



Energy Statement

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**New Build Office Block at the Former Car Wash,
Broad Lane, Haringey**

Prepared for:

Broad Lane Properties Limited

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Executive Summary

This Energy Statement was prepared by Energylab Consulting Ltd in support of the full planning application for the new build, commercial development of offices at the former car wash on Broad Lane, London.

The report confirms that the energy and carbon reduction strategy under the proposed for this development are in line and in compliance with the relevant, applicable targets and requirements listed within the following planning policies of Haringey Council and the London Plan:

1. Haringey Council's Sustainable Design and Construction Supplementary Planning Document (SPD)
2. The London Plan relevant planning policies within section 9, i.e. Energy Hierarchy and carbon reduction targets
3. GLA Energy Assessment Guidance (2022)

The Energy Statement for the new development has been developed in line with the London Plan Energy Hierarchy principles (displayed in Figure 1) to reduce the energy and associated CO₂ emissions using the “Be Lean, Be Clean, Be Green and Be Seen” approach:

1. “Be Lean”: Improvements to the building fabric and energy efficient services to minimise energy demand, including efficient building services and 100% low energy LED lightings.
2. “Be Clean”: The site is not suitable for a local CHP system or connection to an existing district network. Therefore, no carbon savings are possible using this measure.
3. “Be Green”: Renewable and low carbon technologies have been proposed such as PV panels.
4. “Be Seen”: monitor, verify and report on energy performance.

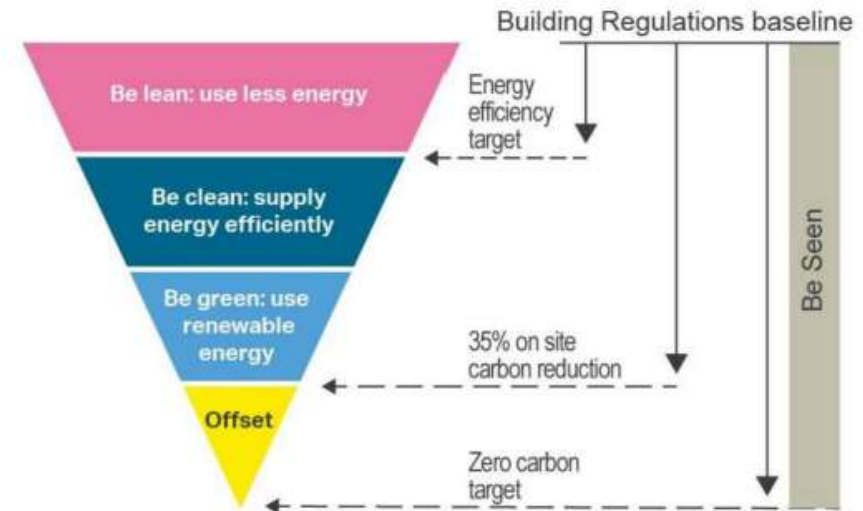


Figure 1: GLA Energy Hierarchy

The target reduction in CO₂ emissions is a minimum 35% on site reduction through the proposed design against the Part L2 2021 target. This should be achieved with a minimum reduction of 15% via energy demand reduction measures and 20% due to incorporating on site renewable technologies and low carbon mechanical systems.

Furthermore, Haringey Council states major developments should seek to reduce carbon emissions by 20% via the utilisation of renewable technologies where technically feasible.

Any remaining CO₂ emissions to reach the target zero carbon will be offset by a one-off payment made to the local authority to invest into suitable sustainable projects within the borough. The current GLA carbon offset price is £95 per tonne of carbon dioxide over 30 years (building services lifespan).



The Part L2 2021 target emissions were calculated using the National Calculation Methods (NCM) 'notional' building. Target Emission Rate (TER) and Target Primary Energy Rating (TPER) are output. (Please see section 3 explaining these values and their significance) Building Emission Rate (BER) and Building Primary Energy Rate (BPER) were then calculated using dynamic modelling software Integrated Environmental Solution Virtual Environment (IESVE) to understand improvement of the actual building over the 'notional' at each stage of the energy hierarchy.

Table 1 displays the compliant results for the BER at each stage of the energy hierarchy for proposed development against the TER as per the Approved Document Part L2 2021.

Table 1: Carbon (CO ₂) Emission Reductions		
	(Tonnes CO ₂ per annum)	(%)
Baseline Part L 2021 Target Emission (TER)	4.36	-
Energy Demand Reduction Savings (Be Lean)	0.67	15
Heat Network/Active Savings (Be Clean)	0.04	1
Renewable Technologies Savings (Be Green)	1.12	26
Total Potential On Site Savings	1.83	42

As displayed in Table 1, there is potential in achieving **15%** reduction in CO₂ emissions as a result of reducing the demand for energy approach, **1%** reduction due to 'Clean' energy supply through utilising efficient electrical boilers for communal areas and WCs, and a potential further **26%** reduction as a result of incorporating renewable technologies, which in this case is a PV panels system for electricity generation and a VRV/F system for heating

and cooling. Furthermore, it is displayed that the Haringey Council target of 20% reduction through renewable technologies has been achieved.

As the area of this building exceeds 1,000 sqm gross internal area (GIA), it is considered a major development. Therefore, any shortfall to a zero carbon development must be redeemed with a carbon offset payment.

Table 2 displays the carbon offset payments towards a net zero target.

Table 2: Carbon Offset Payments	
Shortfall per Annum	2.53
Total Shortfall over 30 Years*	75.9
Carbon Offset Payment (£95 per tonne)	£7,210.50

*It is assumed lifetime of the development's services to be 30 years

Figure 2 displays predicted domestic CO₂ reductions across each phase of the London Plan Energy Hierarchy, surpassing the minimum requirements for CO₂ reductions as displayed by the green dotted lines.



