

Kench Consultants

Brunel Walk

Energy Statement

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REVISION SHEET

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1 INTRODUCTION

1.1 INTRODUCTION TO DEVELOPMENTS

The project anticipates the provision of 45 new residential units and external amenity space.

The site is located in a predominantly suburban area, surrounded by other residential homes.

The plan of the proposed development can be seen in Figure 1 below.

Figure 1; Plan



This statement will demonstrate how the predicted CO2 emissions of the proposed development will be reduced by a minimum of 35% compared with a typical 2021 Building Regulations Part L compliant building.

1.2 PLANNING REQUIREMENTS

The following Energy/CO2 related planning requirements are applicable to this development:

Policy SI 2 Minimising greenhouse gas emissions

A Major development should be net zero-carbon.[151] This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

1) be lean: use less energy and manage demand during operation
2) be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
3) be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
4) be seen: monitor, verify and report on energy performance.

B Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C A minimum on-site reduction of at least 35 per cent beyond Building Regulations[152] is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

1) through a cash in lieu contribution to the borough's carbon offset fund, or
2) off-site provided that an alternative proposal is identified and delivery is certain.

D Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

151 Where zero-carbon is used in the Plan it refers to net zero-carbon – see Glossary for definition.

152 Building Regulations 2013. If these are updated, the policy threshold will be reviewed. https://www.gov.uk/government/publications/conservation-of-fuel-and-power-approved-document-l

1.3 METHODOLOGY

The methodology that has been applied in this report is as follows:

1. Prepare baseline energy calculations for the site based on a Part L 2021 compliant construction specification designed for the development.

2. From the baseline energy calculations, the predicted energy demand for the development in kWh/year and the predicted CO2 emissions in kgCO2/year for the site can be established.

3. **BE LEAN**: Apply energy efficient design principles (improved fabric spec) in order to reduce the energy demand and CO2 emissions of the site. Prepare energy calculations using the improved fabric specification.

4. **BE CLEAN:** Explore opportunities to improve the building services and increase the efficiency in which energy can be delivered to the dwelling.

5. **BE GREEN**: Carry out a renewable energy feasibility study to ascertain which LZC technologies would be suitable for the development and ascertain the impact of introducing different technologies.

6. Establish the sizing of suitable renewable technologies to ensure the CO2 emission reduction target is met.

2 PREDICTED ANNUAL CARBON EMISSIONS

Baseline SAP calculations were prepared based on the construction specification shown in table 1 below. This specification is as outline in Approved Document Part L;

Table 4.1 Limiting U-values for new fabric elements and air permeability in new dwellings

Element type	Maximum U-value[1] W/(m²·K)
All roof types[2]	0.16
Wall[2]	0.26
Floor	0.18
Party wall	0.20
Swimming pool basin[3]	0.25
Window[4][5]	1.6
Rooflight[6][7]	2.2
Doors (including glazed doors)	1.6
Air permeability	8.0m³/(h·m²) @ 50Pa 1.57m³/(h·m²) @ 4Pa

NOTES:

1. Area-weighted average values.
2. For dormer windows, 'roof' includes the roof parts of the windows and 'wall' includes the wall parts (cheeks).
3. The U-value of a swimming pool basin (walls and floor) calculated according to **BS EN ISO 13370**.
4. If performance requires thicker glass to be used, an equivalent window unit with standard thickness (6mm) glazing should be shown to meet the required standard.
5. Including roof windows and curtain walling.
6. U-values for rooflights or rooflight-and-kerb assemblies should be based on the developed surface area of the rooflight (U_d-values), which is often greater than the area of the roof opening. Further guidance on U_d-values is given in the Building Research Establishment's BR 443 and the National Association of Rooflight Manufacturers' Technical Document NTD02.
7. The limiting value for rooflights also applies to kerbs that are supplied as part of a single rooflight-and-kerb assembly sourced from the same supplier and for which the supplier can provide a combined U_d-value for the assembly. An upstand built on site should not exceed a U-value of 0.35W/(m²·K).

Aspect		L1A
	External Walls	0.18 W/m²K
	Communal Walls	N/A
	Insulated Roofs	0.13 W/m²K
	Ground floors	0.13 W/m²K
	Windows (All)	1.6 W/m²K
	External Doors	1.6 W/m²K
	Thermal Bridging	N/A
Ventilation	**Airtightness m3/(hr.m²)**	5
Heating	**Heating**	Gas Boiler
	Hot Water	As Per Heating
	Controls	TTZC
Low energy lighting		100%
Ventilation		Natural ventilation with extracts
Renewables / LZC	**None**	

Part L compliant construction specifications

The conducted SAP calculations have shown the proposed baseline development will generate **736.66 kgCO2/year/m²**.

London Plan Policy SI 2 sets out a requirement for major developments to achieve a net zero-carbon reduction of 100% beyond **Building Regulations**, meaning that a minimum reduction of **736.66 kgCO2/yr/m²** will be expected.

3 PREDICTED ANNUAL ENERGY DEMAND

Based on using the specification outlined in table 1 above, this would create a total predicted energy demand for the development of **237986.3 kWh/year**. The breakdown of this predicted energy demand can be seen in table 2 below. The figures quoted have been derived from the Design Stage SAP 10 Calculations for the development.

