McKee Associates

Energy Statement

College View, Moss Lane East
Cheshire Homes Group

Date. 26 / 03 / 2025
Issue No. 02
Project No. P2408

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Issue History

Revision	Date	Description	Author	Checked	Approved
01	26/02/25	Draft for review	MB	DMC	DMC
02	26/03/25	Update following comment	MB	JM	DMC

Contents

Executive Summary		**Page 4**
1.0	Introduction	Page 5
2.0	Legislation & Standards	Page 6
3.0	Policy JP-S2: Regulated Operational Carbon Emissions	Page 9
4.0	Policy JP-S2: Renewable Energy Generation Target	Page 10
5.0	EV Charging Points	Page 10
6.0	Heat and Energy Networks Assessment	Page 11
7.0	Conclusion	Page 12
Appendix A	PV Array	Page 13
Appendix B	Centralised LTHW System	Page 15
Appendix C	Centralised DHW System	Page 16
Appendix D	Part L 2021 Vol. 2 BRUKL	Page 17

Executive

Places for Everyone – Energy Statement

This Energy Statement has been prepared by McKee Associates on behalf of Cheshire Homes Group ("the Applicant") in support of a full planning application for the demolition of the existing building on the Site and the construction of a new purpose-built student accommodation ("PBSA") development at College View, 410 – 418 Moss Lane East, Manchester, M14 4PQ.

The scheme involves demolition of 410-418 Moss Lane East and erection of part five, part three storey building for use as Purpose Built Student Accommodation ("PBSA"), associated landscaping, servicing, cycle parking and other associated works. The accommodation will provide:

- 132no. studio apartments (126 studio / 6 accessible (95% /5%))
- Car free development with exception of 2 disabled parking bays
- 40no. cycle parking spaces (31%)

The development proposals aim to achieve high compliance with the Manchester City Council 'Places for Everyone' energy and carbon emission planning policies to support Greater Manchester with their vision in becoming a carbon neutral city region by 2038.

This document addresses the requirements of 'Policy JP-S1: Sustainable Development' and 'Policy JP-S2: Carbon and Energy' from the Manchester 'Places for Everyone Joint Development Plan' (Adopted 21 March 2024) for the College View, Moss Lane East PBSA development on Moss Lane East in Manchester City.

The development has been designed to have a low energy demand to address 'Policy JP-S1: 5.17' reducing energy demand via the use of high levels of thermal insulation, low air tightness and high efficiency ventilation with heat recovery. The insulation levels proposed surpass that of the Part L 2021 notional values.

The proposals utilise centralized Air Source Heat Pumps for space heating and domestic hot water. This is to align with 'Policy JP-S1', 5.6: Moving away from carbon intensive gas as the prime source of heat. As the electricity grid continues to decarbonise, so will the proposed development, assisting Greater Manchester in its vision to become a Carbon Neutral City Region by 2038.

Further, the proposals have sought to incorporate both a PV array and a solar thermal array to the development, to assist Greater Manchester to meet its commitment to be carbon Neutral by 2038 and its target to significantly upscale solar Photovoltaic energy (5.5 Policy JP-S1).

As a result, the predicted reduction in CO2 when compared to Part L 2021 Vol. 2 is 17.5%.
The annual carbon emissions are 13.78T CO2 per annum.

Further details of how policy 'JP-S2: Carbon and Energy' have been met are contained within this report.

1.0 / Introduction

This Energy Statement has been prepared by McKee Associates on behalf of Cheshire Homes Group ("the Applicant") in support of a full planning application for the demolition of the existing building on the Site and the construction of a new purpose-built student accommodation ("PBSA") development at College View, 410 – 418 Moss Lane East, Manchester, M14 4PQ.

The scheme involves demolition of 410-418 Moss Lane East and erection of part five, part three storey building for use as Purpose Built Student Accommodation ("PBSA"), associated landscaping, servicing, cycle parking and other associated works. The accommodation will provide:

- 132no. studio apartments (126 studio / 6 accessible (95% /5%))
- Car free development with exception of 2 disabled parking bays
- 40no. cycle parking spaces (31%)

McKee Associates have assessed the proposals for the Purpose-Built Student Accommodation (PBSA) development against the requirements of the 'Places for Everyone' joint development plan, with respect to Energy and Carbon emissions.

The site sits at the edge of the Higher Education Corridor defined by Manchester City Council and is bounded by Moss Lane East to the north and Acomb Street to the west. The proposed scheme comprises one block containing 169 studios and communal spaces.



