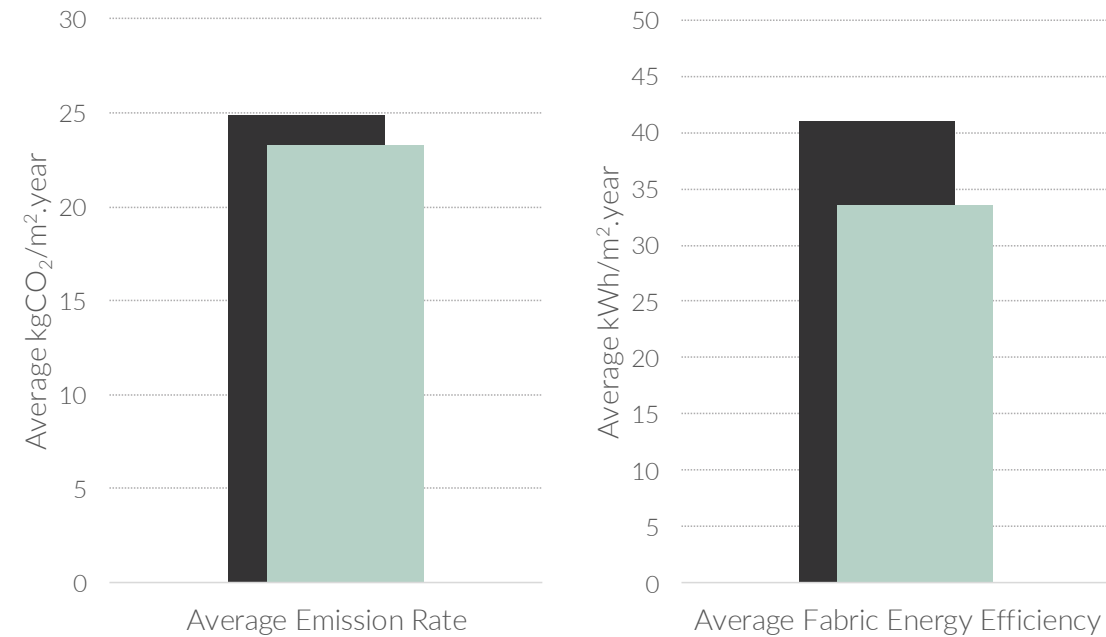


Figure 9 Regulated Carbon Emissions Reduction Using an All-Electric Strategy Part L Compliance

Combining the residential areas with the retail areas and DOT building results in a site-wide reduction in annual regulated carbon emissions of approximately 6.3% over the Part L 2013 benchmark. This correlates to an approximate 15.3% improvement over the Part L 2010 benchmark (shown in Figure 14).

