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CIS Tower, Manchester

Energy Statement

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1.0 Executive Summary

The purpose of this Energy Statement is to demonstrate compliance with the following sustainability targets, and illustrates how the proposed refurbishment incorporates a range of sustainable technologies to achieve these targets:

- Manchester City Council Core Strategy, Policy EN 6 Target Framework for CO₂ reductions from low or zero carbon energy supplies, for non-domestic development:
 - Target 1 – Network development area applies, the minimum requirement is CHP/district heating anchor, or connection or where not feasible, a 15% increase on Part L 2010. Although there is a district heating system in the Town Hall vicinity of Manchester, there are no plans to extend this to this area of the city, which is a significant distance away. However, if the opportunity arises in the future, adequate space has been allocated within the basement plant room to accommodate potential future connections.
- Energy-efficient HVAC equipment, including Air Source Heat Pumps (ASHP), provides effective heating and cooling to mitigate overheating risks. Additionally, Scenario 1 (Table 11) evaluated energy performance using a 2050 heatwave weather file, confirming the resilience of the design against overheating.
- EPC 'A' Rating.
- 'BREEAM Excellent' from the BREEAM UK framework.
- UK Net Zero Carbon Buildings Standard (UKNZCBS) 2050 compliant / Operational Net Zero Carbon, with the following Energy Use Intensity targets for existing buildings ('One-go Retrofit'), for works commencing in 2026:
 - 122 kWh/m²/annum (GIA) to meet UKNZCBS Offices targets.
 - 224 kWh/m²/annum (GIA) to meet UKNZCBS Retail: Supermarket targets.
 - 438 kWh/m²/annum (GIA) to meet UKNZCBS Retail: F&B with Catering targets.
- NABERS UK accreditation.

This report will summarise each of the above criteria and demonstrate how the proposed development can achieve each target.

2.0 Introduction

The CIS Tower is a Grade II listed building located in Manchester city centre, built in the 1960s. It was previously used as office space, with a canteen area and an event space. The proposed design is based on the building being office use, incorporating some retail, restaurant/bar, and event space. A new build three-storey extension is also proposed for the podium, also to be used as office space.

2.1 Modelling Disclaimer

The building has been modelled with accredited software package IESVE accredited software Version 2024.1.0.0 which is approved for the purpose of demonstrating compliance with the energy efficiency and carbon emission requirements of the building regulations.

These assessments were undertaken by an Energy Specialist; an individual who has acquired substantial expertise or a recognised qualification for undertaking assessments within the residential sector and is not professionally connected to a single technology or manufacturer.

It should be noted that the data generated by this work is obtained using computer calculations. These calculations are the best means of predicting the performance of the building at this stage. Full certainty can only be achieved by measuring the performance of the building and associated systems after a period of use.

Whilst the calculations have been undertaken in good faith using reasonable skill and care, Crookes Walker Consulting Limited can take no responsibility for differences between the computer calculations and the actual performance of the completed building due to the inherent complexity and variability of the physics in a building and its environment.

2.2 Thermal Model

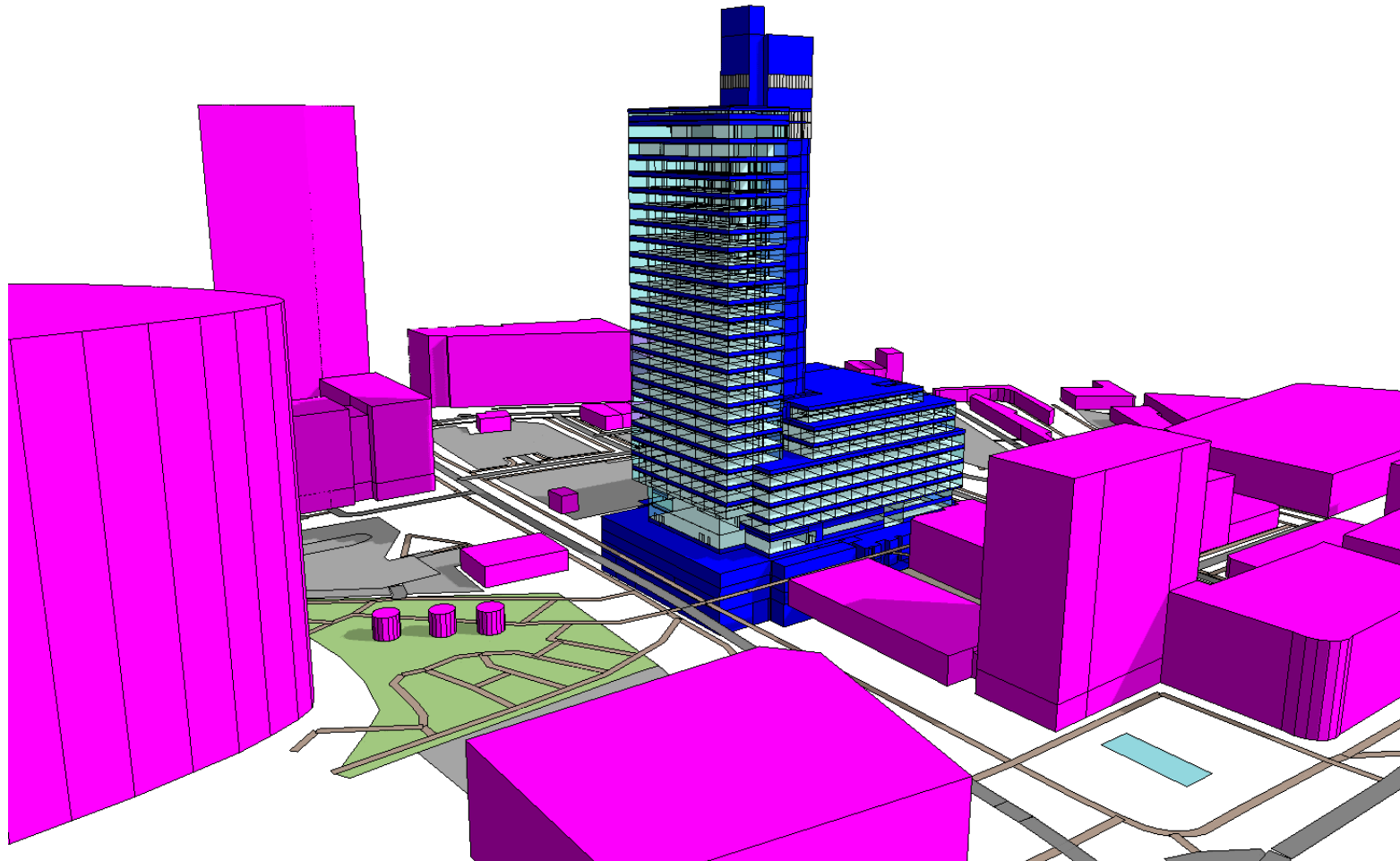


Figure 1. Thermal Model

3.0 Energy Strategy/Methodology

To achieve the stated requirements the proposals have been assessed as per the following, with this methodology to be followed as the design progresses:

- The consideration and incorporation of passive design solutions where feasible
- The incorporation of energy efficiency measures through improved fabric performance and services
- Calculation of the predicted design energy consumption rates and associated annual CO₂ emissions for the development, in comparison with the Building Regulations
- Assessment of viability incorporating Low and Zero Carbon technologies (LZC)

The following bullet points outline the proposed design solutions for the proposed CIS Tower refurbishment and new build extension, which will respond to the energy requirements of the Greater Manchester Authority and the Manchester City Council requirement. An Energy and Sustainability Strategy will be created which will expand on the following details for the development:

- A fabric first approach by replacing the existing poorly performing glazed façade to reduce the building's heat losses.
- Air tightness will be prioritised with optimised levels of permeability preventing heat loss via uncontrolled infiltration.
- Good solar control will be provided by the selection of glazing to avoid the risk of overheating during the summer months and increase the solar gains in the winter months.
- Natural daylighting will improve occupant comfort and reduce the requirement for artificial lighting, saving energy.