2.0 / Legislation & Standards

National Planning Policy

The NPPF (revised December 2024) sets out the Government's planning policies for England and how these are expected to be applied. The overall emphasis of the NPPF is to reiterate the Government's key objectives, including securing sustainable development.

The NPPF defines the purpose of the planning system as being to contribute to the achievement of sustainable development. It explains at Paragraph 8 that there are three dimensions to sustainable development. These are economic, social and environmental and should be pursued simultaneously through the planning system.

Paragraph 10 states that at the heart of the Framework is a presumption in favour of sustainable development.

'Policy 14 – Meeting the challenge of climate change, flooding and coastal change'

Policy 14 sets out the following in paragraph 165-166:

165. To help increase the use and supply of renewable and low carbon energy and heat, plans should:
   a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, and their future re-powering and life extension, while ensuring that adverse impacts are addressed appropriately (including cumulative landscape and visual impacts); 61 In line with the objectives and provisions of the Climate Change Act 2008. 49
   b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
   c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for colocating potential heat customers and suppliers.

166. In determining planning applications, local planning authorities should expect new development to:
   a) comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
   b) Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

Places for Everyone – Policy JP-S1 Sustainable Development

Policy JP-S1 sets out Greater Manchester Vision to be a Carbon Neutral City by 2038. With respect to carbon and energy for new residential developments, the policy expects that new developments will:

- Para 5.6: "Upscale solar Photovoltaic Energy"
- Para 5.6: "Reducing heat demand in homes"
- Para 5.6: "Moving away from carbon intensive gas"

It further requires that;

- Para 5.12: "New homes and commercial/ industrial buildings will need to achieve net zero carbon by 2028."

Para 5.17: "Part L 2021 of national Building Regulations took effect on 15 June 2022 and is a stepping stone to Future Homes and Future Building Standards (FHS), which is currently being consulted in 2024 and is expected to be introduced in 2025. In the interim, the policy will follow the trajectory of FHS in relation to carbon reduction with applicants demonstrating how savings have been maximised following the energy hierarchy. From 2025, applicants will need to demonstrate carbon reductions have been maximised with an opportunity to offset any residual carbon to a carbon offset fund. The approach will be reviewed in line with future standards as they are introduced."

- Para 5.16: For Greater Manchester to meet its carbon neutrality commitments there has to be an increase in renewable energy generation. Community initiatives are likely to play an increasingly important role in the uptake of renewable energy and should be encouraged as a way of providing positive local benefits to wider society. The advantages of increasing renewable and low carbon energy capacity will need to be balanced against any potential impacts such as on residential amenity, local environment and landscape character, sites of conservation and heritage value, telecommunications and aviation equipment and air quality.
- Para 5.23: Under amendments to the Building Regulations, the Government has introduced new requirements for installing electric vehicle charge points in new homes, new non-residential buildings, and when some buildings are renovated. New developments will need to meet the requirements set out in Part S of the Building Regulations, unless superseded by relevant Local Plan policies.

Places for Everyone – Policy JP-S2 Carbon and Energy

Policy JP-S2: Carbon and Energy, set s out the following aim:

> "The aim of delivering a carbon neutral Greater Manchester no later than 2038, with a dramatic reduction in greenhouse gas emissions, will be supported through a range of measures including:
>
> 1. Promoting the retrofitting of existing buildings with measures to improve energy efficiency and generate renewable and low carbon energy, heating and cooling;
> 2. Promoting the use of life cycle cost and carbon assessment tools to ensure the long-term impacts from development can be captured;
> 3. Taking a positive approach to renewable and low carbon energy schemes, particularly schemes that are led by, or meet the needs of local communities;
> 4. Increasing the range of nature-based solutions including carbon sequestration through the restoration of peat-based habitats, woodland management, tree-planting and natural flood management techniques;
> 5. An expectation that new development will, unless it can be demonstrated that it is not practicable or financially viable:
>   a. Be net zero carbon[29] which applies:
>   - from adoption– to regulated operational carbon emissions;
>   - from 2028 -to all emissions 'in construction'.
>
> From 2025 development should also calculate and minimise carbon emissions from unregulated emissions alongside regulated emissions.
> Development proposals should set out how this has been achieved in an energy statement in accordance with the energy hierarchy, which in order of importance seeks to:
>
> I. Minimise energy demand;
> II. Maximise energy efficiency;
> III. Use renewable energy;
> IV. Use low carbon energy; and
> V. Utilise other energy sources.
>
> From 2025 any residual carbon emissions that cannot be fully mitigated on-site should be offset, in agreement with the relevant local planning authority through a financial contribution to a carbon offset fund.
>
> As an interim measure, development should be consistent with the 2022 Part L Building Regulations unless superseded by changes to building regulations and/or national or local planning policies.
>
> b. Incorporate adequate electric vehicle charging points, in line with Part S of the Building Regulations, unless superseded by relevant Local Plan policies, to future proof for the likely long-term demand, taking account of the potential maximum energy demand for the site;