5.1.1 Building Services Performance Targets

Table 3 Proposed Development Target Building Services Performance

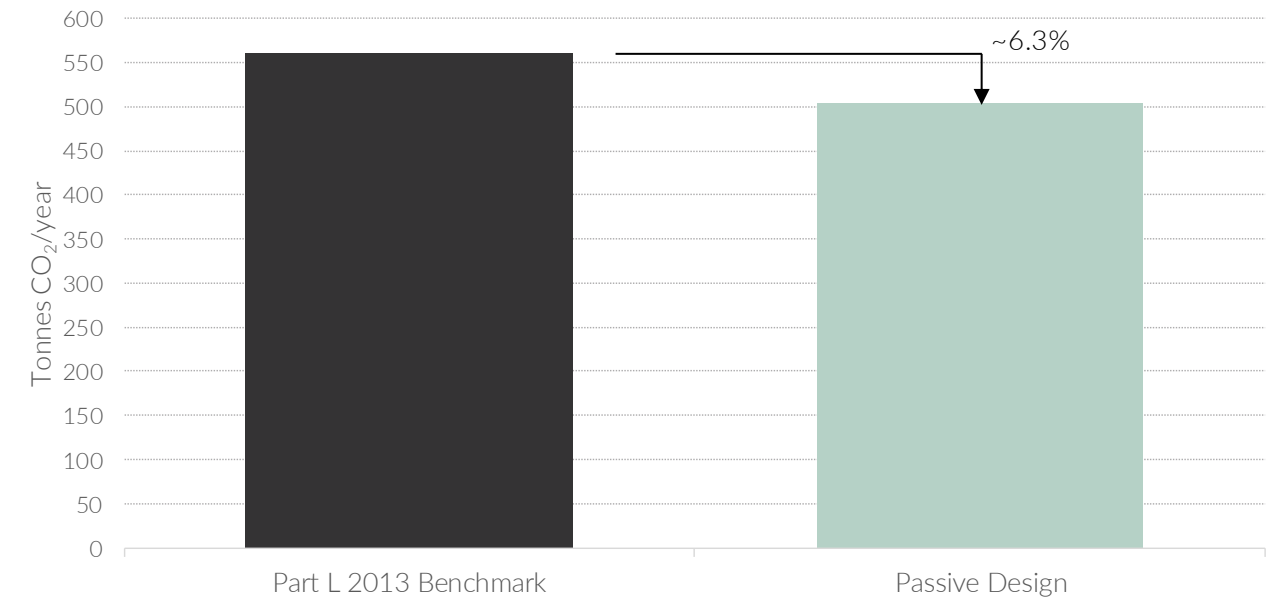


Figure 10 Regulated Annual Carbon Emissions Reduction over Part L 2013 Benchmark

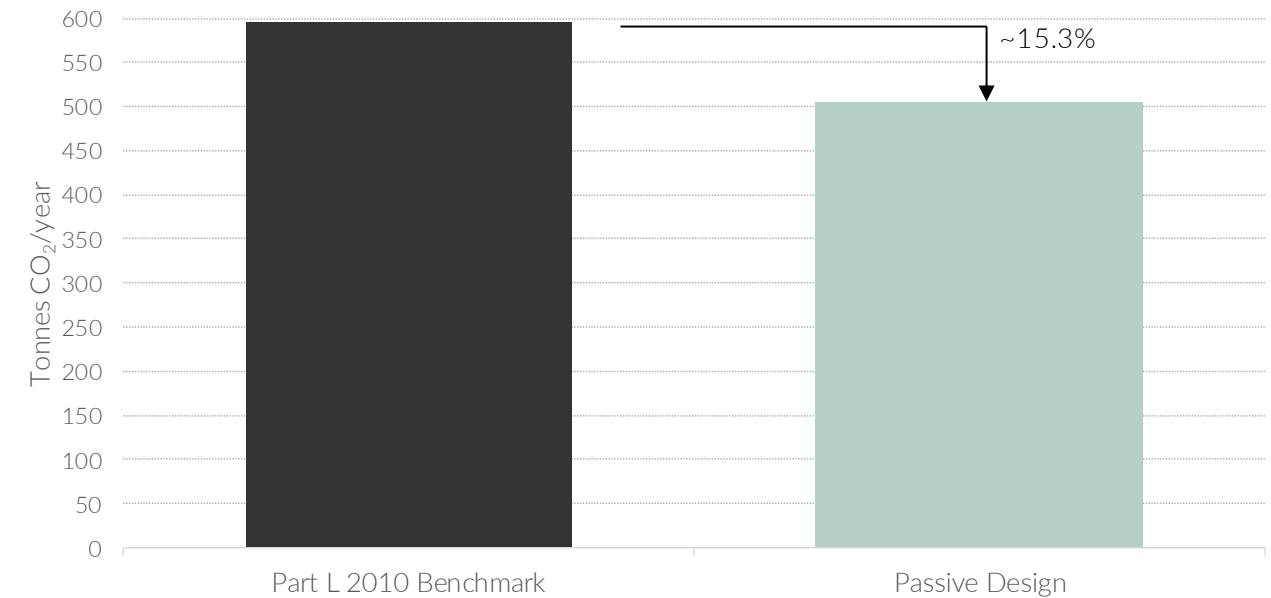


Figure 11 Regulated Annual Carbon Emissions Reduction over Part L 2010 Benchmark

Manchester Core Policy EN6 states that a 15% improvement over Part L 2010 should be achieved where feasible. In order to demonstrate the 15.3% reduction in annual regulated CO₂ for the proposed scheme, triple glazing throughout is required.

There is potential for available roof space to mount a PV array and will be investigated further at the next stage. The inclusion of PV would further better the percentage betterment against the Part L benchmark. A primarily electric strategy does not lend itself to using technology such as Combined Heat and Power (CHP) which is generally the 'go-to' solution for developments which are predominantly residential.

