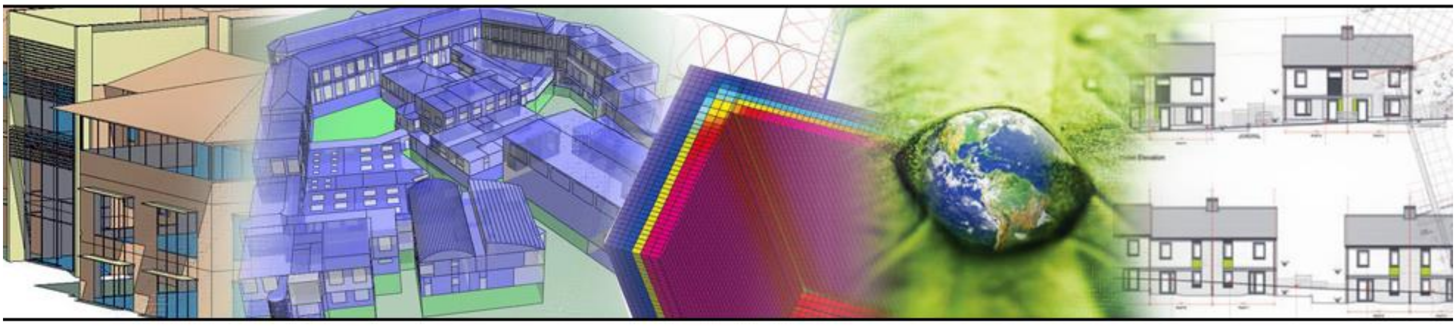

London Plan Energy Strategy Report

Embassy House, West End Lane, West Hampstead, NW6 2NA

Stroma Reference: OP-B069 ES2
Date: 04/10/2024
Prepared for: Capital Property & Construction Consultants Ltd

1. Executive Summary

This Energy Strategy has been produced on behalf of Capital Property & Construction Consultants Ltd to support the planning submission for the proposed roof top extension to provide six residential units at Embassy House, West End Lane, West Hampstead, NW6 2NA**.**

This report outlines the proposed preliminary specification for the development and the resulting savings implemented at each stage of the energy hierarchy in accordance with the New London Plan 2021.

The energy strategy will follow the 'Be Lean, Be Clean & Be Green' design philosophy. In line with this, the scheme will undertake a fabric first approach and incorporate renewable technology on-site via air source heat pumps, which are a zero NOx solution at the source, and Solar Photovoltaics (PV).

The measures implemented at the Be Green stage produce a CO_2 reduction of 83% against the baseline using the SAP10 carbon factors. This exceeds the minimum required 35%.

The remaining emissions shall be offset via a £3,746 contribution to The London Borough of Camden carbon offset fund in order to contribute to sustainable improvements elsewhere in the Borough.

The required tables and graphs can be seen on the next page and in the appended 'GLA Carbon Emissions Reporting Spreadsheet'.

1.1. Results Summary

Scenario	Carbon Dioxide Emissions for residential buildings (Tonnes CO2 per annum) Regulated
Baseline	7.9
Be Lean	7.8
Be Clean	7.8
Be Green	1.3

Table 1. Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

Scenario	Regulated CO_2 savings (Tonnes CO_2/annum)	CO_2 reduction (%)
Savings from 'Be Lean'	0.1	2%
Savings from 'Be Clean'	0	0%
Savings from 'Be Green'	6.5	82%
Cumulative on-site savings	**6.6**	**83%**
Remaining emissions to offset	1.3	-
	Tonnes (Co_2)	
Cumulative savings for offset payment (for 30 years)	**39**	-
Cash in-lieu contribution*	**£3,746**	-

**Carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide*

Table 2. Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

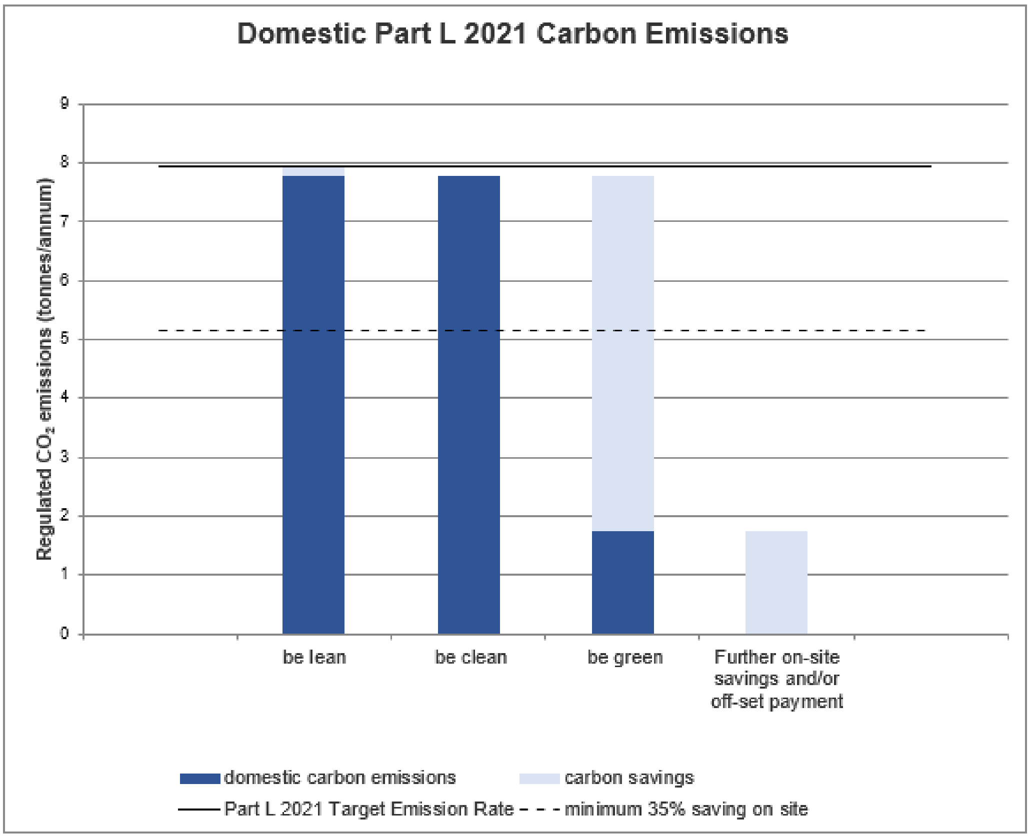

Figure 1. CO_2 savings through the Energy Hierarchy

Contents

2. Quality Management

Prepared by		Checked by
Matthew Stainrod		Rob Waiting BSc (hons) MSc
Sustainability Consultant		Principal Sustainability Consultant
Date: 04/10/2024		**Date:** 04/10/2024
File reference:	OP-B069 ES2	

Version	Status	Date	Change Summary
ES1	First Issue	31/01/2024	-
ES2	Second Issue	04/10/2024	Fabric upgrades, PV included

3. Introduction

Stroma Built Environment has been commissioned by Capital Property & Construction Consultants Ltd to support the planning submission for the proposed roof top extension to provide six residential units at Embassy House, West End Lane, West Hampstead, NW6 2NA**.**

This statement shall set out the applicable policies on energy for the proposed scheme, as well as the methodology for, and results from, an Energy Assessment.

It contains CO_2 emissions assessment in line with the guidance set out by the planning authority and shall detail the energy efficiency measures and low carbon technologies proposed within the design.

4. Development Site

The site consists of an existing five storey building situated on the corner of West End Lane and Cleve Road. The proposal is to construct a roof top extension to provide six residential units.

Figure 2. Proposed top floor plan

5. Planning Policy

There are a wide range of energy-related planning policies that impact upon the design and construction of new developments. The National Planning Policy Framework (NPPF) 2021, indicates a presumption in favour of sustainable development. The regional policy '*The London Plan 2021'*, sets out a requirement to assess energy demand, adopt energy efficiency measures, and make use of decentralised energy and renewable technology where feasible.

The Camden Local Plan follows the requirements of the London Plan and requires development to demonstrate how the principles of the London Plan have been followed.

5.1. London Plan Policy SI.2 Minimising greenhouse gas emissions

This policy requires that all developments meet set targets for CO_2 emissions. These targets are set in the context of the Building Regulations UK Part L (BRUKL) 2010.

The target under the London Plan is for zero net regulated emissions or 'zero carbon'. To achieve this target, carbon reduction should be maximised on site where possible, with the remaining emissions offset via a 'payment in lieu', to fund energy efficiency improvement measures elsewhere in the Borough.

The London Plan details an 'energy hierarchy' to be followed. This is to ensure that poorly designed buildings cannot be offset by renewable energy alone.

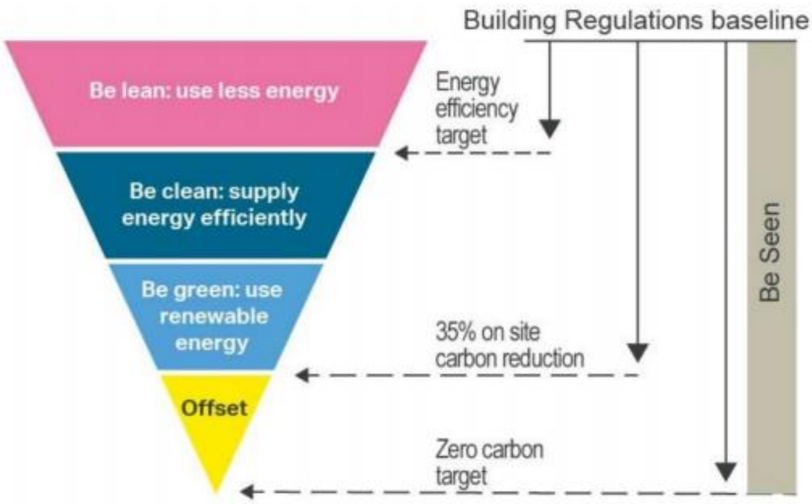

Figure 4.London Plan 2021 'energy hierarchy'