c. Where practicable, prioritise connection to a renewable energy/heating/cooling network in the first instance or a low carbon energy/heating/cooling network that is adaptable to non-fossil fuels at a later date;

d. In residential developments, achieve energy demand reductions in terms of space heat demand; hot water energy demand and the delivery of on-site renewable energy generation, in accordance with Table 5.1.

For renewable energy generation priority should be given to PV installation where technically feasible, alternative technologies will be appropriate where the equivalent generation is evidenced.

e. For non-residential developments, achieve at least BREEAM excellent standard (or equivalent) for the 'Ene 01 – reduction of energy use and carbon emissions' category rising to 'BREEAM outstanding' equivalent for ENE 01 from 2028.

f. Include a detailed energy statement to demonstrate via site relevant evidence how the development has sought to maximize reductions in carbon emissions in line with relevant policy targets, including the minimisation of overheating risks and appropriate measures for post occupancy evaluation. Whole life cycle emissions should be considered where possible.

Regarding Heat Networks, paragraph 5.29 sets out the following requirement;

To comply with policy JP-S3, heat and energy network assessments will be required as part of an energy statement to support planning applications for new developments within the identified "Heat and Energy Network Opportunity Areas" to demonstrate compliance with PfE energy policies. To ensure consistency of approach and to aid the decision-making process, decentralised heat/energy network assessments are required to demonstrate consideration and analysis of:

a. Identification of existing and proposed heat/energy loads;
b. Identification of heat/energy supply sources;
c. Identification of opportunities to utilise renewable and low carbon energy sources;
d. Identification of opportunities to utilise waste and secondary heat sources;
e. Impact of proposals and technology choices on local air quality;
f. Design according to national best practice in relation to efficient heat network design (e.g. CIBSE CP1 Heat Networks: Code of Practice for the UK[35], or equivalent); and
g. Adopting appropriate consumer protection standards (e.g. Heat Trust[36] or equivalent).

Building Regulations Part L

Building regulations Part L 2021 deals with the conservation of fuel and power in new buildings. Part L Vol. 2 addresses the requirements of new build non domestic buildings and the main compliance method is via SBEM calculations.

For non domestic buildings, Part L Vol 2. SBEM calculations set a 'Carbon Target' and an 'Energy Target' that must be met or improved upon. We are not aware of any more onerous targets that must be achieved, other than to meet the minimum Targets set by Part L Vol 2.

Building compliance models are built using SBEM software for residential schemes. The proposed service and fabric specifications are input into the models and a simulation determines whether or not the proposals meet the Carbon, Fabric and Energy Targets.

Carbon reductions reported in this document refer to carbon reductions when compared to the Part L 2021 Target Emission Rate.

3.0 / Policy JP-S2: Regulated Operational Carbon Emissions

Policy JP-S2 requires that development proposals should set out how 'net zero operational carbon emissions' has been achieved in an energy statement in accordance with the energy hierarchy. To support Greater Manchester's vision in becoming carbon neutral by 2038, the scheme has been designed in line with the energy hierarchy ethos as follows:



Be Lean

The proposed building fabric specified betters the Part L 2021 notional building values and is on a par with 'Passivehaus' insulation levels. The proposed fabric specification can be seen in table 1:

Elements	U Value	Improvement over Building Regulations
Ground Heat Loss Floor	0.1 W/m2/K	45%
Roof	0.1 W/m2/K	45%
External Walls	0.15 W/m2/K	42%
Windows	1.4 W/m2/K	12.5%
Air Permeability	4.0 m³/hm²@50Pa	All plots must be air tested

Be Clean

In line with the Greater Manchester aim of reducing carbon intensive gas as the prime source of heat (Policy JP-S1), the proposals utilise centralized ASHP technology to supply LTHW for the purposes of space heating. Additionally, domestic hot water is also served by a centralized ASHP. As the electricity grid continues to decarbonise, so will the proposed development, assisting Greater Manchester in its vision to become a Carbon Neutral City Region by 2038.

