Energy statement

for

16 Elmore Road

Enfield

By

Brady Finn
HIBEC Limited
106a High Street
Henley-In-Arden
B95 5BY

REF C2324518
DATE 30/04/2024

1.0 INTRODUCTION

This report is submitted as part of the planning application for the construction of 1 dwelling at 16 Elmore Road. This report aims to demonstrate the low carbon approach taken in reaching the design solution and show its compliance with Part L Volume 1 of the building regulations.

1.1 Sustainability Targets

The sustainability targets set for the development are as follows.

(1) Achieve a Dwelling Emission Rating (DER) that is 40% lower than the Target Emission Rating (TER) for compliance with the Building Regulations Part L 2021.

(2) Achieve a Dwelling Primary Energy Rating (DPER) that is lower than the Target Primary Energy Rating (TPER) for compliance with the Building Regulations Part L 2021.

(3) Achieve a Dwelling Fabric Energy Efficiency (DFEE) that is lower than the Target Fabric Energy Efficiency (TFEE) for compliance with the Building Regulations Part L 2021.

(4) Achieve carbon reduction as far as possible on-site meeting minimum reductions as set out in parts 2 and 3, or London Plan or subsequent national policy, whichever is higher.

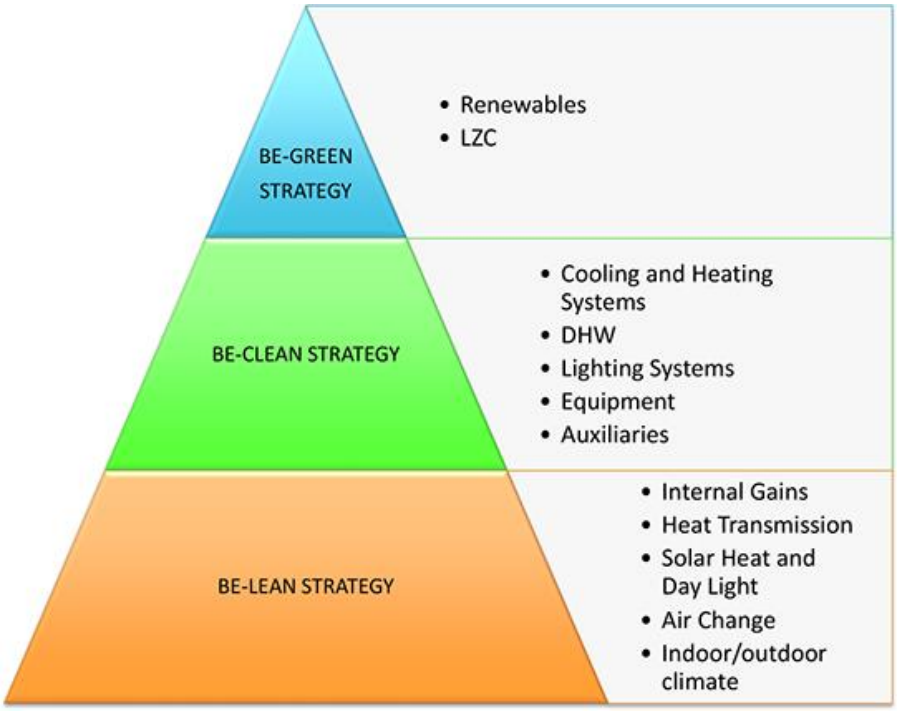
(5) Maximize efficiency and demonstrate a space heating demand of 15kWh/m2/yr.

(6) Achieve an energy use intensity not exceeding 35kWh/m2/y.

(7) To aim for net zero by employing LZC technology and installing on-site renewables equating to a minimum of 80kWh/m2/y.

1.2 Design Approach

The design team's approach to energy strategy is to follow the industry's best practice guidance and can be generally summarized using energy hierarchy and principles of "be lean, be clean and be green" for energy management. The philosophy behind the approach is to reduce the building's demand for natural resources using passive design measures, before using low carbon and renewable technologies.



Be Lean:

- The development has been designed to have a high fabric efficiency and air permeability target. External elements will show an improvement over the Building Regulations Part L 2021 U value targets resulting in low wintertime heating loads.
- The spaces are equipped with large glazing units to improve daylight provision and reduce artificial lighting use.
- Large glazing units also increase solar gain, reducing the heating load.