To demonstrate compliance with the policy it is necessary to assess the energy demand and emissions in detail, and to demonstrate how the energy hierarchy is being followed and how the emissions targets will be met using efficiency measures (Be Lean), decentralised energy systems (Be Clean), renewable energy technologies (Be Green) as appropriate. Finally, the in-use energy consumption needs to be monitors, verified and reported (Be Seen).

Zero Carbon status is then demonstrated through off-setting the balance of regulated CO_2 emissions via a financial contribution to the respective borough. This carbon off-set payment will contribute to a fund which is then invested into other projects where equivalent CO_2 savings can be realised.

5.2. London Plan Policy SI.3 Energy Infrastructure

Major developments with Heat Network Priority Areas (HNPA's) are required to investigate the feasibility of efficient heating infrastructure, in accordance with the following hierarchy:

1. Connection to an existing or planned heating or cooling network
2. Implementation of a communal heating system, using zero-carbon or local secondary heat sources (in conjunction with heat pump, if required), which is designed to allow a cost-connection to a future network if one becomes available.
3. Individual heating systems (low-density individual housing only)

5.3. Camden Local Plan - Policy CC1 Climate change mitigation

The Council will require all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

We will:

a. promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;

b. require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met;

c. ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks;

d. support and encourage sensitive energy efficiency improvements to existing buildings;

e. require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and

f. expect all developments to optimise resource efficiency.

For decentralised energy networks, we will promote decentralised energy by:

g. working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;

h. protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes; and

i. requiring all major developments to assess the feasibility of connecting to an existing decentralised energy network, or where this is not possible establishing a new network.

To ensure that the Council can monitor the effectiveness of renewable and low carbon technologies, major developments will be required to install appropriate monitoring equipment.

5.4. Camden Local Plan - Policy CC2 Adapting to climate change

The Council will require development to be resilient to climate change. All development should adopt appropriate climate change adaptation measures such as:

a. the protection of existing green spaces and promoting new appropriate green infrastructure;

b. not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;

c. incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and

d. measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

e. ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;

f. encourage new build residential development to use the Home Quality Mark and Passivhaus design standards;

g. encouraging conversions and extensions of 500 sqm of residential floorspace or above or five or more dwellings to achieve "excellent" in BREEAM domestic refurbishment; and

h. expecting non-domestic developments of 500 sqm of floorspace or above to achieve "excellent" in BREEAM assessments and encouraging zero carbon in new development from 2019.

6. Assessment Methodology

6.1. Building Regulations – England Approved Document Volume 1 Domestic

Approved document L1A – Conservation of Fuel and Power sets the standard for carbon emissions for new dwellings and was last revised in June 2022 (Part L: 2021). The properties will need to comply with the criteria set out in the document, as follows:

New Build Dwellings

The predicted Dwelling Emission Rate of CO2 emissions from dwellings (DER) are not greater than the Target Emission Rate (TER).

The fabric energy efficiency rates for the building shall be no greater than the target fabric energy efficiency rate

The primary energy rate for the building shall be no greater than the target primary energy rate

That the performance of dwellings as-built comply with the DER values achieved, including site testing that the 'air permeability' rate achieved is as per that specified, or better.

The necessary provisions for energy efficient operation of dwellings are put in place, including operation and maintenance instructions aimed at achieving economy in the use of fuel and power in a way that householders can understand.

6.2. Domestic (SAP 10.2)

The Standard Assessment Procedure (SAP 10.2) is the Government's approved methodology for assessing the predicted energy consumption and carbon dioxide emissions of new buildings. Results are derived in respect of floor area and consider energy use (kWh/m^2/yr) and associated CO_2 emissions (kg.CO_2/m^2/yr) from the following:

- Space heating
- Domestic hot water
- Ventilation
- Lighting
- Ancillary pumps and fans
- Energy generating technology

SAP calculations have been undertaken for all dwellings, by a trained and accredited energy assessor using approved software, and results have been used to determine the predicted energy consumption and CO_2 emissions.

The SAP worksheets (DER/TER, DFEE/TFEE & DPER/TPER calculations), for each dwelling, together with the GLA carbon emissions reporting spreadsheet have been provided within the appendix.