			Total Predicted Energy Requirement (kWh/yr)			
			Space Heating	Water Heating	Lighting, Pumps, Fans	Total Predicted Energy Requirement (kWh/yr)
Plot	No.	Units	Electric	Electric	Electric	
A001	1	kWh/yr	3167.66	2480.56	378.97	6027.19
A101			1907.54	2120.04	267.75	4295.33
A102			1809.9	2142.88	286.05	4238.83
A103			2428.07	2494.21	408.34	5330.62
A201			2335.11	2110.14	267.75	4713
A202			1809.9	2142.88	286.05	4238.83
A203			2428.07	2494.21	408.34	5330.62
A301			1609.03	2150.66	287.39	4047.08
A302			3290.28	2476.31	408.34	6174.93
B001			1737.52	2103.36	246.75	4087.63
B002			3419.71	2473.4	424.48	6317.59
B101			2806.13	2475.56	402.36	5684.05
B102			2230.82	2508.38	436.41	5175.61
B103			2585.48	2339.29	363.32	5288.09
B201			2299.38	2487.41	402.36	5189.15
B202			2230.82	2508.38	436.41	5175.61
B203			1704.79	2362.33	363.32	4430.44
B301			3145.16	2468.93	402.36	6016.45
B302			2230.82	2508.38	436.41	5175.61
B303			2396.25	2343.42	363.32	5102.99
C001			1737.52	2103.36	246.75	4087.63
C002			3419.71	2473.4	424.48	6317.59
C101			2806.13	2475.56	402.36	5684.05
C102			2230.82	2508.38	436.41	5175.61
C103			2585.48	2339.29	363.32	5288.09
C201			2299.38	2487.41	402.36	5189.15
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C203			1704.79	2362.33	363.32	4430.44
C301			3145.16	2468.93	402.36	6016.45
C302			2230.82	2508.38	436.41	5175.61
C303			2396.25	2343.42	363.32	5102.99
D001			2494.88	2483.73	379.86	5358.47
D101			3139.31	2348.48	360.2	5847.99
D102			2321.76	2495.86	424.28	5241.9

D201			3139.31	2348.48	360.2	5847.99
D202			3178.01	2477.29	424.28	6079.58
H001			3203.03	2523.84	447.31	6174.18
H002			2648.03	2534.95	448.89	5631.87
H003			2648.03	2534.95	448.89	5631.87
H004			2648.03	2534.95	448.89	5631.87
H005			2648.03	2534.95	448.89	5631.87
H006			3234.77	2525.14	421.39	6181.3
H201			2764.74	2359.16	380.6	5504.5
H202			1415.57	2179.02	300.37	3894.96
H203			2806.88	2352.15	486.03	5645.06
Total						237986.3

Table 2: Baseline Predicated Annual Energy Demand

4 REDUCING CARBON EMISSIONS THROUGH ENERGY REDUCTION

The Energy Hierarchy sets out the most effective way to reduce a dwelling's CO_2 emissions. Firstly, by reducing energy demand, then by using energy efficiently and lastly by incorporating LZC/Renewable technologies.

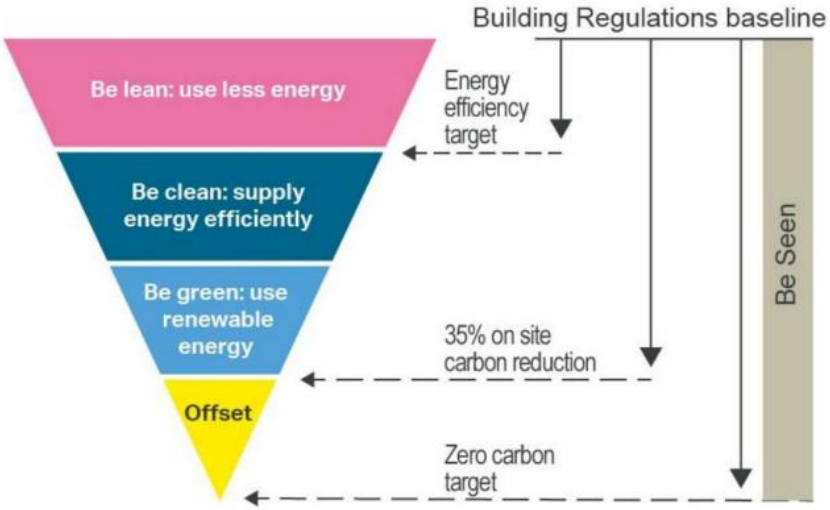


Figure 3: The Energy Hierarchy

Reducing the need for energy usage in the dwelling's design:

The first and most cost-beneficial action is to reduce the amount of energy needed by the dwelling's occupants while still maintaining or even improving the comfort conditions. This can be achieved through passive design, improving the dwelling's external fabric, and following principles to reduce air infiltration.

The developer is attempting to reduce the energy demand and CO2 emissions of the development by making the following fabric and energy efficiency improvements to their standard Part L 2021 building specification:

Energy reduction strategies include:

- Adopting enhanced fabric specifications.
- Installing high-efficiency heating systems.
- Incorporating energy-efficient lighting: 100% of all new lighting to be energy efficient.
- Adopting principles of airtight construction.
- All new windows will be double-glazed.
- Passive Solar Design – Solar gain, solar shading, thermal mass.
- Natural / Passive Ventilation strategy.