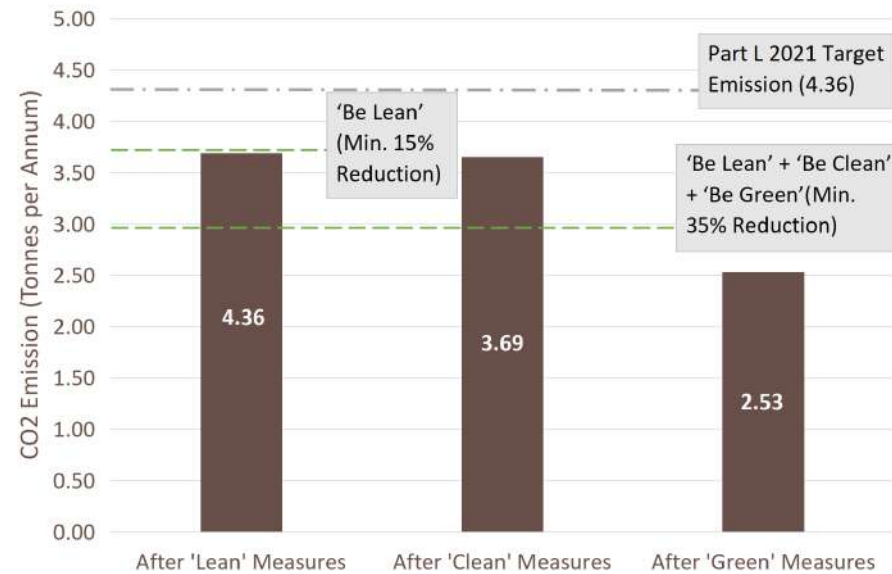


Figure 2: Predicted Domestic CO₂ reductions against Part L 2021 Baseline

The new development has the potential to comply with the Building Regulations Part L2 2021.



1. Introduction

1.1 Existing Site

The site is located on Broad Lane, adjacent to Fountayne Business Centre within the London Borough of Haringey. The existing site is displayed below in Figure 3 (Source: Google Maps). The surrounding buildings predominantly consist of brick facade.



Figure 3: Existing Site

1.2 The Proposal

The proposal is for a 9 storey, new-build office. The office building shall be developed as shell & core, however, the services shall be extended to serve

the speculative office floors alongside the landlord core areas. The services shall consist of space heating, cooling, ventilation, public health/water to core areas and vertical transportation.

In addition to the office space, the development will comprise 6 no. sedum green roofs, 1 no. terrace and 2 no. cycle stores to encourage green means of transportation. Additionally, there will be external amenity spaces included within the building. The area schedule for the proposed development is displayed below in Table 3.

Table 3: Area Schedule	
Building	Approximate Gross Internal Area (sqm)
Ground Floor	1130
1st Floor	877
2nd Floor	877
3rd Floor	873
4th Floor	763
5th Floor	478
6th Floor	232
7th Floor	232
8th Floor	232



1.3 Compliance

This assessment demonstrates how the commercial building achieves a minimum reduction of 35% in regulated Carbon Dioxide (CO₂) emissions over the Part L2 2021 'notional building', and that the proposed climate change mitigation measures would comply with London Plan energy policies, utilising the energy hierarchy as a strategy for carbon reduction. This assessment would also ensure that energy remains an integral part of the development's design and evolution.

The proposed development must achieve zero carbon for regulated emissions through additional on-site measures or payment into an offset fund. The Carbon offset payment is presented in Table 2.

The energy and carbon reduction strategy under the climate change mitigation measures proposed for this development are in line and in compliance with the relevant and applicable targets and requirement listed within the following:

1. Haringey Council's Sustainable Design and Construction Supplementary Planning Document (SPD)
2. The London Plan 2021 relevant planning policies within Chapter 9
3. The GLA Draft Energy Assessment Guidance April 2020

1.4 Carbon Emission Factors

Fuel carbon emission factors are displayed below in Table 4. The proposed development energy performance has been assessed using Integrated Environmental Solutions Virtual Environment (IES VE). The development has been designed as a gas free development, therefore, eliminating any NO_x emissions.

Table 4: Carbon (CO₂) Emission Factors

Fuel Type	Fuel Carbon Factor (kgCO ₂ /kWh)
Natural Gas	0.210 (The development is a gas free development)
Grid Electricity	0.233



2. Establishing CO₂ Emissions

2.1 Software Utilised

The energy and the associated CO₂ emission calculations for the proposed development were calculated using Integrated Environmental Solution Virtual Environment (IES VE). Compliance with Part L2 2021 has been demonstrated for the new building utilising the National Calculation Methodology's (NCM) set building types and activities.

The proposed building energy demand benchmarks were based on the 'NCM Building Area Type B1: Office or Workshop (Office)' in IES. Within the IESVE, NCM room-types were assigned based on their proposed function. For example, all meeting rooms were assigned under 'NCM Office: Office (Office: Meeting)'. In doing so, an accurate analysis of the associated carbon emissions was achieved for each space, and therefore the building.

2.2 Reduction in Carbon Emissions

The Part L2 2021 baseline CO₂ emissions were calculated from the 'notional' building using the Part L approved software tool, Apachesim. The 'notional' building consists of a standard set of fabric and services parameters which deliver the Target Emission Rate (TER) as well as the Target Primary Energy Rate (TPER). Please see sections 3.1 and 3.2 for additional information regarding the TER and TPER.



3. Building Regulation Targets

Newly constructed dwellings/buildings must be shown, by calculation, to meet the following building regulation targets.

3.1 CO2 Emission Rate

A key component of building regulation Part L2 2021 is the target CO2 emission rate (TER). This sets a minimum allowable standard for the energy performance of a building and is defined by the annual CO2 emissions of a notional building of same type, size and shape to the proposed building. The maximum CO2 emission rate for the dwelling, expressed as kgCO2/(m2·year) and determined using the National Calculation Methodology (NCM).