7. Establishing the Baseline Emissions

SAP calculations have been undertaken to assess regulated energy use, accounting for energy demands from space heating and hot water, and electricity for pumps, fans and lighting.

The energy assessment has first established the regulated CO_2 emissions assuming the development complied with Part L 2021 of the Building Regulations using the Building Regulations approved compliance software. When determining this baseline, it has been assumed that the heating would be provided by gas boilers and that any active cooling will be provided by electrically powered equipment.

The TER is the maximum permitted emissions for each new domestic building and is expressed in $kgCO_2/m^2$.

Scenario	Carbon Dioxide Emissions for residential buildings (Tonnes CO2 per annum) Regulated
Baseline	7.9

Table 3. Carbon Dioxide Emissions at baseline stage of the Energy Hierarchy for residential buildings

BE LEAN

Use Less Energy

8. Be Lean: Use Less Energy

This section outlines the energy efficiency proposals to minimise energy demand. Performance and savings are assessed against the previously calculated 'baseline' emissions.

At an early stage, the design team have explored a range of energy efficiency measures including enhanced U-values and the use of efficient mechanical ventilation systems. The London Plan target under the 'Be Lean' policy is to report an improvement on the baseline case with energy efficiency measures alone, as below:

1. Domestic developments should achieve at least a 10 per cent improvement on Building Regulations from energy efficiency
2. Non-domestic developments should achieve at least a 15 per cent improvement on Building Regulations from energy efficiency.

So that the improvements from energy efficiency alone can be properly understood, aspects of the proposals that relate to efficient supply of energy (energy centre proposals) or renewable energy generation, have not been included at this stage.

8.1. Thermal Envelope

Fundamental to achieving energy efficiency in any building is a suitably designed and specified thermal envelope. Passive design features such as appropriate orientation, balancing solar gain and limiting heat loss are all proven techniques to reduce energy consumption. In addition, minimising thermal bridging and controlling air infiltration are important factors.

The following tables illustrate the proposed building fabric performance specification, with respect to the limiting values stipulated in Part L 2021. It is shown that the proposed specification represents a significant betterment of the minimum standards.

Element	Part L Average Minimim U-value (W/m²K)	Proposed U-value (W/m²K)	% Improvement
External Walls	0.26	0.15	42%
Party Walls	0.20	0	100%
Roof	0.16	0.10	38%
Doors	1.6	1.0	38%
Glazed Doors/Windows	1.6	1.20	25%
Y-value	0.20	0.05	75%

Table 4. Proposed Building fabric specification

Element	Part L Maximum Permeability m³/(h.m²) @50 Pa		Proposed Permeability m³/(h.m²) @50 Pa	% Improvement
Air permeability	8		5.00	38%

Table 5. Building airtightness specification

It should also be noted that all specification is subject to review, and as such U-Values, G-Values and thermal bridging details will be investigated further throughout the design stage, with the aim of limiting heat loss, and to reduce emissions as much as practically possible.

8.2. Building Services

Space heating and domestic hot water (DHW) will be provided by air source heat pumps with hot water cylinders to each individual dwelling. Air source heat pumps (ASHP) extract heat from ambient air via a reversed refrigeration cycle. Heat is absorbed into an evaporator (outdoor unit) and increased via compression. This useful heat is transferred to the building via a refrigerant to provide space and/or water heating.

Although the system uses electricity, high Coefficient of Performances (COP) can be achieved resulting in overall CO_2 emissions and running costs below that of an efficient gas-fired boiler. The COP is a function of the difference between ambient air (source) temperature and output (flow) temperature.

Ventilation to all dwellings will be via intermittent extract fans installed within the kitchen and all wet rooms.

Low energy lighting will be specified throughout. In line with building regulations this means each internal light fitting should have lamps with a minimum luminous efficacy of 75 light source lumens per circuit-watt. Typically, this will be achieved with LEDs or compact fluorescent lights and not low voltage Halogen variants.

Element	Specification
Heating	Air Source Heat Pump (Panasonic WH-MDC05J3E5 or equal and approved – M&E to confirm make a model)
Heating emitter	Radiators
Heating control	Programmer, Room Thermostat, TRVs
Domestic hot water	Hot water cylinder
Water consumption	≤105 litres/person/day
Internal fixed lighting	100% low energy LED lighting
Ventilation	System 1 ventilation

Table 6. Building services specification

8.3. Results Summary – Be Lean

Scenario	Carbon Dioxide Emissions for residential buildings (Tonnes CO2 per annum) Regulated
Baseline	7.9
Be Lean	7.8

Table 7. Carbon Dioxide Emissions after Be Lean stage of the Energy Hierarchy for residential buildings