To ensure no heat is wasted, high efficiency local mechanical ventilation with heat recovery is proposed in each room.

High efficiency LED lighting will be used throughout the development.

Be Green

The 'Places for everyone' Policy JP-S2 requires that "For renewable energy generation priority should be given to PV installation where technically feasible". To support Greater Manchester in this aspiration, the proposals have sought to incorporate both 'Photo Voltaic' panels and a Solar Thermal Array on the roof. A Solar thermal array is proposed to reduce the total heat required for the purposes of DHW. Details of the proposed Solar PV array can be found in section 4 and appendix A.

Carbon Offset

As a result of the combined design measures above, the predicted reduction in CO2 when compared to Part L 2021 Vol. 2 is 17.5%. The 'places for everyone' policy JP-S2, paragraph 5 sets a requirement to offset residual emissions for applications made from 2025. The annual carbon emissions are 13.78T CO2 per annum.

4.0 / Policy JP-S2: Renewable Energy Generation Target

Policy JP-S1 requires that 'Best Practice' thresholds for maximising Renewable Energy Generation.

The policy requires that up until 2025, Photovoltaic installations should be at least equivalent to 20% ground floor space. The ground floor area is c. 840m2. This requires a PV array of c.168 m2 should be targeted.

The proposed PV array uses all available roof space and it is expected that an array of 179.1m2 will be located on the roof, which equates to an installed capacity of 40.5kWp and is projected to deliver 31,771 kWh of renewable energy per annum.

5.0 / EV Charging Points

No parking spaces are provided on site. Students are expected to make use of the excellent transport links on the Higher Education Corridor. As such, no EV charging spaces are proposed.
Ample provision has been allowed for the safe and secure storage of bicycles.

6.0 / Heat and Energy Networks Assessment

Around two-thirds of Greater Manchester's carbon emissions come from domestic and commercial buildings. Government analysis30 identifies heat/energy networks as a cost-effective solution to this issue within areas of high heat density, with modelling suggesting that heat networks could be an important part of the least-cost mix of technologies needed to achieve UK-wide decarbonisation targets by 2050. Figure 5.1 shows the broad 'Heat and Energy Network Opportunity Areas' across the nine districts and these areas will be further refined by the districts when more local evidence becomes available.

Heat networks as among the technologies/systems offering the highest technical potential to contribute to the reduction in carbon emissions. The dense urban nature of some parts of Greater Manchester and the scale of development proposed in the Plan allocations means that there are opportunities for significant growth of heat networks aligned with, and building out from, strategic development sites.

As such, to comply with policy JP-S3, a heat network assessment is required as part of the energy statement.

The proposed site is within the 'Heat Networks Opportunity Area'. This is indicated in the map below. The heat network map does not indicate any existing heat network in the vicinity of the site nor proposed heat networks that are being progressed. This has been confirmed by enquiry.



The space heating and DHW proposals are decentralised and as such, connection to a heat network in the future could be possible. The plant room will be arranged such that a future connection could be made.

7.0 / Conclusion

This statement has assessed the proposed Manchester Moss Lane East PBSE against the relevant climate change and sustainability policies and targets, outlined within the Manchester 'places for everyone' planning guidance.

The proposals have been developed using the guiding principles of the energy hierarchy, ensuring a fabric first approach to minimize space heating demand has resulted in dwellings that meet or are very near to achieving the 'best Practice' targets for reducing energy demand, as set out by policy JP-S1.

The proposals utilise electricity for space heating and domestic hot water. As the electricity grid continues to decarbonise, so will the proposed development, assisting Greater Manchester in its vision to become a Carbon Neutral City Region by 2038.

The proposals have sought maximised the amount of PV that can fit on the roof, such that the capacity is equivalent to 40.5kWp. This supports Greater Manchester target for renewable energy generation priority to be given to PV installation where technically feasible".

The development proposals aim to achieve high compliance with the Policies JP-S1, JP-S2 and JP-S3 to support Greater Manchester with their vision in becoming a carbon neutral city region by 2038.