Table 5 displays the overall results for TER against the BER for the proposed development.

Table 5: CO ₂ Emission Rates			
	TER (kWh/m ²)	BER (kWh/m ²)	Improvement (%)
Development Total	4.36	2.53	42

3.2 Primary Energy Rate

Target Primary Energy Rate (TPER) is a new introduction to the English building regulations. TPER considers how much energy (kWh) is required to provide heating and hot water to a newly built dwelling. It will also include energy used by lighting, ventilation, cooling systems and showers.

Instead of just looking at energy used within the building itself, TPER also considers the amount of energy required to produce the fuel source in the first place.

Any additional energy will be added to every kilowatt of the fuel source used by the dwelling to calculate the BPER. Electricity and biomass have the highest primary energy factors as these are perceived to be the fuels which require the most energy to produce and transport. This means houses must introduce low energy or renewable systems to meet (TPER).

Table 6 displays the overall results for TPER against the BPER for the proposed development.

Table 6: Primary Energy Rates			
	TPER (kWh/m ²)	BPER (kWh/m ²)	Improvement (%)
Development Total	34.36	27.80	19



4. The Energy Hierarchy

As previously stated, the London Plan energy hierarchy (“Be Lean, Be Clean, Be Green”) approach has been utilised for the CO₂ emission reduction strategy for the proposed development.

The ‘Be Lean’ approach addresses reduction in energy demand through the adoption of passive and active design measures. The aim is to use less energy and manage demand during operation through fabric and servicing improvements, and the incorporation of flexibility measures.

The ‘Be Clean’ approach aims to utilise existing, local heating distribution networks or combined heat and power (CHP) engines.

The ‘Be Green’ approach incorporates on-site renewable technologies to supply energy to the dwellings.

4.1 Demand Reductions (Be Lean)

Potential reduction due to ‘Be Lean’ measures, in CO₂ emission compared to Part L2 2021, is 15%.

4.1.1 Passive Measures

Before any mechanical systems are considered, the development should be made as energy efficient as possible by utilising passive measures.

Passive design measures would include optimising orientation and site layout, thermal mass and site microclimate to provide natural lighting, heating and cooling of buildings. Green roofs, walls, high ceilings and window

heights (for natural light and ventilation) are preferred (where possible), as well as high thermal mass and the incorporation of solar shading.

Several passive measures have been considered and proposed depending on technical feasibility.

4.1.1.1 Building Facade and Air Permeability

The building facade has a great impact on a building's energy efficiency. Specifying materials with low U-values and ensuring low air permeability* minimise energy demand through reduced heat loss.

All proposed facade constructions are of higher performance than those specified within the NCM ‘notional’ building, as well as Part L2 2021 regulations.

**Air permeability describes the amount of air that passes, perpendicularly through a facade. This can be reduced through material selection and best practice construction methods.*

4.1.1.2 Thermal Bridging

Thermal bridges occur when an area of a building has significantly higher heat transfer than the surrounding parts. Breaks in insulation, reduced insulation or more conductive materials can contribute to thermal bridge effects. The building fabric should be constructed so that thermal bridging, including at the party wall, is reasonably limited.

Building Regulation Part L2 2021 places increased importance on addressing thermal bridging, that could be minimised by careful detailing, or the use of standard details (such as Accredited Construction Details i.e. ACDs) where appropriate.



The role of thermal bridges in building heat loss can be significant for well insulated buildings.

We recommend that as the design is progressed, building junctions are considered carefully to minimise thermal bridging. Standard 'accredited construction details' are available, for which the impact of thermal bridging is known. In many cases the impact of thermal bridging can be ignored if good thermal continuity is achieved through the junction. For more complex or less intuitive scenarios, thermal bridging calculations can be carried out to calculate the additional heat loss.

4.1.1.2 Passive Ventilation

Passive ventilation utilises natural forces, such as wind or thermal buoyancy to extract stale air and supply fresh air to a space.

Natural ventilation has been proposed as the secondary strategy for providing fresh air and dissipating heat across communal spaces and stairwells throughout the building.

The passive ventilation strategy includes single-sided ventilation, cross ventilation and night purge ventilation through openable windows and doors.

4.1.1.3 Passive Measures Summary

Table 7 exhibits a summary of the proposed passive systems.

Table 7: Proposed Passive Systems, Fabric Properties and Part L2 2021 Fabric Standards

	Proposed Design	Part L Limiting Values
Walls U-Value Target	0.13 W/m ² .k	0.26 W/m ² .k
Floors U-Value Target	0.11 W/m ² .k	0.18 W/m ² .k
Roofs U-Value Target	0.12 W/m ² .k	0.18 W/m ² .k
Doors U-Value Target	1 W/m ² .k	1.6 W/m ² .k
Windows U-Value Target	1.1 W/m ² .k	1.6 W/m ² .k
Windows G Value Target	0.35	-
Air Permeability Target	5 m ³ /h.m ² @50pa	8 m ³ /h.m ² @50p
Thermal Bridging Target	0.05 (y-value)	0.2 (y-value)
Heating system pipework	Fully Insulated pipework and fittings to reduce heat loss (All primary pipework insulated to reduce heat loss - domestic hot water and heating).	
Thermal Mass	Medium	-
Green Roof	Sedum green roof proposed for total roof area	
Ventilation	Natural ventilation proposed for communal areas	

4.1.2 Active Measures

Active design measures would include mechanical heating, cooling and ventilation required in the building, also any mechanical systems that are considered, for example, efficient mechanical ventilation with heat recovery (MVHR) or smart control systems.