5 FEASIBILITY STUDY OF RENEWABLE TECHNOLOGIES

This section will assess the technical viability of the following renewable energy technologies for the site in order to rule out unfeasible options:

- Mast mounted wind turbines
- Roof mounted wind turbines
- Solar PV (Photovoltaic) Panels
- Solar Thermal Panels
- ASHP (Air Source Heat Pump)
- GSHP (Ground Source Heat Pump)
- Biomass
- CHP

The following observations have been made with regard to the technical feasibility of integrating renewable energy technologies into this development.

Renewable Technology	Feasible	Reasons
Mast Mounted Wind Turbine	No	There is no sufficient open land for a mast mounted wind turbine to be installed on site.
		The site is situated in a densely populated area. Surrounding properties aren't far enough away to be unaffected by turbine noise, reflected light and shadow flicker.
		The site area is surrounded by buildings and other obstructions that could cause uneven and turbulent wind patterns. Turbulent air conditions may reduce lifespan of components.
		Currently the BWEA suggests a large wind turbine to be viable where wind speed is 7m/s or above. According to the NOABL database the average wind speeds for the site is: 5 m/s at 10m, 5.7 m/s at 25m and 6.2 m/s at 45m height for the property postcode. Therefore, the wind speeds are not sufficient for a mast mounted wind turbine to be viable.
Roof Mounted Wind Turbine	No	The site area is surrounded by buildings and other structures that could cause uneven and turbulent wind patterns. Turbulent air conditions may reduce lifespan of components.
		Roof mounted wind turbines are not yet a proven technology and a number of technical problems have been identified by manufacturers which are being investigated to rectify these issues. Vibration that can be transmitted to the building structure. Noise from a turbine may cause irritation to occupants of the dwelling and adjacent buildings. Noise may also adversely affect ventilation strategy.
		Currently the BWEA suggests a large wind turbine to be viable where wind speed is 7m/s or above. According to the NOABL database the average wind speeds for the site is: 5 m/s at 10m, 5.7 m/s at 25m and 6.2 m/s at 45m height for the property postcode. Therefore, the wind speeds are not sufficient for a roof mounted wind turbine to be viable
Solar PV (Photovoltaic) Panels/Tiles	Yes	The proposed development does have sufficient flat roof area for solar panels accommodation.
		Most of the roofs should be free from overshadowing for most of the day from other buildings, structures or trees.

		The site is located in the region with high level of global horizontal irradiation (1,000-1050 kWh/m2/year)
Solar Thermal Collectors	No	The proposed development has sufficient flat roof area that can accommodate solar thermal panels.
		Most of the roofs should be free from overshadowing for most of the day from other buildings, structures or trees.
		The site is located in the region with high level of global horizontal irradiation (1,000-1050 kWh/m2/year)
		Solar thermal collectors would be compatible with the planned heating system.
		There will be a year round hot water demand.
		In practical domestic solar hot water systems, the solar hot water system is usually run in conjunction with, rather than instead of, a backup conventional boiler and as a result the carbon intensity of the combined system is high relative to other renewables. Moreover the high efficiency of modern condensing boilers, which can convert over 90% of means that the carbon intensity of these heat sources is relatively low at 200-300 gCO2/kWhth. As a result domestic solar water heating systems are a relatively expensive way of mitigating carbon emissions when they replace heat from efficient modern boilers. For this reason they are not recommended.
ASHP (Air Source Heat Pump)	Yes	The proposed development has been designed to accommodate the space for a hot water cylinder.
		The building is suitable for a low-grade heat distribution system (e.g. underfloor water system, oversized radiators).
		Condenser units can be noisy and also blow out colder air to the immediate environment causing nuisance to the residents. Furthermore the noise generated could cause disruption, as plant equipment will need to be fitted to external walls near bedroom and windows.
		There is sufficient outdoor space to locate a condenser away from bedroom spaces
GSHP (Ground Source Heat Pump)	No	It will not be possible to drill a limited number of vertical or horizontal boreholes for GSHP on the site.
		It is possible for developments to accommodate a low-grade heat distribution system (e.g. underfloor water system, oversized radiators).
		The site and neighbourhood contain mature trees. Drilling boreholes on the site create the risk of damaging their roots.
		There is not sufficient space inside the proposed plant room that can service the main dwelling and all outbuildings/annexes.
Biomass Boiler	No	There is an established fuel supply chain for the area.
		There isn't sufficient space for a delivery vehicle (vehicular access to fuel storage, turning circle etc)
		There isn't sufficient space in the proposed buildings for a wood-fuel boiler and associated auxiliary equipment.
		There isn't sufficient space for fuel storage to allow a reasonable number of deliveries.
		Biomass systems are management intensive (fuel sourcing, transport, storage) and require adequate expertise from users.

CHP	No	Given the proposed building use there won't be a high demand for heat for most of the year, therefore CHP won't be suitable.
		A CHP unit only generates economic and environmental savings when it is running at least 4,500 hours per year. This equates to an average heat demand of about 17 hours a day for five days a week throughout the year. The proposed development energy and heat demand profile does not match this requirement.
		CHP is typically utilized on buildings with high electricity and heating demand for most of the year such as local authority buildings, leisure centres, universities, hotels, and district heating schemes where CHP is used to provide electricity, space and water heating.
		CHP should be considered wherever there is demand for electricity and an appropriate demand for heat in the near vicinity.
Hot Water Heat Pump	Yes	Dwelling has been designed to include space for a water immersion cylinder.
		There is sufficient external wall area to provide intake and exhaust vents to the external air.
		There is a sufficient predicted hot water demand to allow a system of this nature to run efficiently.
		Cost of these systems are a fraction of traditional heat pumps and they provide the same level of efficient delivery to all dwellings.