The scheme exceeds the requirement of the Current Building regulations Part L by 17.5%. Regulated operational carbon emissions have been reduced by 17.5% compared to the Part L 2021 Vol.2 Target building,

The sustainability credentials of the building are as follows:

Be Lean:	Building Fabrice performance improved by up to 45% over building regulations limiting values All M&E systems and lighting are the latest high efficiency systems which exceed the limiting efficiencies set out in the building regulations Part L
Be Clean:	Space heating and DHW are provided by Air Source Heat pumps. This ensures there are no on site emissions and enables the scheme to decarbonize in line with the national grid.
Be Green:	the PV array has been maximized to utilise all available roof space. An additional solar thermal array has been included to minimuse the amount of grid supplied electricity required for DHW

Appendix A / PV Array

PBSA Moss Lane Manchester

Perfect Sense Energy

perfect sense energy

Project Overview

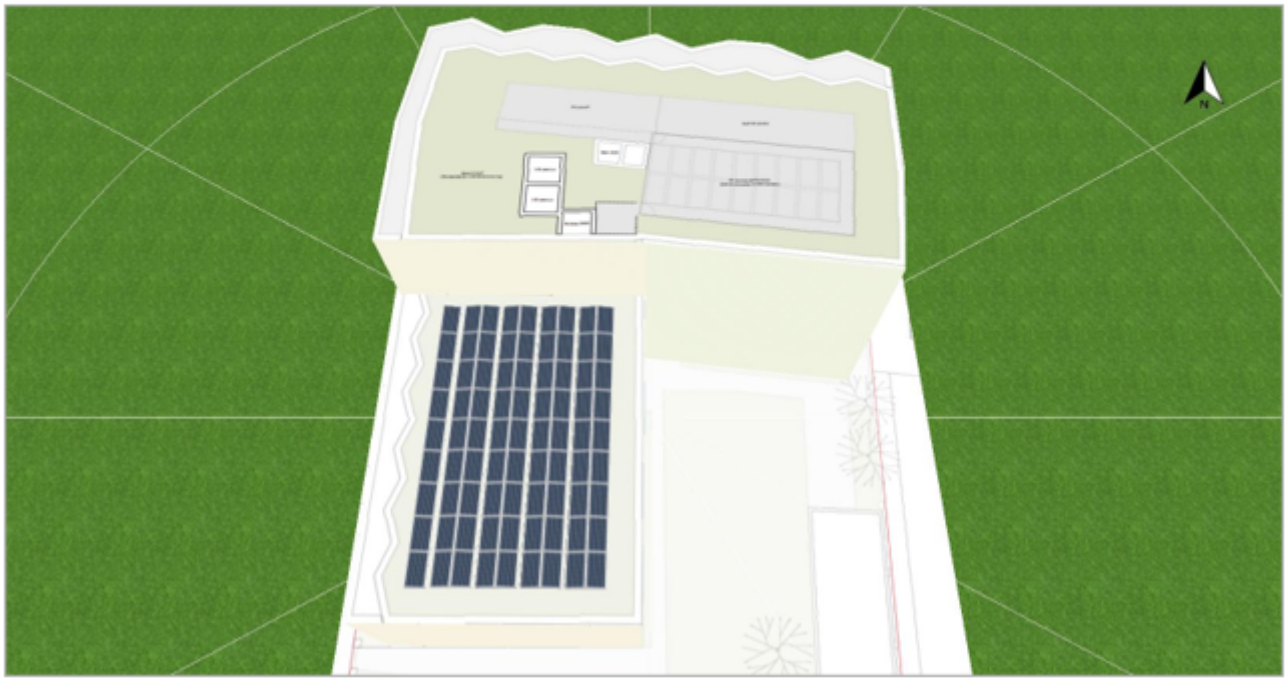


Figure: Overview Image, 3D Design

PV System

3D, Grid-connected PV System

Climate Data	Manchester, GBR (2001 - 2020)	
Values source	Meteonorm 8.2(i)	
PV Generator Output	40.5	kWp
PV Generator Surface	179.1	m^2
Number of PV Modules	81	
Number of Inverters	1	