Considering grid decarbonisation, the use of technologies which burn gas to generate thermal and electrical energy will become redundant within the next 5 – 10 years.

6. Conclusion

This energy strategy has been prepared on behalf of Logik Developments in support of the development proposals for the Arundel Street development in Manchester.

This strategy summarises the relevant regulatory and planning policies applicable to the Proposed Development and sets out how the Proposed Development will address and achieve the relevant policy targets. The strategy responds to the UK planning and regulatory framework, and specifically to the Manchester Core Strategy policy documentation.

6.1 Planning Policy

The Manchester Core Strategy Policy EN6 states that applications for residential development of 10 or more units and all other development over 1,000m² will be expected as a minimum to meet the following targets *(unless this can be shown not to be viable)*:

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Target 1; Network Development Area	CHP / District heating anchor or connection or where not feasible a 15% increase on Part L 2010
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Table 4 Domestic CO₂ Emission Reduction Targets, Manchester Core Strategy

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- Domestic buildings 6% improvement from 2010 to 2013
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6.2 Approach

This report evaluates the Proposed Development against the energy hierarchy; be lean, be clean and be green. The building fabric performance was informed by the Part L1A 2013 target Fabric Energy Efficiency (TFEE) criteria. In the latest edition of the Building Regulations, dwellings must demonstrate that the fabric efficiency is equal to or better than the 'notional' building. The Energy Strategy has been developed using a 'fabric first' approach.

6.3 Proposed Development

Combining the residential areas with the retail areas and the DOT building results in a site-wide reduction in annual regulated carbon emissions of approximately 6.3% over the Part L 2013 benchmark. This correlates to an approximate 15.3% improvement over the Part L 2010 benchmark. Manchester Core Policy EN6 states that a 15% improvement over Part L 2010 should be achieved where feasible. In order to demonstrate the 15.3% reduction in annual regulated CO₂ for the proposed scheme, triple glazing throughout is required.

There is potential scope for available roof space to mount a PV array and will be investigated further at the next stage. The inclusion of PV would further better the percentage betterment against the Part L benchmark. An all-electric strategy does not lend itself to using technology such as Combined Heat and Power (CHP) which is generally the 'go-to' solution for developments which are predominantly residential.

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improvement over the Part L 2010 benchmark (shown in Figure 17).