Table 4: Feasibility Study of Renewable Technologies

Based on the feasibility study in table 4 above, the following technologies have been identified as being feasible for the proposed development:

- Air source heat pump
- Solar PV

6 PREDICTED ENERGY RUNNING COSTS

The S735 achieves a high seasonal coefficient of performance (SCOP), typically quoted as:

- Around 4.29–4.50 for space heating in average UK climates at 35°C flow temperature (common in modern new builds with low-temp emitters).
- Slightly lower (e.g., 3.67–3.70 at 55°C flow, but less relevant here).

For exhaust air heat pumps like this, the SCOP covers combined space heating, DHW, and ventilation heat recovery. In practice, for new builds, a realistic blended seasonal efficiency is often around 4.0–4.3 (accounting for real-world factors like part-load operation, fan energy, and DHW priority), using a conservative SCOP of 4.2 against Section 3 (Predicted annual energy demands) for plot A001 with a predicted annual energy usage of 6027.19 kWh/yr.

- Total electricity for heating + DHW ≈ 6,027 kWh ÷ 4.2 ≈ 1,435 kWh/year.

Add around 100–200 kWh/year for auxiliaries (fans, controls, occasional immersion top-up): realistic total electricity use: 1,500–1,650 kWh/year, current Ofgem energy price cap (1 Jan–31 Mar 2026) sets standard variable electricity at 27.69p/kWh (plus ~54.75p/day standing charge, but for heat pump-only usage, focus on unit rate; standing charges apply regardless).

On a standard tariff (~27.7p/kWh): £415–£460/year total running cost (electricity for the S735 system), on heat pump-optimised tariffs (e.g., Octopus Cosy, EDF Heat Pump Tracker, or similar—often blending off-peak rates of 15–18p/kWh with smart scheduling via myUplink): £300–£370/year (blended ~20–24p/kWh achievable with tariff optimisation, weather/occupancy controls).

The NIBE S735 typically delivers higher seasonal efficiency (4.2 vs. 3.9) in airtight new builds due to built-in ventilation heat recovery (recovers heat from exhaust air in bathrooms/kitchens), no distribution losses (each flat has its own compact indoor unit), and better part-load/inverter performance for small/ variable demands. Centralised Mitsubishi ASHPs lose efficiency through communal pipework, pumping, and balancing across flats.

Running cost savings per flat: NIBE often £30–£80/year lower on standard tariffs, and £20–£60/year lower on optimised tariffs (e.g., Octopus Cosy with myUplink smart scheduling). Savings compound across the development comparing against a centralised system.

Other advantages for NIBE in apartments:

- No outdoor units → easier planning, no visual/noise issues for neighbours, ideal for blocks/flats.
- Integrated mechanical ventilation + heat recovery → improves indoor air quality and reduces separate MVHR costs/energy.
- Simpler per-flat installation/maintenance; no communal plant room complexities.
- A+++ rating, R290 refrigerant, app-based tariff/occupancy optimisation → maximises cheap-rate electricity use.

7 IMPROVEMENTS TO PROVIDE 100% ENERGY REDUCTION

The developer is proposing the following measures to improve the energy performance of the building:

Be Lean;

Improved Fabric U-values to-

- Walls: 0.18 W/m²K
- Floors: 0.10 W/m²K
- Roof: 0.10 W/m²K
- Double Glazed Windows: 1.2 W/m²K
- Use of government approved A construction details (www.recognisedconstructiondetails.co.uk) to limit effects of linear thermal bridging.

Be Clean;

Improved Space & DHW Heating System-

- Remove the need for fossil fuel heating systems from the development in favour of a decarbonised, all-electric heating system such as an Air source heat pumps (e.g NIBE F370)