At this stage, an initial energy model has been developed for the building to estimate the building performance against each of the requirements.

3.1 Energy Efficient Services

A fabric first approach has been taken for the CIS Tower refurbishment and extension, by replacing the façade. The environmental and energy benefits of this are discussed in a separate dedicated part of this Planning Application.

To support this efficient mechanical and electrical systems have been chosen, with the aim to reduce the energy consumption and carbon emissions with appropriate controls to manage the energy used during operation.

The following principles have been used in the development of the building services strategies:

3.1.1 Mechanical Ventilation with Heat Recovery (MVHR)

The existing ventilation system for the CIS is as per the original design in the 1960's with supply air handling plant without heat recovery. As the building is to have a new sealed faced without openings replicating the existing arrangement it is proposed to retain the mechanical ventilation strategy, introduce new central plant with heat recovery. This will transfer heat from the exhaust air to preheat the supply air.

The mechanical ventilation system is to incorporate high efficiency heat recovery with a target efficiency more than 75%.

3.1.2 Building Services Insulation

Thermal insulation is to be provided in accordance with BS 5422: 2001 (Method for specifying thermal insulation materials for pipes, tanks, vessels, ductwork, and equipment operating within the temperature range, -40°C to +700°C) for the following:

- Reduce heat loss and hence conserve energy on all heated water and air systems.
- Prevent the formation of condensation on pipework and ductwork of equipment.
- All thermal insulation will be made from materials with zero ozone depletion potential (CF) and HCFC free)
- Insulation may also be used for acoustic reasons, particularly on rainwater and foul drainage systems.

- Where LTHW or DHW services run along corridors, these services will be provided with 20% more insulation, over and above the British Standard, to prevent nuisance heat gains into the corridors.

3.1.3 Motor Efficiency

All pumps and fans are to be provided with high efficiency motors to reduce energy consumption and energy costs.

Where variable speed pumps and fans are provided, the flow volumes are to be set during the commissioning period by varying the fan / pump speed rather than by increasing the system resistance by means of regulating valves or balancing dampers.

3.1.4 Low and Zero Carbon Technologies

The following LZC technology has been proposed for the CIS Tower development:

- Air Source Heat Pump for space heating and cooling to replace the existing gas fired heating, chillers, and cooling towers.
- New PV system to generate 40MWh per annum to serve the new-build extension only. This can be via a new system (Appendix 4) or the existing panels. At present, the energy analysis has not taken into account the reuse of the existing PV panels; however, the condition and viability for the reuse of the panels and associated equipment is to be determined at the next design stage.

This provides an electric based solution eliminating the need for use of fossil fuels to heat the building and complies with the UK Net Zero Building Standard as discussed later in this statement. The PVs enable the generation of power onsite.

3.1.5 Efficient Lighting Installations

Artificial lighting will be installed that will include the following:

- Energy efficient LED fittings.
- Daylight dimming controls.
- Presence and detection.

4.0 Model Inputs

4.1 NCM Building Types

The CIS Tower development has been assessed under the following NCM building types:

- A1: Retail and Financial/Professional Services
- A3: Restaurant and Cafes/Drinking Establishments and Hot Food Takeaways
- B1: Offices and Workshop businesses

The inputs detailed over the following pages have been taken from CIBSE Guide A, BSRIA Rules of Thumb (2024) 'Mechanical Criteria', NABERS Design for Performance (DFP), the current Building Council of Offices (BCO) recommendations and (for operational profiles) the expected use of the building once occupied.

4.2 Fabric

Fabric Element	u-value (W/m ² K)
Curtain Wall (Existing replaced)	1.44 0.40 g-value LT 0.70
Curtain Wall (Proposed Extension)	1.40 0.40 g-value 0.70
Exposed Floor	0.45
Roof (Existing)	1.42

Fabric Element	u-value (W/m ² K)
Roof (Proposed Extension)	0.18
Roof Light	1.44 0.90 g-value LT 0.90
Air Permeability	4 m ³ /h.m ² @ 50Pa

Table 1. Input Parameters – Fabrics

4.3 HVAC Systems

Energy-efficient HVAC equipment, including Air Source Heat Pumps (ASHP), provides effective heating and cooling to mitigate overheating risks.

HVAC 1: Circulation	
Heating	Electric Panel Heater
Heat Generator Seasonal Efficiency	1.00
Ventilation Type	Natural
Automatic monitoring and targeting	Yes
Set Points	Winter 18°C
HVAC 2: Kitchen (Commercial)	
Heating	Electric Panel Heater

Heat Generator Seasonal Efficiency	1.00
Ventilation Type	Mechanical Supply & Extract
SFP	1.10 Supply 0.50 Extract
Automatic monitoring and targeting	Yes
Set Points	Winter 15°C
HVAC 3: Changing (Showers)	
Heating	Electric Panel Heater
Heat Generator Seasonal Efficiency	1.00
Ventilation Type	Balanced Supply & Extract (MVHR)
SFP	1.60
Heat Recovery Efficiency	75%
Automatic monitoring and targeting	Yes
Set Points	Winter 21°C
HVAC 4: Gym, Yoga, Offices & Reception	
Heating/Cooling Type	VRF from Air Source Heat Pump
Heat Generator Seasonal Efficiency	3.30

Cooling Seasonal Efficiency	5.51
Ventilation Type	Balanced Supply & Extract (Central AHU)
SFP	1.80
Heat Recovery Efficiency	75%
Automatic monitoring and targeting	Yes
Set Points	Gym Summer 16°C Winter 16°C Yoga Summer 18°C Winter 18°C Office & Reception Summer 24°C Winter 21°C
HVAC 5: Function Space (Events), Bar, Retail Unit & Restaurant	
Heating/Cooling Type	VRF from Air Source Heat Pump
Heat Generator Seasonal Efficiency	4.00
Cooling Seasonal Efficiency	5.50
Ventilation Type	Balanced Supply & Extract (MVHR)
SFP	1.60
Heat Recovery Efficiency	80%
Automatic monitoring and targeting	Yes
Set Points	Summer 24°C Winter 21°C

HVAC 6: Comms	
Heating/Cooling Type	DX Cooling
Heat Generator Seasonal Efficiency	4.00
Cooling Seasonal Efficiency	6.50
Ventilation Type	N/A
Automatic monitoring and targeting	Yes
Set Points	Summer 24°C Winter 24°C

Table 2. HVAC System Details

Ventilation is set to activate when the zonal carbon dioxide concentration exceeds 600ppm, gradually increasing airflow to supply the full flow rate upon reaching 800ppm.

Night purge ventilation during summer has been included in the model to operate overnight at 20% of the design flow rate when the outside temperature is below the room air temperature, with the aim of reducing the cooling load.

Zone Type	Flow Rate	CO ₂ Demand Control Ventilation	Night Purge (Summer)
Bar	10 ACH ⁻¹	Yes	Yes
Changing (Showers)	10 ACH ⁻¹	-	-
Circulation	-	-	-

Zone Type	Flow Rate	CO ₂ Demand Control Ventilation	Night Purge (Summer)
Comms	-	-	-
Function Space (Events)	12 l/s/p	Yes	Yes
Gym	6 ACH ⁻¹	Yes	Yes
Kitchen (Commercial)	40 ACH ⁻¹	-	Yes
Office	14 l/s/p	Yes	Yes
Reception	12 l/s/p	Yes	Yes
Retail Unit	10 l/s/p	Yes	Yes
Restaurant	15 ACH ⁻¹	Yes	Yes
WC	6 ACH ⁻¹	-	-
Store	-	-	-
Plant	-	-	-

Table 3. Ventilation Strategy

4.4 Domestic Hot Water

The hot water demand has been taken from the NABERS UK DFP UK Guide and BSRIA.