4.1.2.1 Heating

To fully understand the effect of improved building fabric and 'Lean' measures proposed, a gas boiler was specified in IES VE as per the 'notional' building defined in the Approved Document Part L2 2021 and advised in the GLA Energy Assessment Guidance. Active heating solutions are proposed within section 4.3 of this document, i.e., 'Renewable Energy - (Be Green)'.

4.1.2.2 Active Ventilation

Ventilation will be achieved utilising Air-Handling Units (AHUs) to service each level. These systems mechanically supply fresh air and extract stale air from a space. It is proposed that the AHU specified will have heat recovery with minimum efficiency of 90%.

The ceiling-mounted units will be sized depending on ventilation requirement calculations for the development, conducted by a specialist MEP Engineer to ensure the units can provide adequate indoor air quality.

To ensure high efficiency in MVHR systems, a low air permeability must be maintained. In this case, a value of $3 \text{ m}^3/\text{h.m}^2@50\text{pa}$ has been proposed as displayed in Table 8. This will maximise the heat recovery aspect of the MVHR system. In addition to this, MVHR reduces overheating risk during the summer months.

4.1.2.3 Cooling

The development will be served by a low carbon technology to meet the space cooling and heating demand. A Variable Refrigerant Volume/Flow VRV/F system will be proposed which is a technology based on the principles of an Air Source Heat Pump extracting the free energy within the

air. These systems are operated on grid electricity which will be sourced from a 100% renewable utility supplier.

The systems are extremely efficient with potentially 300% cooling efficiency and 400% heating efficiency. i.e for every 1kW of electricity supplied to the system, the system produces at least 3kW and 4kW of cooling and heating respectively. The low carbon comfort cooling provided will ensure that thermal comfort of the occupant and the response to the changes in internal and external environment will always be managed to the optimum comfort levels expected from a new and modern office development.

Additionally, AHUs will further improve cooling, removing stale air and humidity from the office spaces.

4.1.2.4 Lighting

Traditional fluorescent lighting dissipates a large amount of energy to heat. Alternatively, specifying high efficiency LED lighting can significantly reduce the energy demand for a building, and therefore the carbon emissions.

4.1.2.5 Controls

Smart control systems can massively reduce energy consumption within buildings through targeted heating, cooling, ventilation and lighting.

CO₂ sensors have been proposed for all ventilation systems. Once CO₂ levels rise above a certain threshold, a 'boost' function will be activated to ensure adequate indoor air quality is restored.

As per the Part L2 2021, all areas less than 150 sqm will have its own heating and cooling control system to ensure adequate thermal comfort across all zones of the development.



'Auto-On-Auto-Off' lighting has been proposed for all areas within the building to ensure lighting is only activated when occupants are utilising the offices/WCs/circulation areas.

4.1.2.6 Active Measures Summary

Table 8 displays a summary of the active design measures adopted for this development.

Table 8: Active Measures (Energy Saving)		
Domestic hot water system		- Time control of circulation pump to reduce heat losses - High levels of cylinder insulation to achieve a maximum 1.2 kWh/day heating losses - Water heating to be timed
Mechanical Ventilation		AHU with minimum heat recovery efficiency of 90% to be specified for all office spaces.
Space Heating system controls		Individually timed control of heating in zone equating to less than 150 sqm as per Part L2 2021, enabling heating to be turned off in unoccupied rooms
Smart Controls		Yes, potential smart controls for all services
Lighting		100% LED lighting

4.1.3 Cooling and Overheating

The airtight envelope is critical in reducing energy demand for space heating and domestic hot water, however, this imposes some real challenges related to the risks of overheating. A key aspect of the Haringey Council's

Sustainable Design and Construction SPD and the Approved Document Part O 2021 is to ensure developments are prepared against rising temperatures. Several passive and active measures that may reduce this risk have been displayed in Table 9. However, an official overheating assessment has been performed to assess the level of risk for the proposed development, along with any mitigation methods. Please refer to the TM52 Overheating Assessment prepared by Energylab Consulting Ltd. for the detailed assessment.

Table 9: Measures to Counter Overheating Risk		
Balance daylight and overheating	and	Windows areas, g value, window overhangs and orientation. (Low G-Value specified to mitigate solar gain)
Reduce solar gain		Introduce external shading and balconies where necessary
Improve ventilation		- Openable windows - Trickle vents - Cross ventilation - Thermal mass and night purge - MVHR for floor
Potential ceiling mount fans (future retrofit)		Floor to ceiling height is > 2.8m
Active cooling		High efficiency VRV/F systems to provide cooling (Please see section 4.3.2.2)
CIBSE Overheating assessment TM52		Please refer to the TM52 Overheating Assessment prepared by Energylab Consulting Ltd.



4.1.3.1 Cooling Hierarchy

Overheating risk should be mitigated utilising the cooling hierarchy as stated within Policy SI 4 of the London Plan. This strategy is stated as follows:

1. Reduce the amount of heat entering the building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure.
2. Minimise internal heat generation through energy efficient design.
3. Manage the heat within the building through exposed internal thermal mass and high ceilings.
4. Provide passive ventilation.
5. Provide mechanical ventilation.
6. Provide active cooling systems.

This strategy has been utilised to ensure adequate thermal comfort within the proposed dwellings. An official overheating assessment has been performed to assess the level of risk for the proposed development, along with any mitigation methods required. Please refer to the TM52 Overheating Assessment prepared by Energylab Consulting Ltd. for the detailed assessment.

Carbon Emission Reduction after 'Be Lean'

Potential reduction, due to Lean measures, in CO₂ emission compared to Part L 2021 is 15% for the proposed development. Please see Tables 10a and 10b, summarising findings for 'Be Lean' measures.