Scenario	Regulated CO_2 savings (Tonnes CO_2/annum)	CO_2 reduction (%)
Savings from 'Be Lean'	0.1	2%

Table 8. Regulated Carbon Dioxide savings from Be Lean stage of the Energy Hierarchy for residential buildings

BE CLEAN

Supply Energy Efficiently

9. Be Clean: Supply Energy Efficiently

9.1. District Heating

Where location and development permits; the opportunity of connecting to existing district heating networks (DHN) or the creation of new district heating networks should be considered. District heating networks have the potential to offer significant energy, carbon and cost savings over localised alternatives. District heating networks often utilise low-carbon energy generation/harnessing technologies such as Anaerobic Digestion (AD), Combined Heat and Power (CHP) and Waste Heat Recovery (WHR). Given the ongoing decarbonation of the national grid, more heat pump technology is expected to be introduced over time. District networks also enable heat loads to be balanced between sites and therefore plant to operate more continuously and efficiently.

District energy networks are only generally feasible where there is a high density of heat demand. Capital costs and distribution losses must be relatively insignificant to support their viability. Where an opportunity exists, the network operator should be contacted to assess the viability and costs of connection.

In London, there is a desire to generate at least 25% of heat and power through localised decentralised energy systems by 2025. As such, the London Boroughs were commissioned to identify the energy loads and energy densities within their region. This information has been used to develop The London Heat Map which shows the potential, proposed and existing district heat networks.

The London Heat Map has been investigated for the development site and there are no existing district heating networks within the vicinity of the development. The development is close to the proposed South Kilburn network but there are no further details currently on this proposal.

The proposed development is relatively low-rise and comprises of 6no. apartments. In addition to a high performance specification, the predominant annual energy load is likely to be from Heating and Domestic Hot Water (DHW) and limited to one or two peak periods during the day. In addition to capital costs, the thermal losses and circulation energy are likely to make a district or, community network technically and economically unviable.