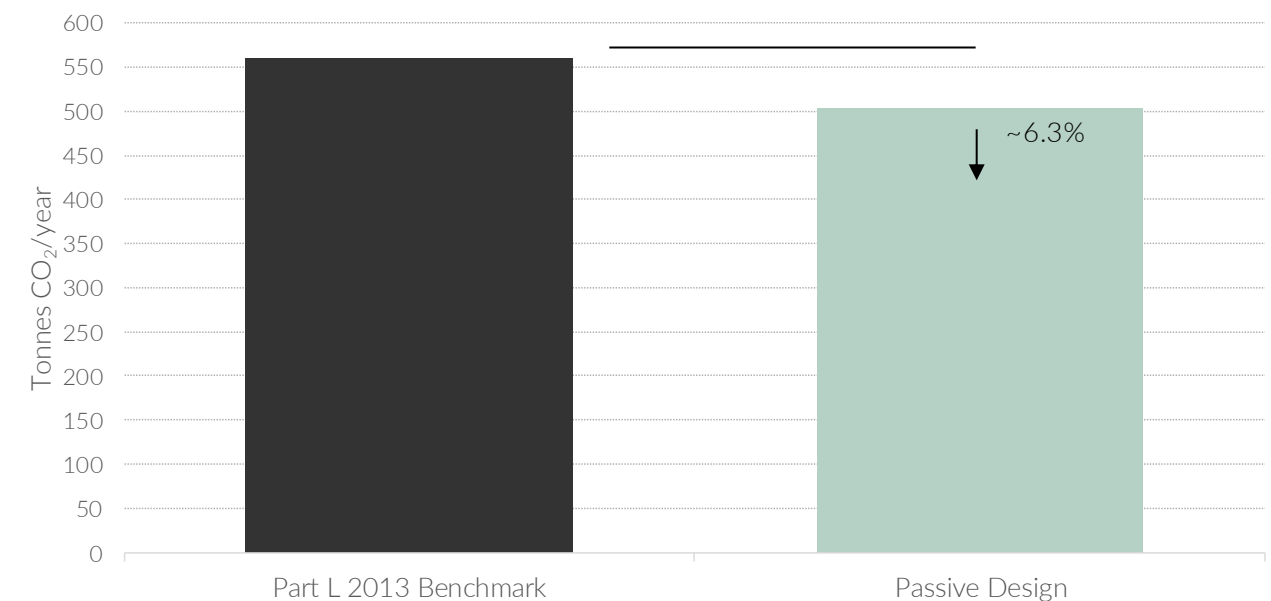


Figure 12 Regulated Annual Carbon Emissions Reduction over Part L 2013 Benchmark

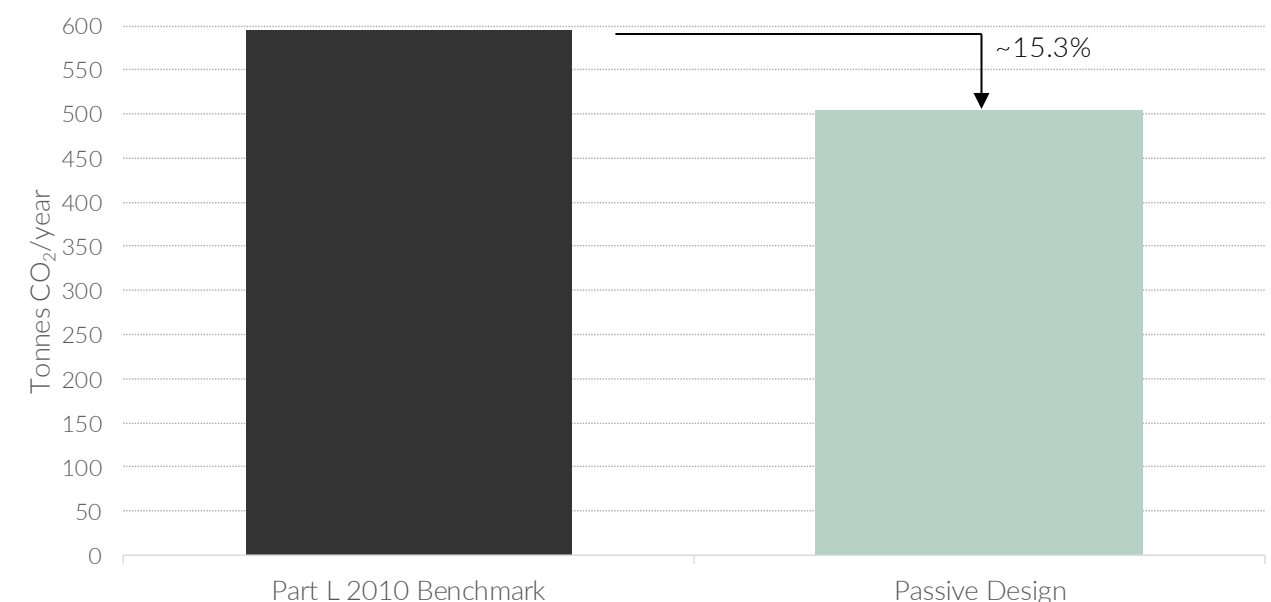


Figure 13 Regulated Annual Carbon Emissions Reduction over Part L 2010 Benchmark

7. Appendices – Performance Parameters

Element	Notional Building	Proposed Target
Exposed Floor (W/m²K)	0.13	0.15
External Wall (W/m²K)	0.18	0.16
Roof (W/m²K)	0.13	0.15
Party Wall (W/m²K)	0.00	0.00 (Fully filled cavity with edge sealing)
External Glazing (W/m²K)	1.40	0.90 (g-value 0.55)
Entrance Doors (W/m²K)	-	1.00
Thermal Bridges	SAP Appendix R	'Accredited Construction Details'
Exposed Floor (m³/hr.m²)	5.00	3.00

Figure 14 - Fabric performance

System	All Electric
Heat Source Efficiency	100%
Heating System Controls	Programmer & 2 Room Thermostats
Water Heating	Immersion; 145l Storage, 1.18kWh/day losses (1 bed) 210l Storage, 1.42kWh/day losses (2+ bed)
Mechanical Ventilation	0.39W/l/s & 93% HR (1 bed) 0.46W/l/s & 92% HR (2+bed)
Ductwork	Insulated, Rigid
Lighting	100% low energy

Figure 15 – Building Systems Performance



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