Table 10a: Carbon (CO₂) Emissions

	Regulated (Tonnes CO ₂ per annum)
Baseline Part L 2021 Target Emission	4.36
After 'Be Lean' Measures	3.69

Table 10b: Regulated CO₂ Savings (Domestic)

	Tonnes CO ₂ per annum	(%)
Savings from 'Be Lean' Measures	0.67	15



4.2 Energy Supply (Be Clean)

Potential reduction due to 'Be Clean' measures, in CO2 emission compared to Part L2 2021, is 1%.

4.2.1 Connection to Existing Heating Distribution Network

There are no available communal plants that are within a reasonable distance to connect to the site. For the above reason connection to a district heating network has been ruled out as an option.

It is not anticipated to achieve any further CO2 reduction than what has been achieved via incorporating the Lean measures through this method.

4.2.2 Local Site CHP

Combined Heat and Power only becomes economically viable for larger schemes with constant and steady demand for heat and electricity throughout the year. This is not suited for the proposed development, which has insufficient steady thermal and electrical loads throughout the year. Therefore, this has been ruled out for the site.

4.2.2 Communal Heating

High efficiency electric boilers with a minimum efficiency of 90% have been proposed for the heating of all communal areas and WCs. This results in minor carbon emission reductions.

4.2.3 Carbon Emission Reduction after Be Clean

Since a district heating connection or on-site CHP is unviable, no carbon emissions reductions are available using these measures. However, minor reduction was observed utilising electric boilers for communal areas and WCs.

Please see Tables 11a and 11b, summarising emission reductions utilising 'Be Clean' measures.

Table 11a: Carbon (CO₂) Emissions

	(Tonnes CO ₂ per annum)
Baseline Part L 2021 Target Emission	4.36
After 'Be Lean' Measures	3.69
After 'Be Clean' Measures	3.65

Table 11b: Regulated CO₂ Savings (Domestic)

	Tonnes CO ₂ per annum	(%)
Savings from 'Be Lean' Measures	0.67	15
Savings from 'Be Clean' Measures	0.04	1



4.3 Renewable Energy (Be Green)

Potential reduction due to 'Be Green' measures, in CO2 emission compared to Part L2 2021, is 26%.

4.3.1 Technology Options

There are several renewable options that could be utilised for the generation of electricity required for lighting, machinery, controls etc on site. Financial and technical feasibility of the following renewable systems was assessed to determine the most suitable technologies for the proposed development:

- Photo-voltaic (PV) panels
- Air-source heat pumps (ASHPs)
- Ground-source heat pumps (GSHPs)
- Variable refrigerant volume/flow (VRV/F) systems
- Wind turbines

Selection is made based on a variety of factors, including efficiency, constraints of the development, location or cost.

4.3.2 Technology Implemented

4.3.2.1 PV Panels System

A PV panels system installed on 70% of all available roof space is proposed. As there are no moving parts in the PV cell, the units tend to be low maintenance but they must be kept clean as efficiency can drop as a result of fouling. This is reduced if the panels are installed at a 5° angle, therefore allowing for potential cleaning through rainfall. Additionally, locating the panels away from trees can mitigate fouling caused by leaves and debris.

Furthermore, an inclination of 5° allows the panels to be out of view from street level, ensuring the aesthetic of the building is not damaged.

Maximum energy yield will occur when the panels are orientated between south-east and south-west. Once installed, the panels have no running costs apart from occasional maintenance.

PV panels are proposed to be installed at a 5° angle, south facing across the proposed sedum green roof areas. Please see Figure 7 for an example of a PV panels system on a sedum green roof. A total of 38 PV panels is proposed to serve this development, based on a 20% efficient PV panel, providing approximately 13 kWp. The initial PV electricity production assessment was based on the parameters defined in Table 12. *Please see Appendix 4 for the PV panels calculation.*

Table 12: PV Requirements

Roof Space	As per drawings
Panel Efficiency	At least 20%
Orientation	South
Inclination of Panel	5 degree closest to the flat
Number of Panels	38
Panel Area	1.62 m ²
Total Panel Area	62 m ²
Electrical Output	12.7 kWp

Due to the surrounding built environment of the site, obstruction and shading to the PV panels will be limited, maximising potential electrical output.





Figure 4: Example of angled PV system on a Green Roof

Figure 5 displays the roof plan of the development. PV panels are proposed across the blue-highlighted sedum roof area to achieve the required electrical output.

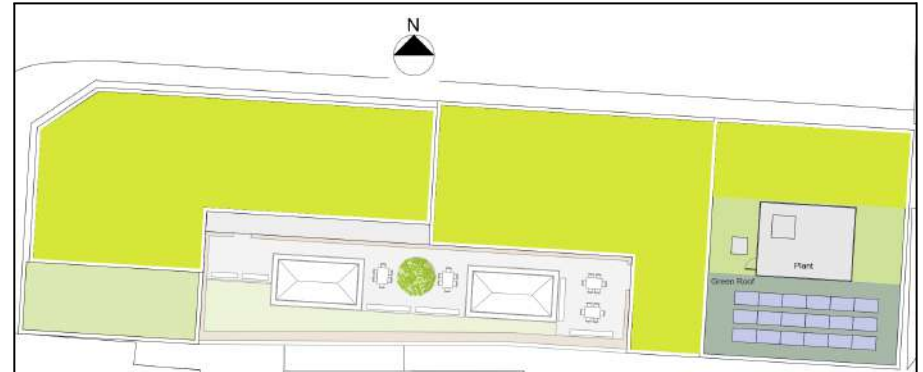


Figure 5: PV Panel Location on Domestic Development

4.3.2.2 Variable Refrigerant Volume/Flow (VRV/F) System

The development will be served by a low carbon technology to meet the space cooling and heating demand. A Variable Refrigerant Volume/Flow VRV/F system will be proposed which is a technology based on the principles of an Air Source Heat Pump extracting the free energy within the air. These systems are operated on grid electricity which will be sourced from a 100% renewable utility supplier.