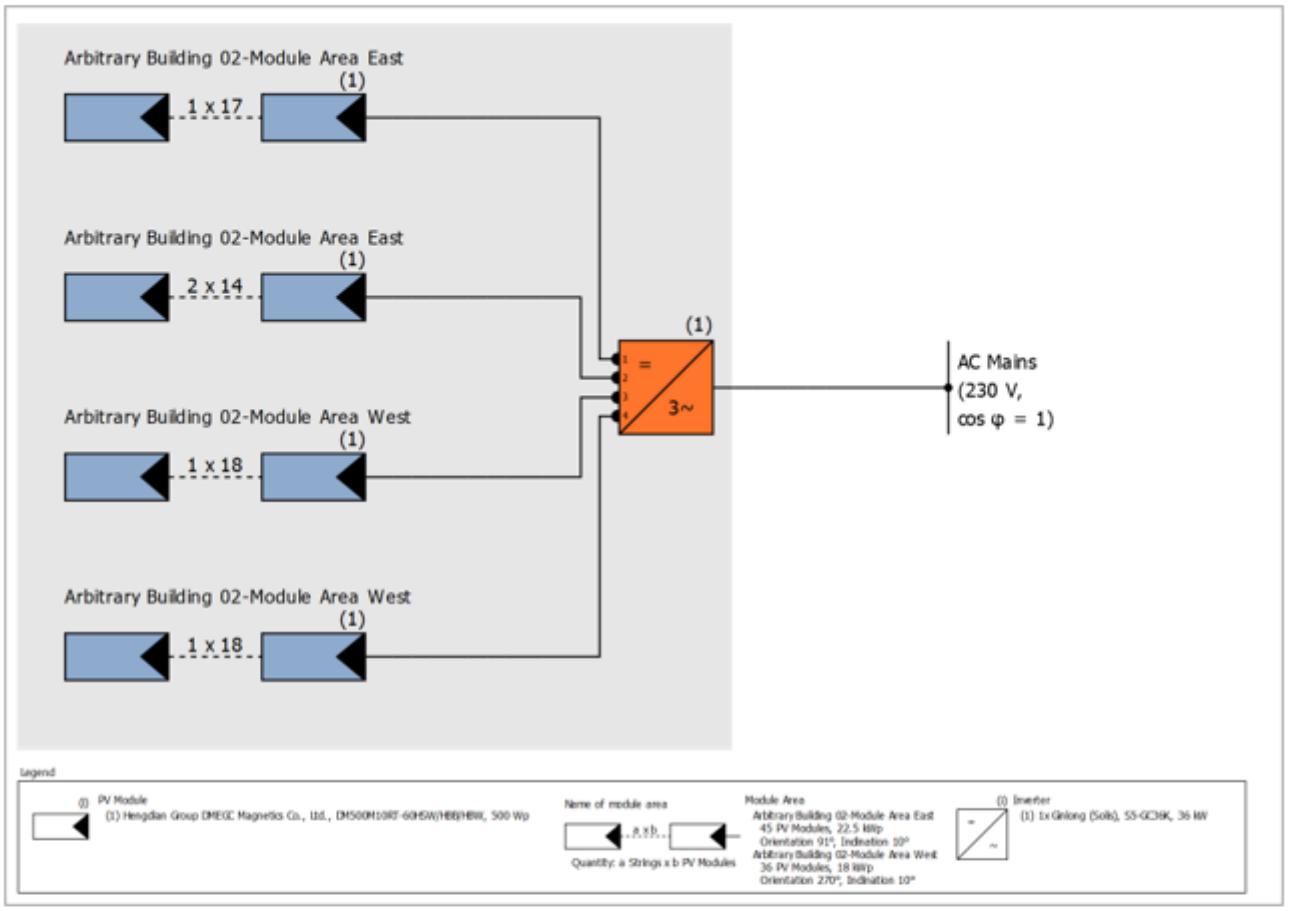


Figure: Schematic diagram

Production Forecast

Production Forecast		
PV Generator Output	40.50	kWp
Spec. Annual Yield	784.11	kWh/kWp
Performance Ratio (PR)	81.19	%
Yield Reduction due to Shading	11.1	%
Grid Export	31,771	kWh/Year
Grid Export in the first year (incl. module degradation)	31,655	kWh/Year
Standby Consumption (Inverter)	15	kWh/Year
CO_2 Emissions avoided	6,574	kg / year

Appendix B / Centralised LTHW System

Commercial Heating | Product Information

MITSUBISHI ELECTRIC

CAHV-R450YA-HPB

Ecodan Air Source Heat Pump

The Mitsubishi Electric Ecodan **CAHV air source heat pump** uses low GWP R454C refrigerant, offering a robust, low carbon system for the provision of sanitary hot water and space heating. This innovative heat pump solution can operate as a single system or form part of a multiple unit system, making it suitable for most commercial applications.