Domestic Hot Water	
DHW Type	Electric Water Heaters
Efficiency	100%
Storage Storage Losses	1,500 litres 0.0567kWh/l/day

Table 4. Domestic Hot Water Details

Domestic Hot Water Daily Demand (litres/person)	
Bar	2
Gym	20
Office	4
Retail Unit	1.28

Restaurant	6
------------	---

Table 5. Domestic Hot Water Daily Demand

4.5 HVAC Operation

Zone Type	Heating Operation Weekday Profile	Heating Operation Weekend Profile	Cooling Operation Weekday Profile	Cooling Operation Weekend Profile
Bar	11:00-24:00 100%	12:00-24:00 100%	11:00-24:00 100%	12:00-24:00 24%
Changing (Showers)	07:00-18:00 100%	-	-	-
Circulation	07:00-18:00 100%	08:00-17:00 10%	-	-
Comms	-	-	On Continuously	
Function Space (Events)	2 hrs 3 times per week 100%	-	2 hrs 3 times per week 100%	
Gym	06:00-22:00 100%			
Kitchen (Commercial)	07:00-22:00 100%	07:00-22:00	-	-
Office	07:00-22:00 100%	09:00-12:00 100%	07:00-18:00 100%	09:00-12:00 100%
Office (L01 after hours zones)		Saturdays 09:00-12:00 100%		Saturdays 09:00-12:00 100%
Reception	07:00-18:00 100%	-	07:00-18:00 100%	-

Zone Type	Heating Operation Weekday Profile	Heating Operation Weekend Profile	Cooling Operation Weekday Profile	Cooling Operation Weekend Profile
Retail Unit	07:00-22:00 100%	Saturdays 10:00-22:00 100% Sundays & Holidays 10:00-16:00 100%	07:00-22:00 100%	Saturdays 10:00-22:00 100% Sundays & Holidays 10:00-16:00 100%
Restaurant (Dining)		07:00-22:00 100%		07:00-22:00 100%
Toilet	07:00-18:00 100%	09:00-12:00 100%	-	-
Store	-	-	-	-
Plant	-	-	-	-

Table 6. HVAC Operation

4.6 Lighting

Zone Type	Energy (W/m ²)	Controls	Weekday Profile	Weekend Profile
Bar	15	PIRs	10:00-22:00 100% 22:00-24:00 50% 24:00-10:00 20%	10:00-23:00 100% 23:00-24:00 50% 24:00-10:00 20%
Changing (Showers)	8	PIRs	07:00-09:00 100% 12:00-13:00 100% 16:00-17:00 100%	-
Circulation		PIRs & Daylight Dimming	07:00-09:00 100%	08:00-17:00 10%

Zone Type	Energy (W/m ²)	Controls	Weekday Profile	Weekend Profile
			12:00-13:00 100% 16:00-17:00 100%	
Comms		PIRs	1 hr/day	-
Function Space (Events)		PIRs	2hrs 3 times a week 100%	-
Gym		PIRs	00:00-05:00 10% 05:00-06:00 30% 06:00-07:00 70% 07:00-21:00 100% 21:00-22:00 70% 22:00-23:00 40% 23:00-24:00 20%	00:00-05:00 10% 05:00-06:00 30% 06:00-07:00 70% 07:00-08:00 50% 08:00-14:00 90% 14:00-16:00 90% 16:00-18:00 80% 18:00-20:00 70% 20:00-22:00 50% 22:00-23:00 30% 23:00-24:00 20%
Kitchen (Commercial)	15	PIRs	07:00-22:00 100%	07:00-22:00 100%
Office	2.55	PIRs & Daylight Dimming	00:00-07:00 5% 07:00-08:00 30% 08:00-09:00 75% 09:00-17:00 100% 17:00-18:00 75% 18:00-19:00 25% 19:00-21:00 15%	00:00-08:00 5% 08:00-17:00 15% 17:00-24:00 5%

Zone Type	Energy (W/m ²)	Controls	Weekday Profile	Weekend Profile
			21:00-24:00 5%	
Office (L01 after hours zones)	2.55	PIRs & Daylight Dimming	00:00-07:00 5% 07:00-08:00 30% 08:00-09:00 75% 09:00-17:00 100% 17:00-18:00 75% 18:00-19:00 25% 19:00-21:00 15% 21:00-24:00 5%	Saturdays 00:00-08:00 5% 08:00-12:00 40% 12:00-17:00 15% 17:00-24:00 5% Sundays & Holidays 00:00-08:00 5% 08:00-17:00 15% 17:00-24:00 5%
Reception	10	PIRs & Daylight Dimming	09:00-17:00 100%	08:00-17:00 10%
Retail Unit	15	PIRs	10:00-22:00 100%	Saturdays 10:00-22:00 100% Sundays & Holidays 10:00-16:00
Restaurant (Dining)	15	PIRs	07:00-22:00 100%	07:00-22:00 100%
Toilet	8	PIRs & Daylight Dimming	07:00-17:00 100%	08:00-17:00 10%
Store	8	PIRs	1 hr/day	-
Plant	8	PIRs	1 hr/day	-

Table 7. Lighting Operation Details

4.7 Occupancy

Zone	Occupancy (m ² /person)	Sensible Gain Latent Gain (per person)	Weekday Profile	Weekend Profile
Bar	3	90 50	11:00-12:00 15% 12:00-14:00 40% 14:00-17:00 25% 17:00-19:00 60% 19:00-20:00 70% 20:00-21:00 50% 21:00-23:00 25% 23:00-24:00 10%	12:00-14:00 30% 14:00-17:00 60% 17:00-19:00 90% 19:00-22:00 100% 23:00-24:00 50%
Changing (Showers)	15	90 50	07:00-09:00 100% 12:00-13:00 50% 17:00-18:00 35%	-
Circulation	15	100 60	07:00-18:00 100%	08:00-17:00 10%
Comms	1 person	90 50	1 hr/day	-
Function Space (Events)	6	90 50	2 hrs 3 times per week 100%	-
Gym	6	165 275	00:00-05:00 5% 05:00-06:00 10% 06:00-07:00 40% 07:00-08:00 50% 08:00-09:00 45%	00:00-05:00 5% 05:00-06:00 10% 06:00-07:00 8% 07:00-08:00 13% 08:00-09:00 25%

Zone	Occupancy (m ² /person)	Sensible Gain Latent Gain (per person)	Weekday Profile	Weekend Profile
			09:00-10:00 35% 10:00-11:00 45% 11:00-12:00 50% 12:00-14:00 60% 17:00-18:00 65% 18:00-19:00 85% 19:00-20:00 100% 20:00-21:00 80% 21:00-22:00 60% 22:00-23:00 45% 23:00-24:00 25%	09:00-10:00 42% 10:00-11:00 58% 11:00-13:00 70% 13:00-14:00 68% 14:00-16:00 65% 16:00-17:00 63% 17:00-18:00 60% 18:00-19:00 58% 19:00-20:00 55% 20:00-21:00 50% 21:00-22:00 45% 22:00-23:00 25% 23:00-24:00 10%
Kitchen (Commercial)	3	100 60	07:00-09:00 80% 09:00-10:00 70% 10:00-12:00 50% 12:00-13:00 80% 13:00-14:00 50% 14:00-16:00 25% 16:00-17:00 50% 17:00-21:00 80% 21:00-22:00 35%	07:00-22:00 80%
Office (Podium)	8	90 50	07:00-08:00 10%	08:00-17:00 5%