Be Clean:

- The proposed system specification capitalizes on the ongoing grid decarbonization in providing an all-electric building solution.
- The dwellings are heated by Air Source Heat Pump, which also supplements the electric immersion hot water cylinders.

Be Green:

- The site will utilise heat pump technology, which is a LZC technology, and photovoltaic panels to achieve net-zero.

1.3 Methodology

The calculation methodology used to determine the CO_2 emission rates, Primary Energy Rates, and Fabric Efficiency rates was SAP10, producing Building Regulations England Part L (BREL) reports for the dwellings.

The SAP10 Part L assessment software produces evaluations of energy use in residential buildings for compliance with the Building Regulations and Building Energy Performance Certification (EPC) purposes.

Notional Buildings of the same geometry, space use, construction, and specific features

for HVAC, DHW and Lighting systems are generated along with the actual buildings that are assessed. Compliance with Part L is based on the comparison between the energy use and Target Emission Rate (TER), Target Primary Energy Rate (TPER) and Target Fabric Energy Efficiency (TFEE) derived from the notional and the energy use and the actual Dwelling Emission Rate (DER), actual Dwelling Primary Energy Rate (DPER) and actual Dwelling Fabric Energy Efficiency (DFEE) where the actual dwelling emission rate, actual dwelling primary energy rate and dwelling fabric energy efficiency must be less than or equal to the target emission rate, target primary building rate and target fabric energy efficiency respectively.

2.0 Part L Modelling Inputs

This section details the parameters and assumptions used in modelling the proposed buildings.

The model geometry has been created following drawings issued by Area dated March 2024.

2.1 Building Fabric

Building envelope performance is key to demonstrating Part L1 (2021) compliance. The enhancement of U-values whilst limiting thermal bridging and uncontrolled air ingress/leakage (air permeability) can significantly reduce the energy demand of the building. As such the building envelope is proposed to achieve an improved standard of thermal insulation with limited thermal bridging and optimised air tightness.

Unilin Insulation thermal bridging details and psi values have been used based on 125mm CT/PIR cavity wall construction.

The following table summarises the proposed building fabric U-value performances:

Building Element	Thermal Transmittance U-value (W/m².K)
External Walls	0.16
Sloped Roof Flat Roof	0.15 0.17
Ground floors	0.13
Glazing	1.20
Personnel Doors	1.00

** **All glazing** modelled with a **G-value of 0.43 (43%) BFRC certified.**

2.1.1 Air Permeability

An ‘As-Built’ building air permeability target of 3.00m3/hr.m2 is assumed.

2.1.2 Lighting

It is assumed that **luminaire lumens/circuit watt values ≥ 95lm/W** in the apartments and that brightness (Lux) levels are both carefully specified as not to be excessive whilst still meeting specific design requirements.

2.1.3 Space Heating and DHW Generation

It is proposed that the space heating load will be met by Vaillant aroTHERM 5kW + AI (SAP Code 104415) ASHPs with heat emitted from radiators.

For the DHW, A Vaillant Unistor 200L electric immersion cylinder has been specified, which will be supplemented by the ASHP. Loss of the cylinders is to be 1.2kWh/day with a heat transfer area of 1.40m^2 (Vaillant code 0020235272)

2.1.4 Ventilation

Mechanical ventilation with heat recovery (MVHR) has been assumed (Nuaire MRXBOXAB-ECO4) along with a improved air tightness of 3.00m^3/hr.m^2. It is assumed that the specific fan power will be confirmed by commissioning certificates.

2.1.5 Renewables

The feasibility of effectively and efficiently incorporating renewable technologies into the development has been analysed. An overview of each of the renewable energy technologies assessed in this study are as follows. The technologies have been given a feasibility status of: 'Recommended', 'Considered', or 'Not Recommended' for the described reasons. Wind power has been discounted as there are no viable locations to locate wind turbines and they would likely cause noise nuisance for occupants of the site and surrounding buildings. Biofuel has also been discounted as biomass deliveries by heavy goods vehicles are not feasible due to site constraints and would have associated noise and safety considerations.