The multiple unit system has the ability to cascade available units to both on and off mode to meet the load from a building. As an example of this unique modulation, a 16 unit system allows 0.5kW increments of capacity, from 7.8kW all the way up to 640kW*. With cascade and rotation built in as standard, the Ecodan CAHV system is perfectly suited to commercial applications including schools and hospitals.

R454C

*At nominal conditions A7W35

Key Features & Benefits:

- Low GWP R454C refrigerant and reduced embodied carbon helps achieve CSR targets
- Achieves 70°C outlet temperature down to -20°C ambient temperature for continuous heating provision
- Multiple unit cascade control from 7.8kW to 640kW capacity provides design flexibility for a wide range of commercial applications
- Water flow temperatures from 24°C to 70°C without boost heaters results in cost and energy savings
- Advanced heat exchange design combined with the properties of R454C refrigerant enables a shorter defrost time
- Low frequency compressor control improves energy efficiency and product operation
- Ability to rotate units based on accumulated run hours offers extended product life
- Requires only water and electrical connections, for ease of installation
- Hermetically-sealed monobloc design, requiring low maintenance



les.mitsubishielectric.co.uk

MODEL			CAHV-R450YA-HPB
Power source			3-phase 4-wire 380-400-415V 50/60 Hz
Capacity(EN14511) *1		kW	40
	Power input	kW	14.03
	Current input	A	23.7-22.5-21.7
	COP (kW/kW)		2.85
	SCOP Low/Medium		3.57/3.24
Capacity *2		kW	33.4
	Power input	kW	16.6
	Current input	A	28.0-26.6-25.7
	COP (kW/kW)		2.01

Appendix C / Centralised DHW System

Commercial Heating | **Product Information**

CAHV-R450YA-HPB
Ecodan Air Source Heat Pump



MODEL			CAHV-R450YA-HPB
Power source			3-phase 4-wire 380-400-415V 50/60 Hz
Capacity(EN14511) *1		kW	40
	Power input	kW	14.03
	Current input	A	23.7-22.5-21.7
	COP (kW/kW)		2.85
	SCOP Low/Medium		[illegible]

Appendix D / Part L 2021 Vol. 2 BRUKL

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Moss Lane East PBSA

As designed

Date: Wed Mar 26 11:54:27 2025

Administrative information

Building Details

Address: Moss Lane East PBSA, Moss Side, Manchester, M14 4PQ

Certifier details

Name: N Duggan Seven Consulting Ltd

Telephone number: 0161 209 3259

Address: Peter House, Oxford Street, Manchester, M1 5AN

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.27

BRUKL compliance module version: v6.1.e.1

Foundation area [m^2]: 637.91

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2$annum	4.36	
Building CO_2 emission rate (BER), $kgCO_2/m^2$annum	3.6	
Target primary energy rate (TPER), kWh_{PE}/m^2annum	46.01	
Building primary energy rate (BPER), kWh_{PE}/m^2annum	37.05	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.15	0.15	0000002D_W1
Floors	0.18	0.15	0.15	R000001B_F
Pitched roofs	0.16	-	-	No heat loss pitched roofs
Flat roofs	0.18	0.1	0.1	RB000004_C
Windows** and roof windows	1.6	1.4	1.4	0000002D_W1_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.4	1.4	RB00000A_W4_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [$W/(m^2K)$] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [$W/(m^2K)$]

$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [$W/(m^2K)$]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m^2K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
$m^3/(h.m^2)$ at 50 Pa	8	4

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m²]	3827.5	3827.5
External area [m²]	3872.8	3872.8
Weather	MAN	MAN
Infiltration [m³/hm²@ 50Pa]	4	3
Average conductance [W/K]	1136.37	1663.87
Average U-value [W/m²K]	0.29	0.43
Alpha value* [%]	61.52	26.79

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
	Offices and Workshop Businesses
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
100	**Residential Institutions: Universities and Colleges**
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	14.3	14.97
Cooling	0.2	0.14
Auxiliary	2.16	1.9
Lighting	6.12	6.39
Hot water	7.78	7.26
Equipment*	10.15	10.15
TOTAL**	30.57	30.65

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	6.86	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0.81	0
Displaced electricity	*6.86*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	190.36	192.48
Primary energy [kWh_{PE}/m²]	37.05	46.01
Total emissions [kg/m²]	3.6	4.36