Zone	Occupancy (m ² /person)	Sensible Gain Latent Gain (per person)	Weekday Profile	Weekend Profile
Office (Tower)	10	90 50	08:00-09:00 20% 19:00-17:00 70% 17:00-18:00 35% 18:00-19:00 10% 19:00-21:00 5%	
Office (L01 after hours zones)	8	90 50		Saturdays 08:00-09:00 5% 09:00-12:00 15% 12:00-17:00 5% Sundays & Holidays 08:00-17:00 5%
Reception	8	90 50	09:00-17:00 100%	08:00-17:00 10%
Retail Unit	8	100 60	07:00-09:00 80% 09:00-10:00 70% 10:00-12:00 50% 12:00-13:00 80% 13:00-14:00 50% 14:00-16:00 25% 16:00-17:00 50% 17:00-21:00 80% 21:00-22:00 35%	Saturdays 10:00-22:00 80% Sundays & Holidays 10:00-16:00 80%
Restaurant (Dining)	3			
Toilet	8	90 50	07:00-09:00 20% 09:00-10:00 80% 10:00-13:00 20% 13:00-14:00 50% 14:00-18:00 20%	08:00-17:00 10%

Zone	Occupancy (m ² /person)	Sensible Gain Latent Gain (per person)	Weekday Profile	Weekend Profile
Store	1 person	90 50	1 hr/day	-
Plant	1 person	90 50	1 hr/day	-

Table 8. Occupancy Details

Zone	Equipment Energy (W/m ²)	Weekday Profile	Weekend Profile
Bar	20	00:00-10:00 20% 10:00-11:00 30% 11:00-12:00 50% 12:00-17:00 60% 17:00-20:00 80% 20:00-21:00 60% 21:00-23:00 40% 23:00-24:00 50%	00:00-10:00 20% 10:00-11:00 30% 11:00-12:00 50% 12:00-17:00 70% 17:00-22:00 100% 22:00-23:00 90% 23:00-24:00 50%
Changing (Showers)	5	1 hr/day	-
Circulation	-	-	-
Comms	250	On Continuously	On Continuously
Function Space (Events)	10	2 hrs 3 times per week 100% Else 20%	-
Gym	20	00:00-06:00 20%	00:00-06:00 20%

Zone	Equipment Energy (W/m ²)	Weekday Profile	Weekend Profile
		06:00-07:00 50% 07:00-08:00 60% 08:00-09:00 70% 09:00-12:00 80% 12:00-17:00 90% 17:00-19:00 100% 19:00-20:00 90% 20:00-21:00 70% 21:00-22:00 50% 22:00-23:00 30% 23:00-24:00 20%	06:00-07:00 30% 07:00-08:00 50% 08:00-09:00 70% 09:00-12:00 90% 12:00-14:00 100% 14:00-16:00 90% 16:00-18:00 80% 18:00-19:00 60% 19:00-20:00 50% 20:00-22:00 30% 22:00-24:00 20%
Kitchen (Commercial)	40	07:00-22:00 100% Else 25%	07:00-22:00 Else 25%
Office (Podium)	7.5	00:00-07:00 25% 07:00-08:00 65% 08:00-09:00 80% 09:00-17:00 80% 17:00-18:00 65% 19:00-20:00 55% 20:00-24:00 25%	00:00-24:00 25%
Office (Tower)	6		Saturdays 00:00-24:00 25% Sundays & Holidays 00:00-24:00 25%
Office (L01 after hours zones)	7.5		
Reception	15	00:00-09:00 20% 09:00-17:00 100% 17:00-24:00 20%	08:00-17:00 25%

Zone	Equipment Energy (W/m ²)	Weekday Profile	Weekend Profile
Retail Unit	25	10:00-22:00 100% Else 25%	Saturdays 10:00-22:00 100% Sundays & Holidays 10:00-16:00 100%
Restaurant (Dining)	5	07:00-22:00 100% Else 25%	07:00-22:00 100% Else 25%
Toilet	1400W (Hand dryer)	1 hr/day	1 hr/day
Store	-	-	-
Plant	-	-	-

Table 9. Zonal Equipment Details

Equipment Type	Equipment Energy	Operation
External Lighting (Building Mounted)	30 x 0.25 kW fittings	Summer 21:00-06:00 Winter 17:00-09:00
Passenger Lifts	206,670 kWh	Total annual consumption

Table 10. Other Equipment Energy Consumption

4.8 Modelled Scenarios

The design proposals were evaluated for their impact on energy consumption. In addition to this 'baseline', additional scenarios were assessed. These are given in the table below.

Scenario	Details
Baseline (Planning design)	As per the inputs stated in the Input Parameters in this report
01	As per the Baseline, with: A future weather file representing a short and intense heatwave (Manchester DSY2 2050 High 50 th Percentile)
02	As per the Baseline, with: An increased equipment load in all Offices of 11 W/m ²
03	As per the Baseline, with: 25% of Offices (Offices on levels 02 – 05) operating for longer hours (07:00-20:00) for three months of the year
04	As per the Baseline, with: No daylight dimming controls
05	As per the Baseline, with: MVHR SFPs reduced to 1.10 W/l/s. AHU SFP reduced to 1.50 W/l/s. Heat Recovery efficiency enhanced to 85% for both MVHR and AHU
06	As per the Baseline, with: Heating set point in Circulation areas set to 12°C (unheated)

Scenario	Details
	Glazing g-value increased to 0.50
07	As per the Baseline, with: Basement external walls and thermal lining at the ceiling of B2 set to a U-value of 0.26 W/m ² K
08	Optimised model combining Scenarios 05, 06 & 07

Table 11. Modelled Scenarios

5.0 Results

5.1 Manchester City Council Core Strategy

The CIS Tower development meets the criteria stated in the Manchester City Council Core Strategy Policy EN6 Target Framework for Carbon Dioxide reductions from low or zero carbon energy supplies, by achieving a 70% improvement above the Approved Document Part L 2010. This result has been calculated using the input parameters stated in this report, using the Scenario 8 optimised model.

The Manchester City Council Climate Change Emergency and the Manchester's Net Zero Carbon Strategy have also been considered during the early design stage for the CIS Tower development, by assessing the development against the UKNZCBS and NABERS, with the aim of improving the energy efficiency of the building and reducing the Carbon Dioxide emissions.

5.2 Energy Performance Certificate

The CIS Tower development surpasses the target EPC rating of 'C', achieving an estimated EPC 'A' rating with an asset rating of '20'. This outcome is based on calculations using the input parameters outlined in this report and the Baseline (planning design) model. Table 12 highlights the significant reduction in operational carbon emissions achieved by the proposed design. Specifically, the Building Emission Rate (kgCO_2/m^2) demonstrates a 75.2% reduction compared to the existing building with current systems under the Baseline model, and a 77.8% reduction under the Scenario 08 optimised model.

Appendix 2 contains a draft EPC for the Be Lean + Be Clean + Be Green strategy, while Appendix 3 provides a draft EPC for the Be Lean + Be Clean (Optimised) + Be Green approach. The Be Green strategy includes 40 MWh of photovoltaic (PV) energy generation.

Iteration	Building Emission Rate (kgCO ₂ /m ² per year) *	vs. Existing BER (%)	Primary Energy (kWh _{PE} /m ² per year)	vs. Existing Primary Energy (%)	EPC Rating	Asset Rating	vs. Existing Asset Rating
Existing Building Existing Systems	33.18	-	220.46	-	E	125	-
Be Lean	28.99	-12.6	203.54	-7.7	D	118	-7
Be Clean	9.94	-70.0	105.81	-52.0	A	25	-100
Be Green	32.31	-2.6	211.61	-4.0	E	123	-2
Be Lean + Be Clean + Be Green	8.22	-75.2	87.87	-60.1	A	20	-105
Be Lean + Be Clean (Optimised) + Be Green	7.35	-77.8	79.02	-64.2	A	18	-107

Table 12. Improvements on EPC Rating, NCM Energy & NCM Carbon Emissions

5.1 BREEAM UK

The targeted 'BREEAM Excellent' classification requires the building to be assessed in its new build and existing components.

To achieve the BREEAM Ene 01 credits, the proposed fabric and servicing strategies, combined with the inclusion of a nominal PV system (serving the new build extension only) will achieve all four credits (Appendix 4).