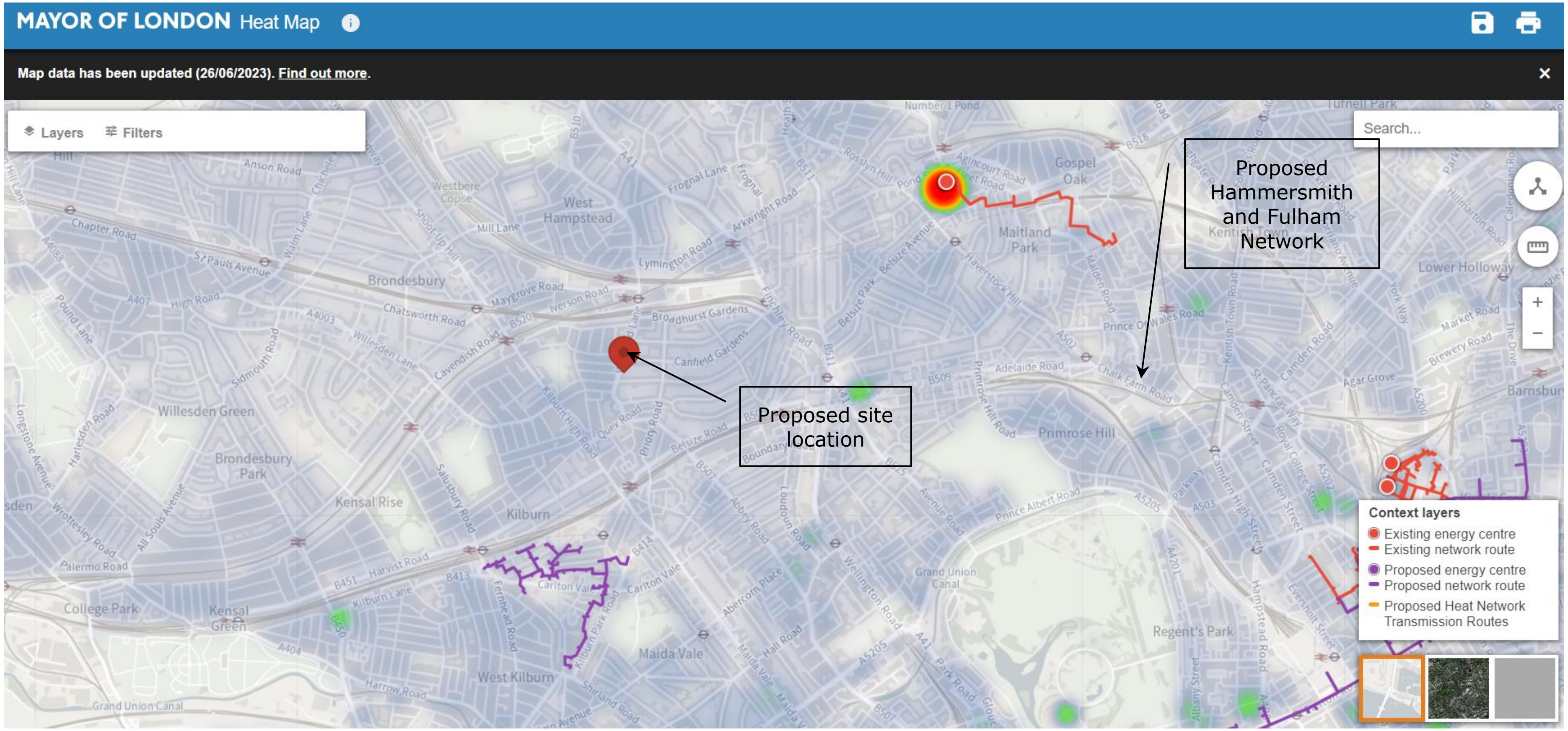

Figure 5.London Heat Map for the site region[1]

[1] https://www.london.gov.uk/what-we-do/environment/energy/london-heat-map/view-london-heat-map

9.2. Be Clean summary

There are currently no existing district heating networks within the vicinity of the development and so connection to an existing network is not currently an option.

There is therefore no change to the CO2 emissions after the 'Be Clean' assessment, when compared to the 'Be Lean' assessment.

9.3. Results Summary – Be Clean

Scenario	Carbon Dioxide Emissions for residential buildings (Tonnes CO2 per annum) Regulated
Baseline	7.9
Be Lean	7.8
Be Clean	7.8

Table 9. Carbon Dioxide Emissions after be Clean stage of the Energy Hierarchy for residential buildings

Scenario	Regulated CO_2 savings (Tonnes CO_2/annum)	CO_2 reduction (%)
Savings from 'Be Lean'	0.1	2%
Savings from 'Be Clean'	0	0%

Table 10. Regulated Carbon Dioxide savings from Be Clean stage of the Energy Hierarchy for residential buildings

BE Green

Use Renewable Energy

10. Be Green: Use Renewable Energy

10.1. Overview

Renewable energy is defined as energy derived from energy flows that occur naturally and repeatedly in the environment. It may be contrasted with energy sources that can be depleted such as fossil fuels or uranium-238-based nuclear power. It therefore follows that the commonly used phrase "equipment to generate renewable energy" is an oxymoron since renewable energy cannot be "generated" – the true function of the technology is to harness a natural energy flow.

Renewable energy technologies, with a couple of exceptions, all utilise energy from the sun – either directly or indirectly, the exceptions being true geothermal, which uses heat from the earth's core, and tidal / marine current electricity generation which uses the gravitational forces between the earth and the moon, (although some marine currents are also greatly affected by solar energy). Insofar as this report is only concerned with practical options for on-site renewable energy, these options are not considered further. The remaining range of "solar" technologies are however vast, and some would not even appear to be solar on superficial inspection. They can be summarised as follows:

- Solar thermal – direct heating of water for space heating or domestic hot water
- Photovoltaic – direct generation of electricity from sunlight
- Hydroelectricity – use of solar (water cycle) driven water flows to generate electricity
- Wind turbines – use of solar driven air movement to generate electricity
- Heat pumps – extraction of solar heat from the earth, atmosphere or water bodies
- Bio-fuels – combustion of solid or liquid bio-fuels to produce heat or electricity

The technologies, and their potential application to this site are discussed in more detail in the following sections. However, one further pertinent point must be made. The reason for adopting renewable energy technologies is to reduce greenhouse gas emissions – mainly carbon dioxide, and none of the technologies are wholly "zero carbon". This is because when the whole life cycle is considered, some energy must be put into every system to manufacture and maintain the equipment (which has a finite life) or to operate the equipment, and generally at present this energy is derived from non-renewable sources. Examples include the energy needed to refine and process the silicon used to manufacture photovoltaic panels, the diesel fuel used to transport wood pellets to the development and to power the wood processing machinery, and where applicable to bio-fuels, the energy used to manufacture the fertilizers needed to maintain soil fertility.

Finally, due to the dynamic and innovative nature of the renewable energy technology industry even apparently similar products can differ in vital practical details which means that detailed design of installations must be undertaken by experts, often working closely with the product manufacturers, as virtually no two products are identical or interchangeable.

10.2. Heat Pumps

Heat pumps collect low temperature heat and "concentrate" it to a usable temperature. A typical heat pump serving a heat network will typically deliver 2-3 kWh of useful energy for every 1 kWh of input energy. A heat pump operating in this way can therefore be deemed to have delivered 1-2 kWh of low carbon energy.