Be Green

Renewable Energy Sources-

- Installation of Solar PV

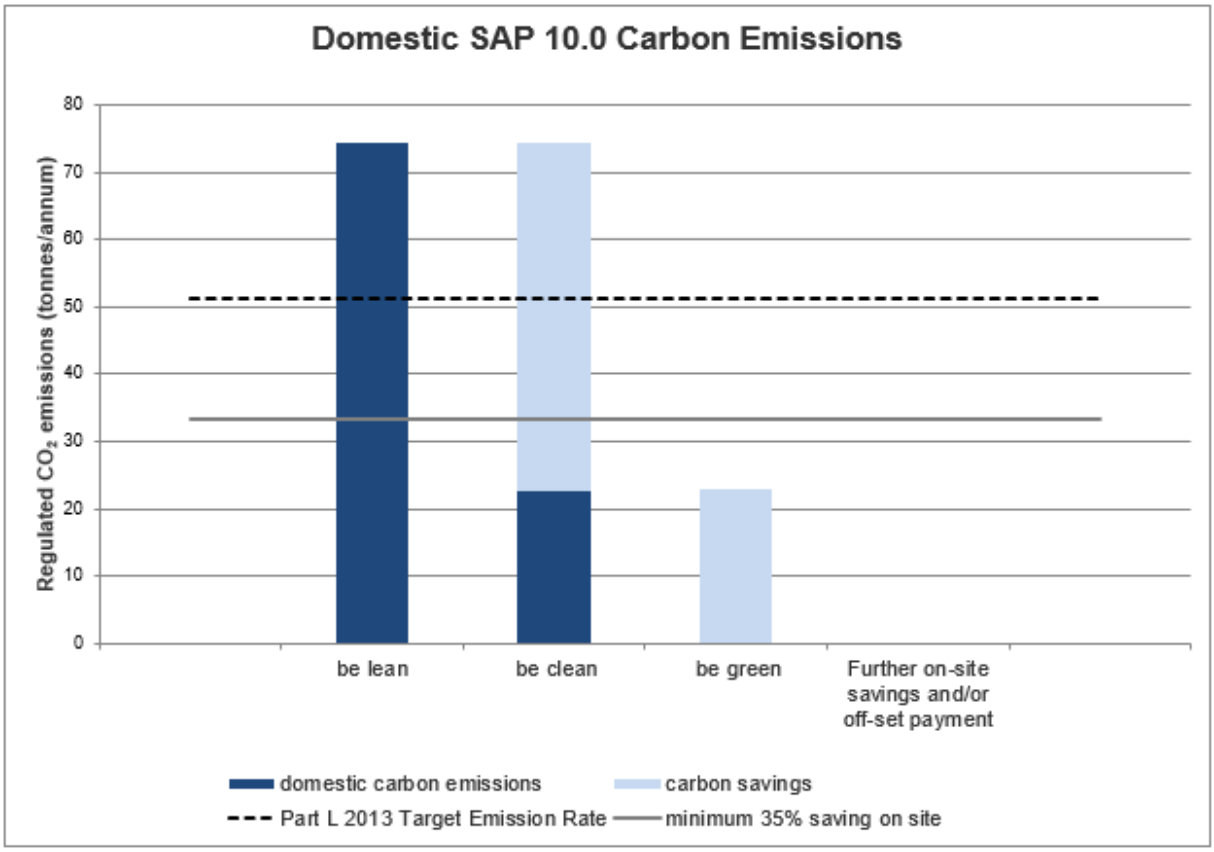
Table 5 below shows the percentage reduction in energy usage following the proposed heating and fabric improvements. This has been extracted from the GLA Carbon Reporting Spreadsheet that has been completed using the SAP results and will be submitted along with this report.

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	-26.4	-45%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	92.6	159%
Cumulative on site savings	**66.2**	**113%**
Annual savings from off-set payment	-7.8	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**-233**	-
Cash in-lieu contribution (£)	**-22,174**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

As can be seen from the above table, this development is exceeding the target of a 100% carbon reduction beyond Building Regulations by achieving over a 100% reduction in predicted emissions. The graph below also extracts from the GLA carbon reporting spreadsheet completed for the development and submitted alongside this statement offers a visual representation of how the improvements suggested affect the carbon emissions of the proposed development.



With its fabric first approach and use of LZC technologies, this proposed development promotes the goals of the GLA, in its ability to reduce heat demand, and then meet that demand by the most efficient means. The concentration on improving the fabric of the design to exceed best practice for the current times will not only help in the short term by reducing energy demands and CO2 emissions now, but also allows the building to be future proofed and net-zero ready to meet further targets and needs that may be required in years to come.

8 HEATING STRATEGY (FROM CENTRALISED TO INDIVIDUAL)

The decentralised EASHP approach was selected to deliver individualised, efficient heating, hot water, and ventilation solutions for each apartment. This strategy provides multiple operational, spatial, and performance benefits compared to a centralised system, while maintaining compliance with Building Regulations Part L (2021) and contributing significantly to regulated carbon reductions under the Be Green stage of the energy hierarchy.

A decentralised EASHP (specifically the NIBE F735 units proposed) recovers heat from warm, stale exhaust air extracted from kitchens, bathrooms, and utility rooms. The recovered heat is upgraded via the heat pump cycle to provide space heating and domestic hot water. Where specified, a Mechanical Ventilation with Heat Recovery (MVHR) module can be integrated. As the source heat is derived from indoor air (typically warmer and more consistent than outdoor air), the system achieves higher and more stable efficiency, particularly during colder periods.

In contrast, a conventional centralised ASHP extracts heat directly from ambient outdoor air, the temperature of which varies seasonally. Efficiency (measured as Seasonal Coefficient of Performance, SCOP) declines in lower outdoor temperatures as the system must work harder to extract usable heat.

Published performance data confirms:

- NIBE F735 EASHP: SCOP = 3.86 (stable performance due to indoor exhaust air source).
- Mitsubishi Electric CAHV centralised ASHP (comparable large-scale monobloc unit): SCOP = 3.54 (more variable due to dependence on outdoor air temperature).

- Reduced Heat Losses: Individual units eliminate the need for extensive hot water distribution pipework and risers, minimising standing and circulation losses common in centralised systems.
- Spatial Efficiency: Decentralised units require no large external plant areas or communal plant rooms for buffer vessels, circulating pumps, or heat exchangers. This preserves valuable ground-floor and rooftop space for resident amenities (e.g., pram and bin stores) and maximises available roof area for photovoltaic (PV) arrays.
- Improved Resilience and Maintainability: Failure of a single apartment unit affects only that dwelling, rather than the entire building. Maintenance is simpler and less disruptive, with no requirement for complex communal heat network infrastructure.
- Enhanced Indoor Air Quality and Ventilation: Integrated mechanical extract (with optional MVHR) ensures continuous ventilation, better humidity control, and improved occupant health compared to systems relying on passive or window-based ventilation.
- Lower Operational Risk: Performance is largely independent of extreme outdoor temperatures, providing more consistent efficiency and reduced peak electrical demand during cold spells.