The systems are extremely efficient with potentially 300% cooling efficiency and 400% heating efficiency. i.e for every 1kW of electricity supplied to the system, the system produces at least 3kW and 4kW of cooling and heating respectively. The low carbon comfort cooling provided will ensure that thermal comfort of the occupant and the response to the changes in internal and external environment will always be managed to the optimum comfort levels expected from a new and modern office development.

Furthermore, VRV/F systems are quiet, therefore disturbance to occupants in the upper levels is minimised.



The outdoor units will be sized depending on space and domestic water heating load calculations for the development, conducted by a specialist MEP Engineer.

Please see Figure 6 for an example of the proposed VRF units.



Figure 6: VRF Unit in Acoustic Enclosure

4.3.3 Carbon Emission Reduction after Be Green

Potential reduction, due to Green measures for the domestic development, is displayed below in Tables 13a and 13b.

Table 13a: Carbon (CO₂) Emissions (Domestic)

	(Tonnes CO ₂ per annum)
Baseline Part L 2021 Target Emission	4.36
After 'Be Lean' Measures	3.69
After 'Be Clean' Measures	3.65
After 'Be Green' Measures	2.53

Table 13b: Regulated CO₂ Savings (Domestic)

	Tonnes CO ₂ per annum	(%)
Savings from 'Be Lean' Measures	0.67	15
Savings from 'Be Clean' Measures	0.04	1
Savings from 'Be Green' Measures	1.12	26



5. Operational Electricity Costs

5.1 Energy Demand

The GLA Energy Assessment Guidance (2022) states designers should aim to reduce peak energy demand.

'The assumption is that, if peak electrical demand is reduced across London, then less power infrastructure and less carbon intensive electricity generating plants will be needed to meet that demand.'

This can be achieved by improving a building's energy efficiency via passive or active measures. The measures proposed for this development have been set out in section 4 of this document. In implementing these measures, operational electricity costs are reduced.

5.2 Estimated Operational Electricity Costs

The current cost of grid electricity is 34.0p/ kWh. Utilising the estimated heating and cooling demands calculated from the IES VE model, an estimation of the annual operational electricity costs was obtained. These are displayed in Table 14.

Table 14: Estimated Operational Electricity Costs

	Unit
Cooling + Heating Demand	151,060 kWh/yr
Primary Energy	43,960 kWh/yr
Current Electricity Cost	36.0 p/kWh
Estimated Cooling + Heating Costs	54,380 £
Estimated Primary Energy Cost	15,830 £
Estimated Total Cost	124,590 £



6. Conclusion

This Energy Statement was prepared by Energylab Consulting Ltd in support of the full planning application for the new build, commercial development of offices at the former car wash on Broad Lane, London.

The report confirms that the energy and carbon reduction strategy under the proposed for this development are in line and in compliance with the relevant, applicable targets and requirements listed within the following planning policies of Haringey Council and the London Plan:

1. Haringey Council's Sustainable Design and Construction Supplementary Planning Document (SPD)
2. The London Plan relevant planning policies within section 9, i.e. Energy Hierarchy and carbon reduction targets
3. GLA Energy Assessment Guidance (2022)

The Energy Statement for the new development has been developed in line with the London Plan Energy Hierarchy principles (displayed in Figure 1) to reduce the energy and associated CO₂ emissions using the “Be Lean, Be Clean, Be Green and Be Seen” approach:

1. “Be Lean”: Improvements to the building fabric and energy efficient services to minimise energy demand, including efficient building services and 100% low energy LED lightings.
2. “Be Clean”: The site is not suitable for a local CHP system or connection to an existing district network. Therefore, no carbon savings are possible using this measure.
3. “Be Green”: Renewable and low carbon technologies have been proposed such as PV panels.
4. “Be Seen”: monitor, verify and report on energy performance.

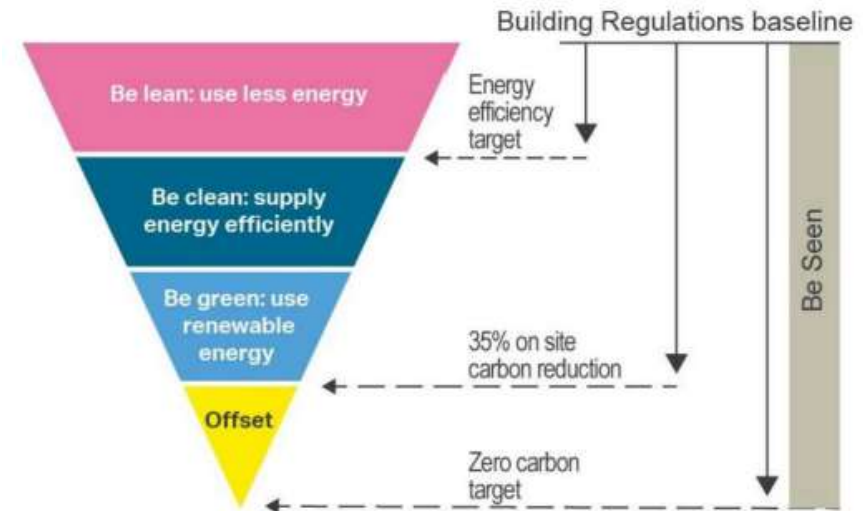


Figure 1: GLA Energy Hierarchy

The target reduction in CO₂ emissions is a minimum 35% on site reduction through the proposed design against the Part L2 2021 target. This should be achieved with a minimum reduction of 15% via energy demand reduction measures and 20% due to incorporating on site renewable technologies and low carbon mechanical systems.

Furthermore, Haringey Council states major developments should seek to reduce carbon emissions by 20% via the utilisation of renewable technologies where technically feasible.