A Low Zero Carbon (LZC) Study was undertaken for the BREEAM Ene 04 credit, concluding Air Source Heat Pump (ASHP) and PVs are the most feasible LZC technologies that may be included in the proposals. Modelling shows that heat pumps use almost 8.5% of the total energy that will be consumed to service the building.

The following feasibility matrix is based on assumptions of size, output, use and cost and therefore should not be used as a basis for design. They are used to compare the potential impact of each technology.

Technology	Annual CO ₂ Reduction (%)	Result	Capital Cost (£)	Result	Payback Period	Result	Recommendation
Photovoltaics	10	High	1,060,438	High	7.3	Medium	High
Solar Thermal	0.3	Low	156,319	Low	11.5	High	Low
Wind Turbine	0.9	Medium	250,000	Low	19	High	Low
ASHP	6.8	High	3,071,480	High	20.9	High	High
GSHP	2.5	Low	5,681,569	High	29	High	Low
CHP	13.6	Medium	3,787,713	High	11.4	High	Low
Biomass	5.1	High	4,261,177	High	127	High	Low

Table 13. LZC Feasibility Matrix.

Where the following applies:

Result	Annual CO2 Reduction (%)	Capital Cost (£)	Payback (Years)
High	>8	>750,000	>8
Medium	3 - 8	250,000 - 750,000	3 – 8
Low	<3	< 250,000	<3

Table 14. LZC Feasibility Matrix

The following LZC technologies were not include in the proposed CIS Tower design due to the following:

Hydropower

Reason for omission: No moving water in the vicinity of the site.

Combined Heat & Power (CHP)

Reason for omission: The use of the building is not expected to generate a sufficient base load to enable the use of CHP.

Ground Source Heat Pumps (GSHP)

Reason for omission: Not financially viable.

Wind-power

Reason for omission: Site is unlikely to have sufficient exposure.

Biomass

Reason for omission: The existing site does not have sufficient space available for Biomass installation.

Photovoltaic Panels

PVs to deliver an annual yield of 40MWh to achieve BREEAM 'Excellent'. PV system to serve the new-build extension only. This can be via the existing panels or a new system (Appendix 4). At present, the energy analysis has not considered the reuse of the existing PV panels; however, the condition and viability for the reuse of the panels and associated equipment is to be determined at the next design stage.

5.2 UK Net Zero Carbon Buildings Standard

The UKNZCBS offers energy performance targets. The following are energy usage targets for 'one-go' retrofit refurbishment works and assumes that the refurbishment works will commence in 2025:

- Offices: 125 kWh/m²/annum
- Retail - Supermarkets: 230 kWh/m²/annum
- Retail - F&B with Catering: 450 kWh/m²/annum

If the refurbishment works have not started on site in 2025, and works commence in 2026, the following targets must be achieved:

- Offices: 122 kWh/m²/annum
- Retail - Supermarkets: 224 kWh/m²/annum
- Retail - F&B with Catering 438 kWh/m²/annum

Figure 2 displays the Energy Use Intensity results for the Offices, demonstrated through numerous scenarios as described in Table 11 above. All scenarios achieve an Energy Use Intensity below the UKNZCBS 2025 and 2026 targets, with a minimum improvement of 30% over the 2025 target, and a minimum improvement of 28% over the 2026 target.

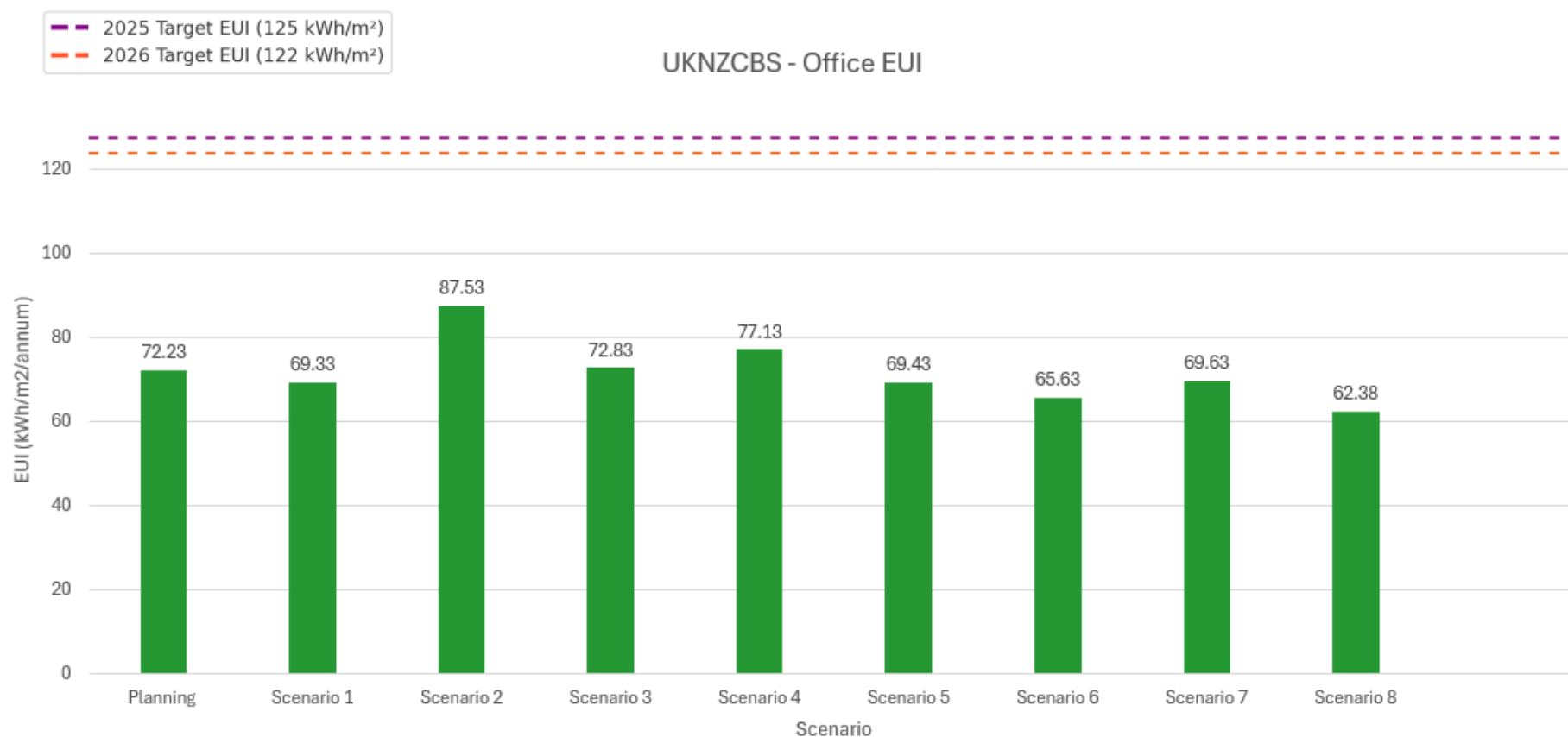


Figure 2. UKNZCBS – Office Energy Use Intensity

The NCM building type for the Retail units is unknown at this time, therefore the worst-case scenario has been assigned at this time, as Retail: Supermarket, which has the highest Energy Use Intensity for the 'Retail' type.

Figure 3 displays the Energy Use Intensity for the 'Retail: Supermarket' units, with an Energy Use Intensity over the UKNZCBS 2025 and 2026 targets, including a 9% improvement over the 2025 target and a 6% improvement over the 2026 target.