The decentralised EASHP strategy delivers substantial regulated carbon savings under the Be Green stage (159% in the latest GLA modelling, contributing to overall on-site reductions of 113%). This exceeds the London Plan Policy SI2 minimum 35% on-site target by a considerable margin.
While the fabric performance (Be Lean) has required justified adjustments due to planning and construction constraints (as detailed in later sections of this report), the adoption of high-efficiency decentralised low-carbon heating compensates effectively, in line with GLA Energy Assessment Guidance permitting greater reliance on Be Green measures where fabric enhancements are reasonably constrained.

The selected system therefore represents an optimised, pragmatic solution that prioritises overall carbon reduction, operational efficiency, resident comfort, and long-term maintainability.

9 BE LEAN

As part of the building project, the original U-values and air permeability rate were approved within the planning pack to ensure compliance with thermal performance standards under UK Building Regulations (Part L). However, during detailed design and construction phases, certain practical and regulatory constraints prevented us from achieving the originally approved targets in full. Below, I outline the key variances based on the revised calculations, along with the reasons for these changes. For reference, the approved and revised values are as follows.

Fabric Parameter	Approved Value	Revised Value
External Walls	0.15 W/m²K	0.18 W/m²K
Roof	0.10 W/m²K	0.10 W/m²K
Floor	0.10 W/m²K	0.10 W/m²K
Windows	1.30 W/m²K	1.20 W/m²K
Air Permeability Rate	2 m³/h·m² @ 50Pa	3.5 m³/h·m² @ 50Pa

To achieve the original U-value of the external walls of 0.15 W/m²K, the wall construction would have required increased insulation thickness, resulting in an overall cavity width of approximately 220mm instead of the planned 175mm, This change would have necessitated resubmission through the planning process, as confirmed by the architect, due to alterations in the building's external dimensions and appearance. Additionally, there were structural implications: the concrete blocks specified for the project have a compressive strength of around 30 N/mm², which are relatively dense and heavy. Increasing the wall depth would have added significant load, potentially requiring revisions to the foundation design or structural reinforcements, increasing costs and timelines without proportional benefits.

The use of Polyisocyanurate (PIR) insulation, which offers high thermal efficiency and could have achieved the target U-value with a reduced overall wall thickness. However, Haringey Council specifically rejected the use of PIR insulation during the review process, mandating the substitution with mineral wool instead. Mineral wool has a lower thermal conductivity compared to PIR, meaning a thicker layer was required to approach the original performance level.

Regarding the windows this element performed better than originally approved, thanks to advancements in glazing technology and supplier specifications that allowed for enhanced thermal breaks and low-emissivity coatings without altering the overall design.

The original planning approval incorporated an air permeability target of 2 m³/h·m² @ 50Pa, which represented an ambitious level significantly exceeding the requirements under Approved Document L (Part L) of the UK Building Regulations (2021 edition, applicable as of December 2025). Under current Part L regulations for dwellings.

- The limiting (worst-case) backstop value is 8 m³/h·m² @ 50Pa.
- The notional dwelling specification used for compliance modelling assumes 5 m³/h·m² @ 50Pa.

A target of 2 m³/h·m² @ 50Pa aligns more closely with Passivhaus or near-Passivhaus standards, which are voluntary and considerably more stringent than standard Building Regulations compliance.

To ensure robust compliance with Part L without relying on post-construction remedial works, designers typically adopt a conservative (higher) design air permeability in SAP modelling. Industry guidance recommends setting design targets above the notional 5 $m^3/h \cdot m^2$ to account for real-world variability and avoid non-compliance risks. Pursuing 2 $m^3/h \cdot m^2$ in the design-stage calculations would have introduced significant risk of failing the as-built test, potentially requiring extensive remedial sealing (which can be disruptive and costly late in the programme). London Plan Policy SI2 requires major residential developments to achieve at least:

- 10% regulated carbon reduction through Be Lean measures; and
- A minimum 35% overall on-site regulated carbon reduction against Part L 2021, with residual emissions offset to achieve zero carbon.

The latest modelling demonstrates:

- **Cumulative on-site savings of 113%** (66.2 tonnes CO_2 per annum), substantially exceeding the 35% minimum.
- No reliance on district heating (Be Clean: 0%).
- Primary carbon reductions delivered through air source heat pumps and associated low-carbon technologies (Be Green: 159%).

While the Be Lean stage does not meet the conditioned 18% (or the policy minimum 10%), GLA Energy Assessment Guidance (2022) explicitly acknowledges that fabric performance may be constrained in some cases and permits greater reliance on low/zero-carbon heating systems where fabric has been maximised as far as reasonably practicable. The significant over-performance in overall on-site reductions (113%) compensates for the Be Lean shortfall, aligning with the energy hierarchy's flexible application.

The development fully complies with Building Regulations Approved Document L (2021) and delivers substantial regulated carbon savings beyond statutory requirements.

10 BE CLEAN

A connection to a district heating network has been considered part of the energy strategy for Blocks A, B, C, and D. However, the local district heating network is situated too far from the development to make a connection technically or financially viable. The excessive distance would require significant infrastructure works, including extensive pipework installation through existing urban areas, leading to prohibitive costs and logistical challenges.