Solar/Photovoltaics

Overview	Photovoltaics (PV) modules convert sunlight directly to DC electricity. The solar cells consist of a thin piece of semiconductor material, in most cases silicon. When sunlight shines on the cell it creates an electric field causing electricity to flow: the greater the light intensity, the greater the flow of electricity. Individually, PV cells only provide a small amount of electricity, and they are generally grouped together into a module for convenience and higher output.
Status	Recommended
Reasons	- The orientation and roof space of the dwellings means space is available to implement this system. - The roofs are not overshadowed and will be of suitable construction to accommodate this type of system.

Ground Source Heat Pump	
Overview	Space heating and cooling can be provided by circulating water through the ground or via subterranean water. Ground water cooling and heating makes use of the relatively stable ground/water temperatures throughout the year, typically ranging between 10-14°C. The heat pump extract or dumps heat to the ground via a ground contacting heat exchanger. Ground source heat pumps require no flues and have no acoustic issues.
Status	Considered – Not Recommended
Reasons	- Constrained site with no obvious location to site bore holes - Significant additional capital cost

Air Source Heat Pump	
Overview	Works in a very similar way to a ground source heat pump extracting heat energy from the air to provide heating to a building or hot water system. The heat pump extracts or dumps heat to the outside air via a heat exchanger. Air source heat pumps require no flue.
Status	Recommended
Reasons	- High Efficiency and able to provide a stable environment during summer and winter months.

Measures to be adopted

Air source heat pumps and photovoltaics will be adopted for the dwelling, utilizing the decarbonizing grid and high efficiency to reduce carbon emissions.

To achieve net zero, **4.71kW** of photovoltaic panels have been assumed to be installed facing east, with an elevation of 30°.

3.0 Energy Modelling Inputs and Assessment Methodology

Analysis has been performed to assess the currently proposed architectural and engineering services strategy in terms of associated carbon dioxide (CO_2) emissions.

As required, the performance of the proposed design has been benchmarked against Part L1 (2021) Notional target building. SAP10 has been used.

3.1 Regulated and Non-Regulated Energy

Building Regulations Part L1 (2021) compliance calculations are concerned with measuring the performance of the actual building against a 'Notional' compliant building in terms of 'regulated' energy/CO2 emissions only.

Regulated energy includes that associated with;

1. Space heating and cooling generation
2. DHW generation
3. Auxiliary energy (fans/pumps/controls)

4. Internal Lighting (external lighting is excluded)

In line with Part L1 a 'regulated energy' approach to calculating the energy demand/CO2 emissions has been taken.

3.2 Architectural Drawings Details

The models were developed based on the following architectural drawings as issued on 28/04/2024.

- 390-01
- 390-05
- 390-11
- 390-12
- 390-13
- 390-15
- 390-16
- 390-17
- 390-18
- TS24-115-1_1

4. Carbon Reduction

In summary and as shown in the accompanying documents the carbon reduction for the development **achieves a reduction of 100% regulated CO2 emissions reduction when compared to a Part L1 2021 target emission rate (TER) which equates to 0kg of CO_2 emitted per year.**

This level of performance demonstrates compliance with Criterion 1 of Part L (2021), far surpassing the London Plan, and therefore also satisfies the planning requirement.

5. Space heating Demand

By using the fabric detailed under 2.1, and the ventilation strategy detailed under 2.1.4 the space heating demand for the dwelling equates to **19.90kWh/m^2/y**.

6. Operational Energy Used

By using the Air Source Heat Pump for space heating and to supplement the hot hot water the operation energy used in the dwelling is **24.39kWh/m^2/y,** below the target of 35kWh/m^2/y.

6. Conclusions

This Energy Strategy overview has assessed the service strategy and likely CO_2 emissions for the development.

This document demonstrates how improvement on the baseline carbon emissions has been achieved, in accordance with the energy hierarchy (lean, clean and green):

- Lean – Measures include U-values that better Part L1 (2021) requirements, minimised thermal bridging, and robust air tightness.
- Clean – Space heating and DHW met via ASHP.
- Green – implementing LZC technologies to further reduce the CO2 emissions from the building, via PV panels.