Any remaining CO₂ emissions to reach the target zero carbon will be offset by a one-off payment made to the local authority to invest into suitable sustainable projects within the borough. The current GLA carbon offset price is £95 per tonne of carbon dioxide over 30 years (building services lifespan).



The Part L2 2021 target emissions were calculated using the National Calculation Methods (NCM) 'notional' building. Target Emission Rate (TER) and Target Primary Energy Rating (TPER) are output. (Please see section 3 explaining these values and their significance) Building Emission Rate (BER) and Building Primary Energy Rate (BPER) were then calculated using dynamic modelling software Integrated Environmental Solution Virtual Environment (IESVE) to understand improvement of the actual building over the 'notional' at each stage of the energy hierarchy.

Table 1 displays the compliant results for the BER at each stage of the energy hierarchy for proposed development against the TER as per the Approved Document Part L2 2021.

Table 1: Carbon (CO ₂) Emission Reductions		
	(Tonnes CO ₂ per annum)	(%)
Baseline Part L 2021 Target Emission (TER)	4.36	-
Energy Demand Reduction Savings (Be Lean)	0.67	15
Heat Network/Active Savings (Be Clean)	0.04	1
Renewable Technologies Savings (Be Green)	1.12	26
Total Potential On Site Savings	1.83	42

As displayed in Table 1, there is potential in achieving **15%** reduction in CO₂ emissions as a result of reducing the demand for energy approach, **1%** reduction due to 'Clean' energy supply through utilising efficient electrical boilers for communal areas and WCs, and a potential further **26%** reduction as a result of incorporating renewable technologies, which in this case is a PV panels system for electricity generation and a VRV/F system for heating

and cooling. Furthermore, it is displayed that the Haringey Council target of 20% reduction through renewable technologies has been achieved.

As the area of this building exceeds 1,000 sqm gross internal area (GIA), it is considered a major development. Therefore, any shortfall to a zero carbon development must be redeemed with a carbon offset payment.

Table 2 displays the carbon offset payments towards a net zero target.

Table 2: Carbon Offset Payments	
Shortfall per Annum	2.53
Total Shortfall over 30 Years*	75.9
Carbon Offset Payment (£95 per tonne)	£7,210.50

*It is assumed lifetime of the development's services to be 30 years

Figure 2 displays predicted domestic CO₂ reductions across each phase of the London Plan Energy Hierarchy, surpassing the minimum requirements for CO₂ reductions as displayed by the green dotted lines.



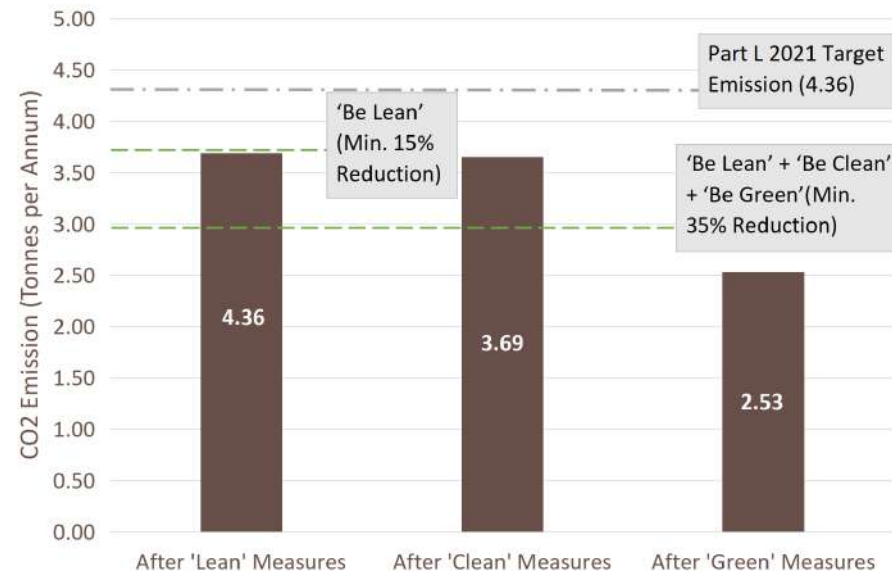


Figure 2: Predicted Domestic CO₂ reductions against Part L2 2021 Baseline

The new development has the potential to comply with the Building Regulations Part L2 2021.



Appendices

Appendix A: Preliminary Appraisal of Renewable Energy Options

This appendix summarises the preliminary analysis of renewable energy options, and identifies which should be assessed in further detail, and which should be discounted because of clear technical reasons or other obstacles.

LZC Technology	Basic Technical Information	Technical, Environmental & Economic implications / Considerations	Suited Application	Site Specific Comment	Detailed Analysis ?
Solar thermal	Solar collectors (flat plate or tube) transfer energy into transfer liquid to a closed loop twin coil hot water cylinder	+ Government grants available (RHIs) +/- Can meet a significant proportion of the DHW demand - Efficiency affected by site factors – shading, orientation and roof/ground space - Requires considerable hot water demand all year round to be financially beneficial	Domestic and commercial applications with high annual hot water load; leisure centres, canteens, washrooms	This technology has not been specified as the PV panels proved to be the most viable and sufficient technology to achieve the targeted reduction in CO2 emissions. Hence this has not been specified for this development.	No
Wind turbine	Turbine/generator converts wind energy to electrical power.	+ Government grants available (FITs) + Allows on site generation of renewable electricity - Can create structural, vibrations and noise implications - Not suited for urban environments - Costs can be high in relation to the actual amount of electricity generated - Potential for additional planning issues	Large sized turbines in non-urban or offshore locations will be more effective	The site is located in a dense urban area and further planning approvals would be required.	No
Solar Photo-voltaic	Converts sunlight to DC electrical power which then uses an inverter to convert to AC.	+ Government grants available (FITs) + Allows on site generation of renewable electricity + Generally payback between 7-12 years + Low maintenance requirements - Efficiency affected by site factors – shading, orientation and roof/ground space	Wide range of building types particularly buildings with limited solar shading and south facing roof	There is sufficient roof space with minor over shading from surroundings.	YES