While an immediate connection is not feasible, provisions can be made within the plant rooms of each block to allow for a future connection should the district heating network expand within reasonable proximity. Future-proofing measures include dedicated service entry points and sufficient space allocations within the plant rooms to accommodate the required heat interface units and associated infrastructure.

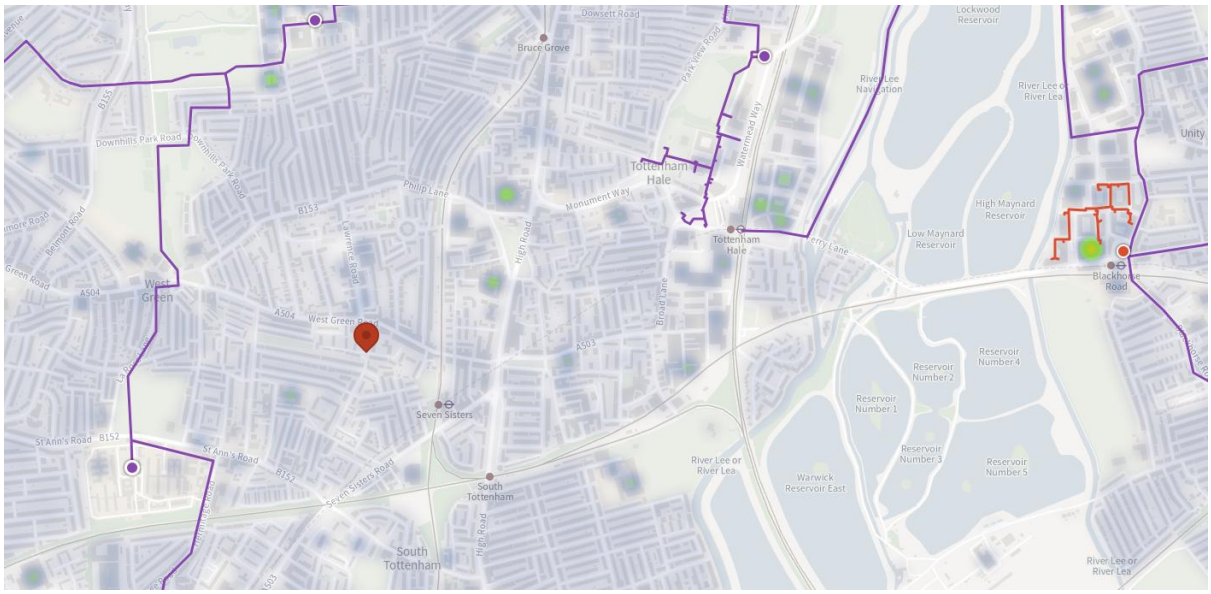
Despite these preparations, transitioning from the current heating system to a district heating network in the future would be a complex process requiring significant modifications to the building's heating distribution system. Due to the work involved, all tenants may be required to vacate and temporarily relocate during the switch-over period. Replacing key plant and distribution infrastructure would cause system-wide shutdowns and potential structural modifications to accommodate new pipework and connections.

A transition to district heating would only become feasible if and when a decision is made to extend the local district heating network to Brunel Walk. Should such an expansion take place, a connection would then be possible. However, until this occurs, the current design remains the most practical and reliable solution.

Additionally, once the final handover from Selsdon has been completed, careful consideration will need to be given to the funding and management of future works related to the communal areas and the connections to individual apartments. Establishing a clear plan for how these works will be financed and how the associated costs will be distributed will ensure that there is clarity on the financial responsibilities of all parties involved before the works are undertaken.

Transitioning to a district heating network in the future would necessitate substantial financial investment. The extensive work required throughout the communal areas and the connections to each apartment would incur significant costs. Therefore, it is recommended that such a transition be considered only after the existing heating system has reached the end of its operational life. According to the CIBSE Indicative Economic Life Expectancy Table, the typical life expectancy for air source heat pumps is approximately 15 years.

The current local energy centre supplying the district heating network (DEN) is located 1.53 miles from the development, While the Mayor of Lonon future expansion plans include constructing the St Ann's Energy Centre in 2028, which will bring the DEN closer to the site, the proposed point of entry for the new network will still be 0.41 miles away. This distance remains a considerable challenge, as it would still require extensive underground pipework and associated infrastructure to establish a connection. Until a more accessible point of entry is developed, the current heating strategy remains the most practical and efficient solution for the development, ensuring energy security and long-term sustainability.



Local Existing & Proposed DEN networks (Orange = Existing & Purple = Proposed)

Planning for the district heating connection at that juncture would align with the natural replacement cycle of the building's heating infrastructure, thereby optimising resource allocation and minimising disruption to residents. Establishing a clear funding strategy for these future works is also essential, as well as ensuring financial responsibilities are defined and agreed upon well before the system reaches the end of its service life.

Given the extensive financial implications and logistical challenges associated with transitioning to a district heating network in the future, it is recommended that Condition 29 be omitted from the scheme. The current heating design has been developed to provide an efficient and reliable solution within its current restraints; enforcing a condition that mandates future connection could impose unnecessary financial burdens and create significant disruption for residents. Instead, a more pragmatic approach would allow the system to operate for its intended lifespan before reassessing the feasibility of a district heating connection based on the network's expansion and funding availability.