There are two common types of heat pump – ground source and air source. Water source heat pumps are also available, but rarely applicable, as they require a local large body of water. In urban locations such as this, ground source heat pumps are also rarely viable, due to the complexity of drilling boreholes to collect heat. These are typically up to 100m deep and should be spaced at least 6m apart to avoid over-cooling the ground. A typical borehole can deliver a maximum output of 4kW of heat, therefore, a significantly large area is required in order to be considered feasible.

Air source heat pumps collect heat from the ambient air using air-heat-exchanger units.

Whilst heat pumps can provide good levels of performance, they have practical limitations. Firstly, to be effective, the units must be located externally, which can impact acoustically as well as on visual amenity and space. In addition, as heat pumps collect heat from the air, their efficiency is intrinsically linked to air temperature. Therefore, when the demand for heat is at its peak, the efficiency of the system is at its lowest. Furthermore, as the system relies on grid-produced electricity to operate, its real carbon emissions will be heavily linked to the variable carbon intensity of the national grid.

The introduction of SAP10 carbon emission factors has, in most cases, resulted in heat pumps being the only viable option to reduce carbon emissions in line with London Plan target requirements. The challenge for the design team is how to incorporate this technology where it can operate at its most efficient capacity and it is anticipated that these will need to be at roof level in most cases.

A heat pump specialist is to be appointed at the earliest opportunity to calculate the appropriate heat pump size for each dwelling and provide installation/location drawings.

10.3. Solar Photovoltaics (PV)

Photovoltaic panels are conceptually straightforward. The panels produce "zero carbon" electricity that is used in place of grid electricity, and the carbon dioxide emissions saved are the emissions that would have occurred had the electricity been produced by a power station feeding the grid.

Photovoltaic panels have certain siting constraints. To produce the maximum output, they should face due south, although south-east to south-west is certainly acceptable, and even east or west will be acceptable if the angle of inclination is no more than 20º. When not in direct sunlight, but shaded by obstacles such as adjacent buildings or trees, the output of the affected panel is significantly reduced. As groups of panels are connected electrically in "series" a reduced output from one panel will reduce the output from all the panels in the group. This means that it is particularly important to avoid shading. However, photovoltaic panels have many advantages. They are clean, silent, reliable, low maintenance, and are easy to install. They also have a very long life – up to 40 years – which is at least double that typically quoted for other technologies.

In addition, and unlike most solar thermal panels, and most other renewable energy technologies, photovoltaic panels are "zero carbon" in use. They simply produce electricity when exposed to sunlight. However, the situation is rather different when the carbon dioxide emissions are determined using a "whole life cycle analysis" approach that includes the energy and other greenhouse gas emissions associated with panel.

This development proposal is well suited to photovoltaic panel technology and there is available roof space.

The system inverter will convert DC output to AC, bringing power into phase with the mains electricity supply. If there is any surplus electricity produced, this can be exported to the grid to be utilised by others.

It is proposed that 80no PV panels can be installed on the roof of the development, totalling 20kWp (250w panels) on a south orientation.

A PV installer shall need to be appointed at the earliest opportunity to verify that these savings are achievable and a roof plan showing the array should be provided once this is confirmed.

10.4. Results Summary – Be Green

Scenario	Carbon Dioxide Emissions for residential buildings (Tonnes CO2 per annum) Regulated
Baseline	7.9
Be Lean	7.8
Be Clean	7.8
Be Green	1.3

Table 11. Carbon Dioxide Emissions after Be Green stage of the Energy Hierarchy for residential buildings

Scenario	Regulated CO_2 savings (Tonnes CO_2/annum)	CO_2 reduction (%)
Savings from 'Be Lean'	0.1	2%
Savings from 'Be Clean'	0	0%
Savings from 'Be Green'	6.5	82%
Cumulative on-site savings	**6.6**	**83%**
Remaining emissions to offset	1.3	-

Table 12. Regulated Carbon Dioxide savings from Be Green stage of the Energy Hierarchy residential buildings