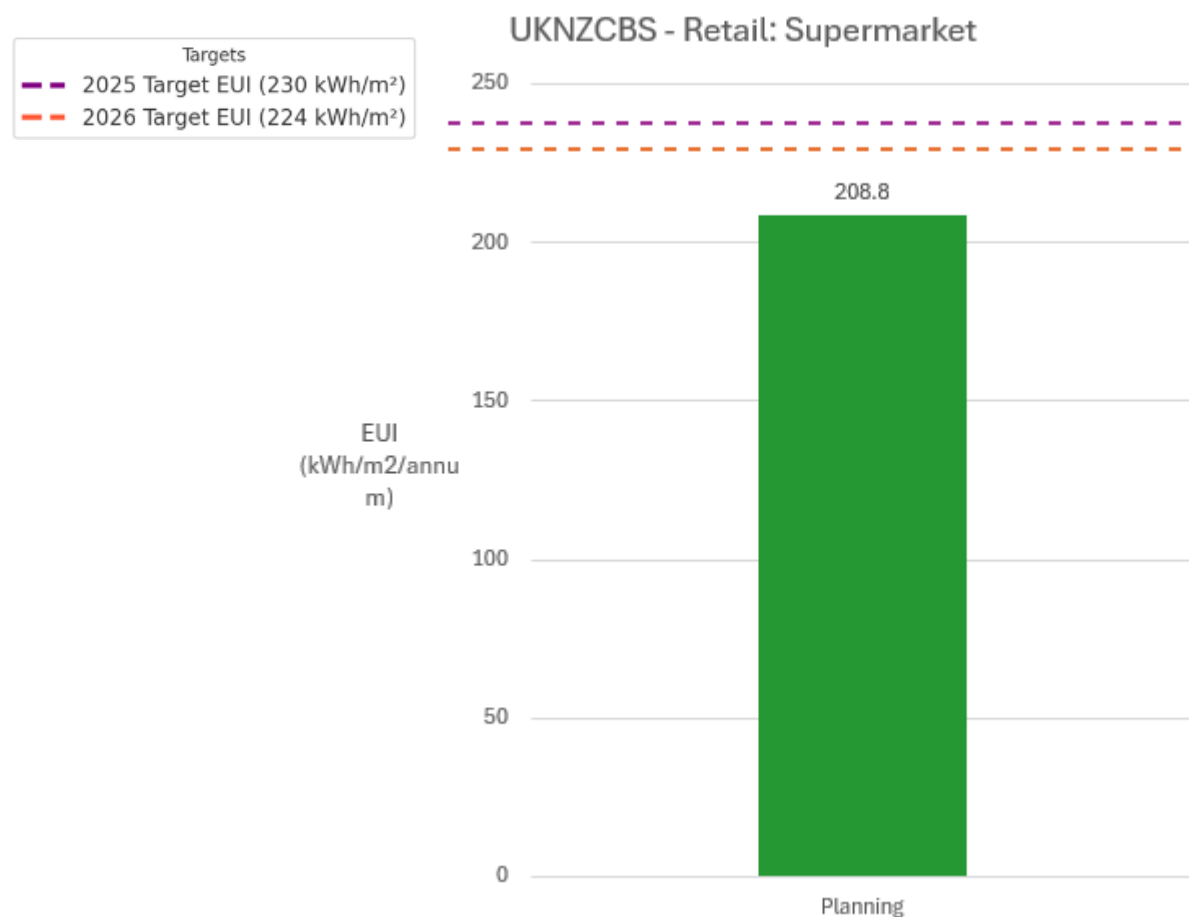


Figure 3. UKNZCBS – Retail: Supermarket Energy Use Intensity

Figure 4 displays the Energy Use Intensity for the 'Retail: F&B with Catering', assessing the Restaurant, Kitchen, Bar and Leisure zones, with an Energy Use Intensity over the UKNZCBS 2025 and 2026 targets, including a 48% improvement over the 2025 target and a 47% improvement over the 2026 target.

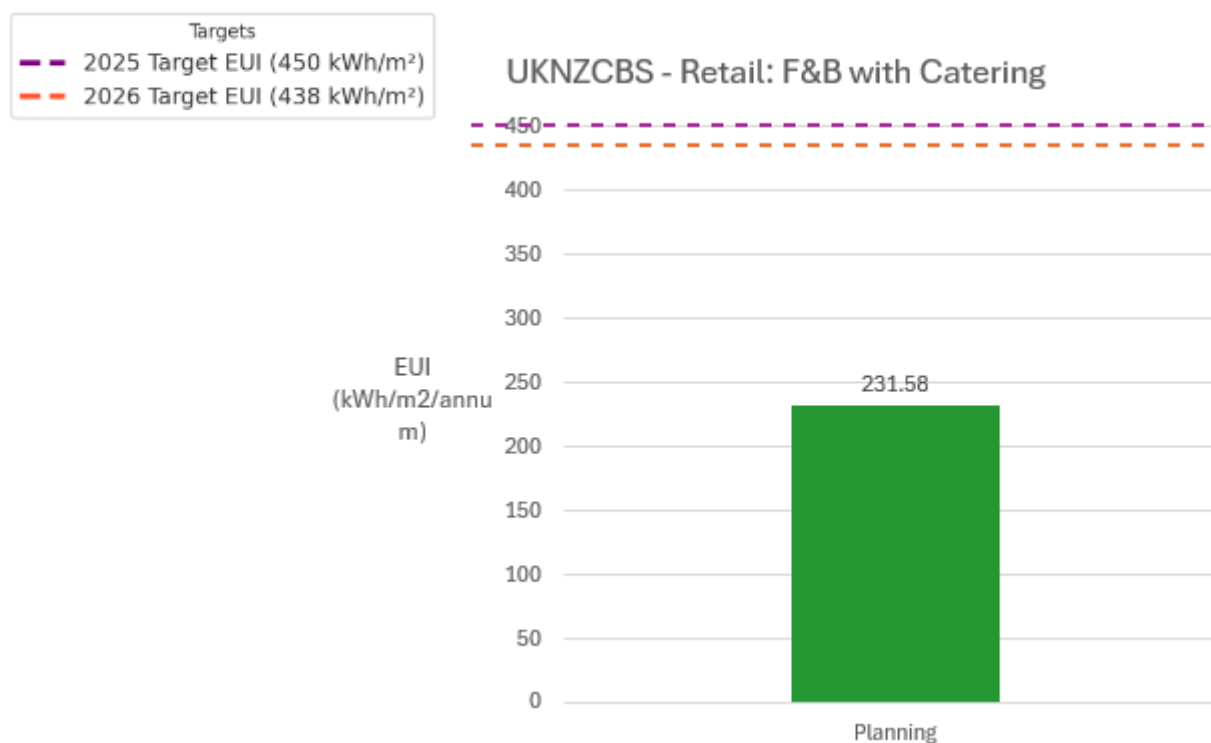


Figure 4. UKNZCBS – Retail: F&B with Catering Energy Use Intensity

Figure 5 displays the Energy Use Intensity for the 'Sports & Leisure: Fitness', assessing the Gym, Yoga and Archive Room, with an Energy Use Intensity over the UKNZCBS 2025 and 2026 targets, including a 12% improvement over the 2025 target and a 10% improvement over the 2026 target.

The 'Sports & Leisure: Fitness' zones have been assessed as full fit out 24/7 occupied gym areas.