11 BE GREEN

The space heating demand is targeted at ≤ 40 kWh/m²/year, achieved through efficient insulation, airtight construction, and the integration of decentralised Exhaust Air Source Heat Pumps (EAHPs) in each apartment. The EAHP system, combined with Mechanical Ventilation with Heat Recovery (MVHR), ensures heat retention and optimised energy use, further contributing to carbon reduction. Additionally, on-site renewable energy generation via the 82.5 kWp solar PV array supports compliance with the "Be Green" approach, further reducing reliance on grid electricity. Through this combination of enhanced fabric performance, efficient heating systems, and renewable energy integration, the development fully meets the 18% carbon reduction target under SAP2012, ensuring compliance with planning and sustainability commitments while supporting the transition to zero-carbon living.

It is acknowledged that certain building fabric elements have experienced an increase in U-values compared to the original planning approval, resulting in higher heat loss coefficients. Specifically, U-values have increased by 16.67% for walls, 23.08% for floors, and 9.09% for the roof; however, this has been partially offset by an 8.33% improvement in window performance, reducing heat loss through glazed elements. Collectively, these changes have led to a 3.12% increase in the overall heat loss of a single apartment. Despite this, the design has been carefully developed to ensure compliance with energy and carbon reduction targets. Through strategic design measures and system optimisations, the project has successfully achieved a 100% reduction in regulated carbon emissions compared to the 2013 Building Regulations Part L baseline and a minimum 18% reduction in regulated carbon emissions as calculated using SAP 2012 carbon factors. These results demonstrate that, while the thermal envelope has undergone minor adjustments, the overall energy strategy remains robust, achieving full compliance with sustainability commitments through enhanced building services, renewable energy integration, and optimised system efficiencies.

A solar photovoltaic (PV) system will be installed across the roofs of all residential blocks, maximising the available roof area for renewable energy generation. The PV layouts, as detailed in the drawing pack, have been carefully designed to ensure optimal panel positioning and efficiency while maintaining compliance with maintenance and safety requirements. A 1m clearance zone has been maintained around the roof perimeter to facilitate safe maintenance access and prevent overshadowing from the parapet. Additionally, dedicated maintenance zones have been incorporated around the Automatic Opening Vents (AOVs) to ensure unobstructed access.

The PV panels will be mounted on a fixed-frame system at a 10-degree tilt, with an azimuth angle of 0 degrees south to 10 degrees southwest, optimising solar exposure and energy yield. The selected panels are mono-crystalline silicon with an anodised aluminium frame, offering a high efficiency of 23.8% and a rated output of 465Wp per panel. This carefully considered design ensures that the development benefits from maximum renewable energy generation, contributing to its zero-carbon strategy and overall sustainability commitments.

The electricity generated from the solar PV installation will be directly supplied to each apartment, allowing residents to benefit from on-site renewable energy production. Each apartment will be equipped with its own dedicated inverter, with a specific allocation of PV panels connected to convert the generated electricity for domestic use. To ensure accurate

monitoring and tracking of solar energy generation, a meter will be installed within each apartment, allowing residents to view and manage their solar energy consumption effectively. This system provides a fair and transparent allocation of solar energy, maximising self-consumption and reducing reliance on grid electricity.

The table below provides a breakdown of the number of PV panels installed per block and the total expected electricity generation from the solar PV system.

Block	Quantity of panels (No.)	Total output (kWp)
Block A	46	21.4
Block B	69	32.1
Block C	69	32.1
Block D1	36	16.7
Block D2	56	26
Total	276	128.3

Initially, Meinhardt energy statement was designed around a centralised air source heat pump (ASHP) system with a future provision to connect to a future DEN connection. However, this was revised in favour of a decentralised exhaust air source heat pump (EAHP) arrangement. This change enables each apartment to have an independent EASHP unit, improving energy efficiency by eliminating heat distribution losses associated with a centralised network. The decentralised approach also enhances occupant control, simplifies maintenance, and ensures that heating and hot water provision is delivered at the point of use. The decision stems from the fact that the local district heating network is too far from the development to make a connection technically or financially viable.

The development ensures that a minimum 82.5 kWp solar photovoltaic (PV) array, further enhancing renewable energy generation on-site and contributing to overall carbon reduction targets. These measures collectively ensure compliance with the sustainability requirements while delivering long-term environmental and financial benefits for the development.

A comparison has been carried out between the original energy statement produced by Meinhardt and the proposed revised energy strategy to assess the impact on domestic carbon dioxide (CO_2) savings. The comparison focused on ensuring that the revised strategy continued to meet the commitment of achieving a 100% reduction in regulated carbon emissions compared to the 2013 Building Regulations Part L, in line with the Energy and Overheating Assessment prepared by Meinhardt (dated 5 October 2022). The results confirmed that the revised heating and energy strategy remains fully compliant with the targeted 100% reduction in regulated carbon emissions, ensuring the development meets sustainability requirements without compromise.

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: Savings from energy demand reduction	11.0	22%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	38.7	79%
Cumulative on site savings	**49.7**	**101%**
Annual savings from off-set payment	-0.6	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**-17**	-
Cash in-lieu contribution (£)	**-1,650**	

Meinhardt Domestic Carbon Dioxide (CO_2) Savings

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for domestic buildings

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	-26.4	-45%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	92.6	159%
Cumulative on site savings	**66.2**	**113%**
Annual savings from off-set payment	-7.8	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**-233**	-
Cash in-lieu contribution (£)	**-22,174**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development Information' tab

Kench Consultants Domestic Carbon Dioxide (CO_2) Savings