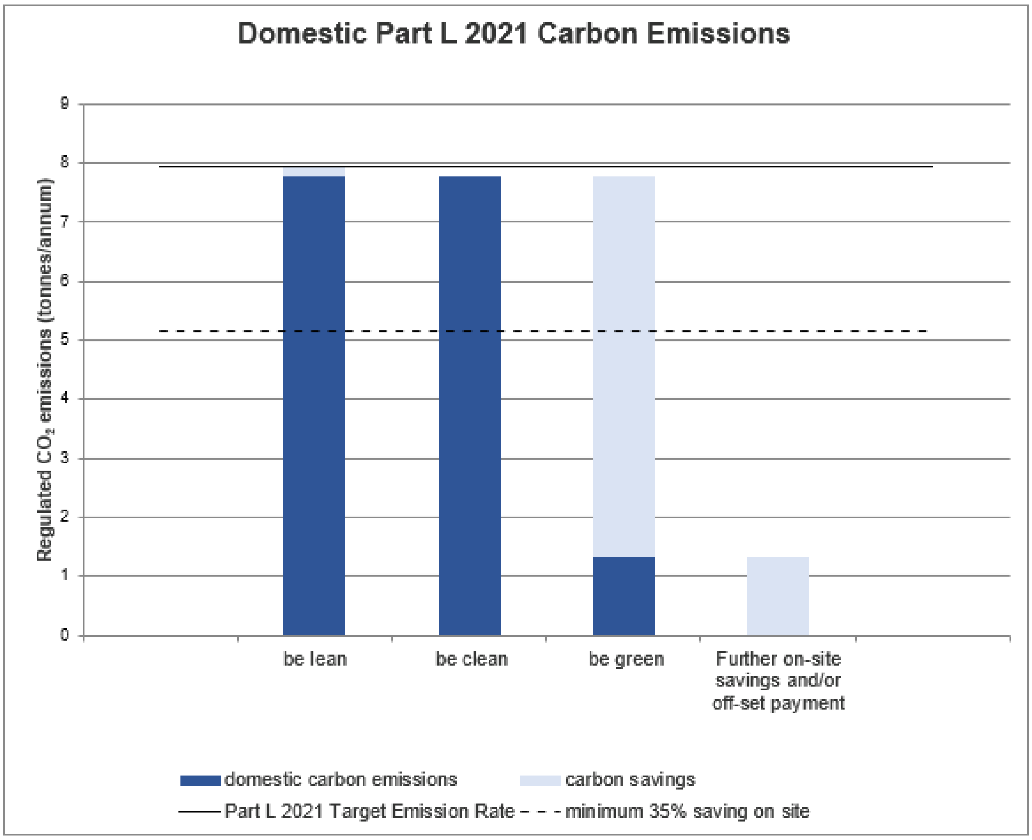

Figure 6. CO_2 savings through the Energy Hierarchy

11. Carbon Offset

If the net zero-carbon target cannot be met on site and the GLA is satisfied that onsite savings have been maximised, then the remaining emissions are offset via a financial contribution to the relevant Borough's carbon offset fund.

Contributions to the carbon offset fund are to be spent within the vicinity of the named development and used for retrofitting existing buildings, decentralised energy networks, renewable energy or any other programme that achieves a calculable reduction in carbon emissions.

The total remaining emissions for the development are calculated as 52 tonnes/CO_2/year.

In accordance with The London Borough of Camden planning policy, the offset fee is calculated as £95/tonne for a period of 30 years. The offset fee required can therefore be calculated as per the below:

Scenario	Regulated CO_2 savings (Tonnes CO_2/annum)	CO_2 reduction (%)
Savings from 'Be Lean'	0.1	2%
Savings from 'Be Clean'	0	0%
Savings from 'Be Green'	6.5	82%
Cumulative on-site savings	**6.6**	**83%**
Remaining emissions to offset	1.3	-
	Tonnes (Co_2)	
Cumulative savings for offset payment (for 30 years)	**39**	-
Cash in-lieu contribution*	**£3,746**	-

**Carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide*

Table 13. Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings showing the carbon offset payment

It should be noted however that the exact amount will change dependent on detailed design, and specific products specified for construction, as such it is the case that this payment be recalculated post-construction, and true figures calculated from the 'As Built' emissions.

12. Conclusions

This Energy Statement has outlined the proposed preliminary specification for the development and the resulting savings implemented at each stage of the energy hierarchy. The baseline has been created by establishing the current Regulatory minimum standard and adjusting the figures to reflect the latest draft CO_2 emission factors as desired by the GLA.

There are currently no existing district heating networks within the vicinity of the development and so connection to an existing network is not currently an option. Therefore, an ASHP system shall be implemented, with provision made to allow for connection to a future district heating scheme if one becomes available. Additionally, a Solar Photovoltaics (PV) system will be installed to the available roof space.

The measures implemented at the Be Green stage produce a CO_2 reduction of 83% against the baseline using the SAP10.2 carbon factors. This exceeds the minimum required 35%.

The remaining emissions shall be offset via a £3,746 contribution to The London Borough of Camden carbon offset fund in order to contribute to sustainable improvements elsewhere in the Borough.

Therefore, the foregoing results show that the development proposals have been assessed in line with the applicable planning policies of the London Plan: London Plan Policy SI.2 Minimising greenhouse gas emissions; London Plan Policy SI.3 Energy Infrastructure; and London Plan Policy SI 4 Managing heat risk, in addition to the local policies of Camden Town Council.

Appendices

Appendix A – SAP Worksheets

Appendix B – GLA Carbon Emissions Reporting Spreadsheet