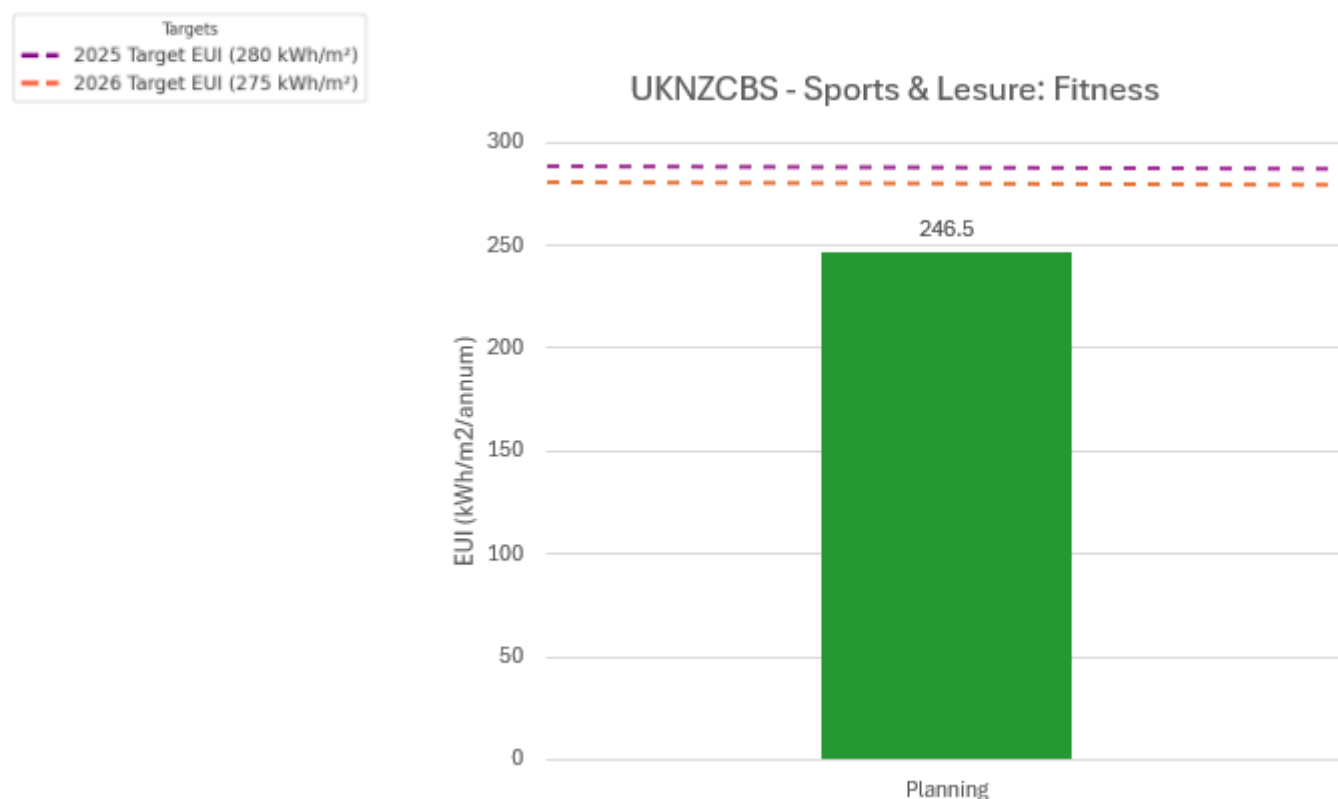


Figure 5. UKNZCBS – Sports & Leisure: Fitness Energy Use Intensity

5.1 NABERS UK

NABERS UK is an adaption of the successful rating programme NABERS that operates in Australia. Launched in 1999, NABERS is widely considered to be a world leading environmental performance rating tool for commercial buildings that gives a rating of up to six stars (the higher the more efficient). The CIS Tower development is aiming for an appropriate NABERS rating.

Figure 6 displays the Energy Use Intensity for the Offices compared to a 4.5* rating. All scenarios, except Scenario 2 (increased power load), achieve a 4.5-star rating. Scenario 08 achieves the highest margin 23.7%. Typically, a 25% margin is used at this stage, but this varies case by case and may be reduced with consent. However, the typical margin may be achieved with the current proposals once the design is developed in further detail.