LZC Technology	Basic Technical Information	Technical, Environmental & Economic implications / Considerations	Suited Application	Site Specific Comment	Detailed Analysis ?
Air heat pump	Air Source Heat Pumps (ASHP) capture heat from the outside air and transfer the heat directly to the air inside the building or transferring the heat to a liquid medium that can be pumped around the building	+Lower installation cost than ground source heat pump + Can provide heating and cooling + Government grants available (RHIs) -COP is not as good during the heating season when the outside air temperature is often less than the ground temperature -Can restrict distribution strategies -Carbon saving are less clear cut -Noise and visual impact	Wide range of building types particularly buildings designed to have low temperature heat emitters.	Planning, noise and space limitations.	YES
Ground Source Heat Pump	Ground Source Heat Pumps (GSHP) capture heat from the ground and transfer the heat to a liquid medium that can be pumped around the building	+ COP is much better than air source heat pumps + Government grants available (RHIs) -Requires area for ground collector or borehole -High initial capital cost - Can restrict distribution strategies -Carbon saving are less clear cut	Suits building designed to have low temperature heat emitters with sufficient space for necessary ground works	Limited external ground space to allow for the installation. The high capital cost relevant to the size of the development has also been considered when discounting this technology.	No
Biomass	Uses biomass as a fuel source for space heating and hot water	+ Government grants available (RHIs) + Renewable source of heating - Requires large fuel storage capacity - Generally a large capital cost	Building/site with sufficient access and storage facilities and a capable maintenance team	There is insufficient storage space and very limited access for regular deliveries to warrant further investigation.	No



Appendix B: Supporting BRUKL Document (Be Lean)

Please see 'Appendix B: Be Lean BRUKL Supplementary Document'

Appendix C: Supporting BRUKL Document (Be Clean)

Please see 'Appendix C: Be Clean BRUKL Supplementary Document'

Appendix D: Supporting BRUKL Document (Be Green)

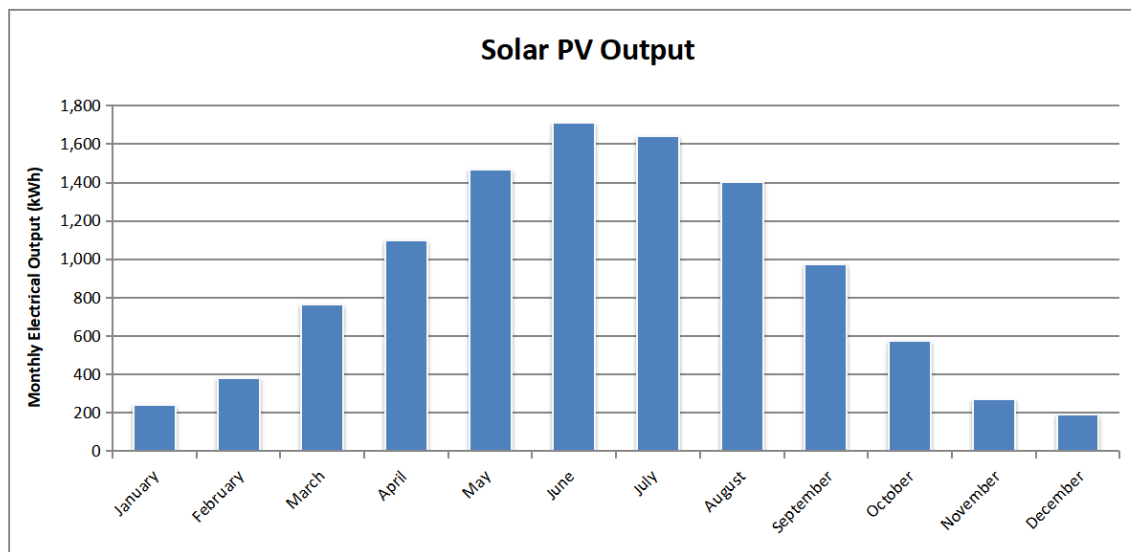
Please see 'Appendix D: Be Green BRUKL Supplementary Document'

Appendix E: PV Calculation

Photovoltaics

Choose Panel:	Reference Number	243	
	Manufacturer	Sunpower	
	Model	E20/333	
Technical Data:	Open Circuit Voltage at STC	65.30 V	<i>Voc_STC</i>
	Short Circuit Current at STC	6.46 A	<i>Isc_STC</i>
	Rated (Peak) Power	333 W	<i>Pmax</i>
	NOCT	45 deg.C	<i>NOCT</i>
	Temperature Coefficient of Voltage	0.0 mV/deg.C	<i>CtV</i>
	Temperature Coefficient of Current	0.0 mA/deg.C	<i>CtI</i>
	Fill Factor	0.7894	<i>FF</i>
	Panel efficiency	20.4%	
	Area per Panel (Gross)	1.63 m2	
Panels:	Number of Panels	38 Panels	<i>No_PV</i>
	Total Area of Panels	62.0 m2	<i>Apv</i>
	Inclination of Panel	0 °	
	Orientation of Panel	South	
CO2:	Carbon Intensity of Grid Electricity	0.517 kgCO2/kWh	<i>Cgrid</i>
	Annual output from PV	10717 kWh	
	CO2 displaced per year	5,541 kg	

Summary:	Total Array Rated Output	12.7 kWp
	Annual output from PV	10,717 kWh
	CO2 Displaced per year	5,541 kg



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We have a proactive approach to spatial design and how building services integrate within the space. We offer our clients a high quality service by working closely with them and their team to achieve a successful end product which meets the ESG agenda.

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