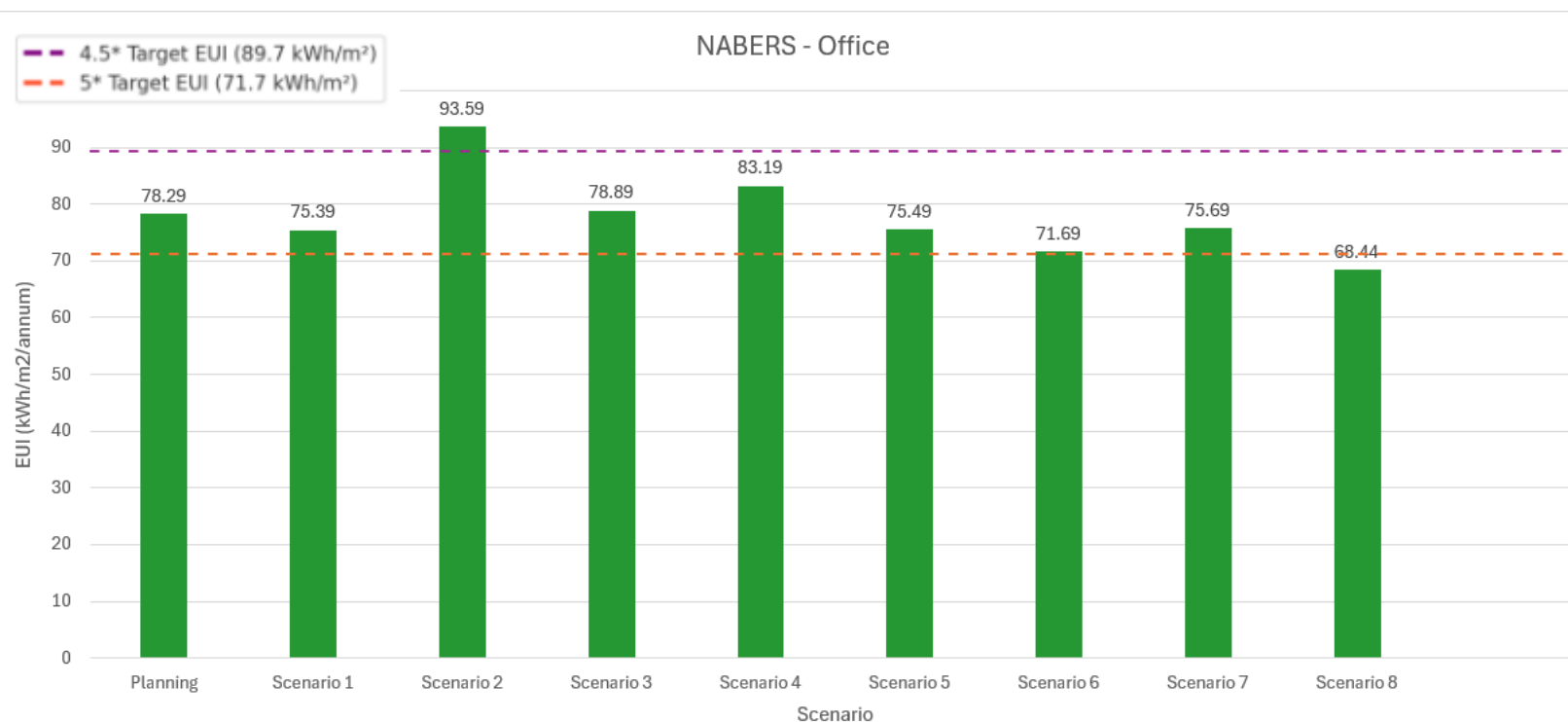


Figure 6. NABERS – Office Energy Use Intensity

6.0 Appendix 1 – UKNZCBS Existing Building Retrofit Energy Use Intensity Targets



UK Net Zero Carbon Buildings Standard

Pilot Version rev1

Table OE-2: Energy use intensity limits, Existing Building with One-Go Retrofit

← Date of commencement on site	Commercial Residential		Culture & Entertainment	Data Centres		Healthcare	Higher Ed.	Homes	Hotels	Offices (either GIA or NIA metrics may be used)	Retail	Schools	Science & Tech.	Sport & Leisure	Storage & Distribution																																																
	kWh/m ² GIA/yr	Student resi.		kWh/m ² GIA/yr	Care homes											kWh/m ² GIA/yr	Performance	kWh/m ² GIA/yr	Collection	kWh/m ² GIA/yr	Archives	PUE	Low utilisation	PUE	High utilisation	kWh/m ² GIA/yr	Acute Trust	kWh/m ² GIA/yr	Care Trust	kWh/m ² GIA/yr	Community Trust	kWh/m ² GIA/yr	Mental health & Learning Trust	kWh/m ² GIA/yr	Ambulance Trust	kWh/m ² GIA/yr	-	kWh/m ² GIA/yr	Single family homes	kWh/m ² GIA/yr	Flats	kWh/m ² GIA/yr	General	kWh/m ² GIA/yr	Call Centres	Trading Floors	kWh/m ² GIA/yr	Supermarket	kWh/m ² GIA/yr	High street retail, Department store	kWh/m ² GIA/yr	F&B without catering ^a	kWh/m ² GIA/yr	F&B with catering ^b	kWh/m ² CPA/yr	Landlord areas ^c	kWh/m ² GIA/yr	Retail warehouse	kWh/m ² GIA/yr	Early years	Primary	Secondary incl. SEN	kWh/m ² GIA/yr
2025	110	220	130	100	10	1.4	1.2	258	140	162	166	182	130	75	65	180	100	125	191	239	220	275	230	90	250	450	80	100	90	85	95	360	210	500	280	35	100	230																									
2026	108	216	128	98	10	1.4	1.2	259	140	163	167	182	127	74	65	176	97	122	187	234	216	270	224	87	243	438	79	97	89	84	94	351	206	490	275	34	97	221																									
2027	106	211	125	96	10	1.39	1.19	259	140	163	167	182	123	73	64	172	94	118	183	229	211	264	217	84	236	425	77	94	88	83	92	341	202	480	270	33	94	211																									
2028	103	206	122	93	10	1.38	1.18	259	140	163	167	182	119	72	64	168	91	114	179	224	206	258	210	81	228	412	75	90	86	81	90	331	198	470	264	32	90	201																									
2029	101	202	120	91	10	1.38	1.18	259	140	163	167	182	116	71	63	164	88	110	174	218	201	252	204	78	221	400	74	87	85	80	89	322	194	460	259	31	87	192																									
2030	99	197	117	89	9	1.37	1.17	259	140	163	167	182	112	70	63	160	85	107	170	213	196	245	197	75	214	387	72	84	84	79	87	312	190	450	254	30	84	182																									
2031	96	192	114	86	9	1.36	1.16	259	140	163	167	182	108	69	62	156	82	103	166	208	191	239	190	72	206	374	70	80	82	77	85	302	186	440	248	29	80	172																									
2032	94	188	112	84	9	1.36	1.16	259	140	163	167	182	105	68	62	152	79	99	162	203	186	233	184	69	199	362	69	77	81	76	84	293	182	430	243	28	77	163																									

7.0 Appendix 2 – Draft EPC: Be Lean + Be Clean + Be Green

Energy Performance Certificate
Non-Domestic Building

 HM Government

CIS Tower EPC_ Be Lean + Be Clean + Be Green
Miller Street
Manchester
M60 xxx

Certificate Reference Number:
3492-0707-2687-0009-8688

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information in the guidance document *Energy Performance Certificates for the construction, sale and let of non-dwellings* available on the Government's website at www.gov.uk/government/collections/energy-performance-certificates.

Energy Performance Asset Rating

More energy efficient





A 0-25
B 26-50
C 51-75
D 76-100
E 101-125
F 126-150
G Over 150

Net zero CO₂ emissions

**20**

This is how energy efficient the building is.

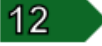
Less energy efficient

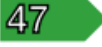
Technical information

Main heating fuel:	Grid Supplied Electricity
Building environment:	Air Conditioning
Total useful floor area (m ²):	55255.867
Building complexity:	Level 5
Building emission rate (kgCO ₂ /m ² per year):	8.22
Primary energy use (kWh _{eq} /m ² per year):	87.87

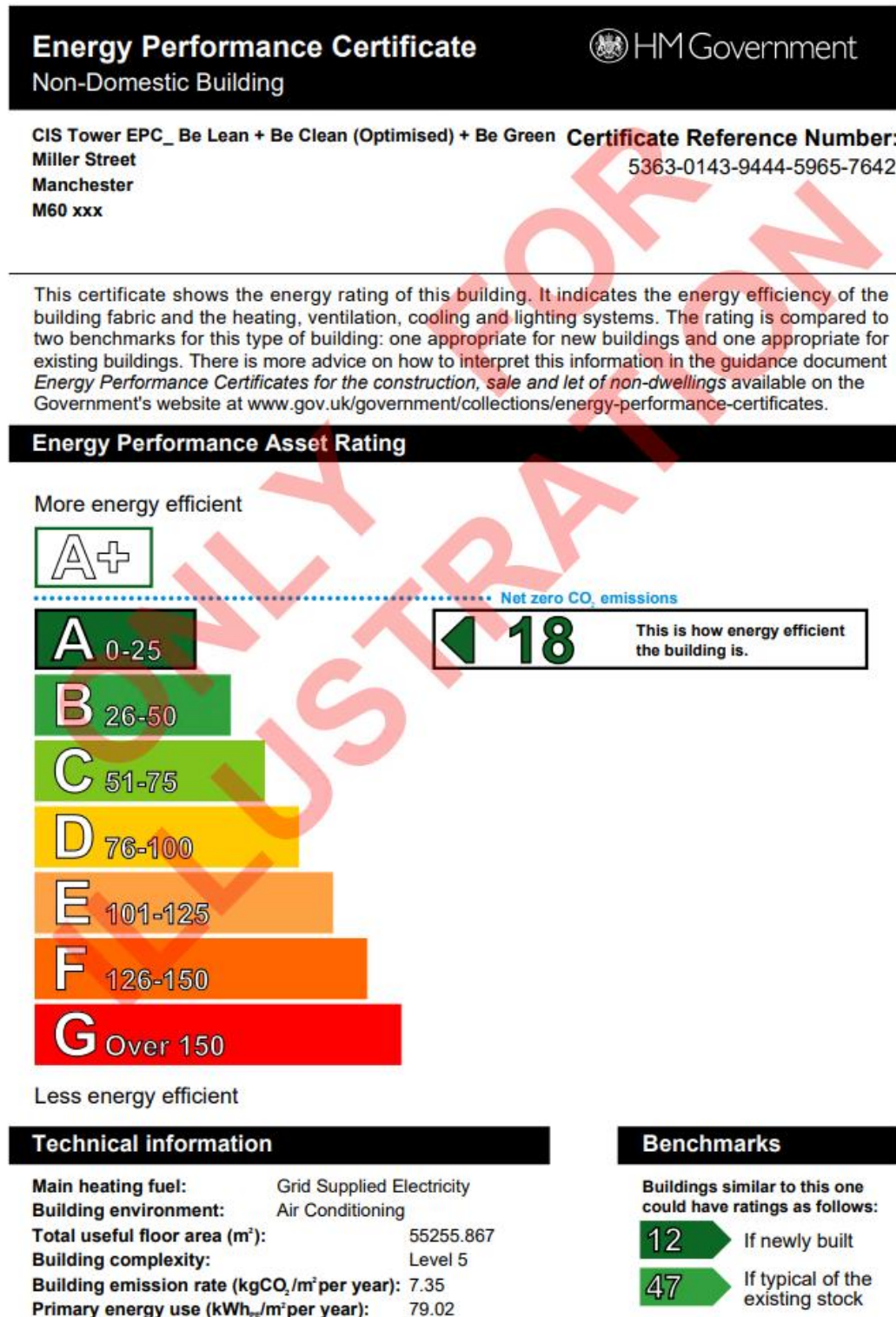
Benchmarks

Buildings similar to this one could have ratings as follows:

**12** If newly built

**47** If typical of the existing stock

8.0 Appendix 3 – Draft EPC with 40MWh PV



9.0 Appendix 4 – PV Area Drawing

