

ENERGY STATEMENT

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STEPHENSON HOUSE REDEVELOPMENT

Lazari Properties 2 Limited



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1.0 Introduction

This Energy Statement document is issued on behalf of Lazari Properties 2 Limited for the proposed refurbishment and development of Stephenson House in central London in the Borough of Camden. This report makes due reference to the energy requirements in regard to minimising carbon dioxide emissions from the following documents:-

- Building Regulations 2013 Approved Document Part L2A and Part L2B Conservation of Fuel and Power.
- London Plan 2015, with application of the Be Lean, Be Clean and Be Green policy.
- Camden Development Policies 2010. Policy DP22 promoting sustainable design and construction.
- Core Strategy 2010 CS13 Tackling climate change through promoting higher environmental standards.

The purpose of the Energy Statement is to demonstrate that the proposed development will achieve sustainability, energy and carbon emission targets where possible as dictated by the above guidelines and legislation.

The report will show how the development will achieve compliance with building regulations 2013 Part L2A (see section 4.0 for compliance) and reduce CO_2 emissions by the building fabric thermal performance and low energy technologies applied to the environmental services and efficient control of energy usage.

BREEAM requirements for the commercial part of the building and a SAP assessment for the residential areas are dealt with in separate reports.

2.0 Executive Summary

The Energy Statement has been prepared on behalf of Lazari Properties 2 Limited to cover the proposed refurbishment and development of Stephenson House in central London in the Borough of Camden.

The Energy Statement makes reference to the energy and CO_2 emission standard requirements and compliance as defined by the Building Regulations Part L2A 2013, and the technical specification.

The Energy Statement will show that the proposed development has targeted the requirements of the improvement in energy and CO_2 emissions performance by the use of sustainable and energy efficient measures, as defined by the London Plan 2015 – Be Lean, Be Clean and Be Green Policies.

The HM Government Simplified Building Energy Modelling software (iSBEM) has been utilised to show how the baseline development scheme* achieves AD L2A 2013 compliance with a target energy performance certificate with a 'B' rating.

*The proposed baseline development scheme utilises low thermal property 'U' values below AD L2A requirements, air source heat pumps with high COP and heat recovery for heating and cooling, mechanical ventilation systems with heat recovery, high efficiency gas-fired water heaters and LED lighting with PiR control throughout.

The London Plan 40% reduction in CO_2 emissions against BR Part L2A 2010 equates to 28% against BR Part L2A 2013. However, given the development has restricted external wall space due to adjacent buildings and further to discussions with the Camden Sustainability Officer, we have applied Camden Core Strategy 2010 CS13 clause 13.11, which advises "Once a building and its services have been designed to make sure energy consumption will be as low as possible and the use of energy efficient sources has been considered, the council will expect developments to achieve a reduction in carbon dioxide emissions of 20% from on-site renewable energy generation, unless it can be demonstrated that such provision is not feasible".

Table 1 below shows that the baseline scheme for the development which is L2A compliant but can be improved by application of PV cells* for on-site electricity generation.

Stephenson House – Table 1 – Building CO ₂ emissions kg CO ₂ /m²/yr						
Office and retail redevelopment scheme	TER CO ₂ Emissions	BER CO ₂ Emissions	CO₂ Emissions Savings			
Part L2A 2013 Target CO ₂ Emission Rate.	22.7					
Proposed scheme with solar preheat		20.5	-9.7%			
Proposed scheme with 200m ² of PV and solar preheat		20.3	-10.3%			

TER: Target emissions rate (set for a notional building).

BER = Building emissions rate for this property.

To achieve Part L 2013, the BER must be equal or less than the TER.

The EPC energy performance certificate for the scheme with 200m² PV would be a B33, a B rating.

3.0 Site Description

The proposed development is a refurbishment and extension to the existing Stephenson House building on Hampstead Road. The development incorporates refurbishment, expansion and extension of the current building to increase the lettable floor area and provide a better quality of environment for tenants for office areas as well as providing some retail and residential accommodation.

Stephenson House is located in the London Borough of Camden a short walk from Euston Station on the junction of Hampstead Road and Drummond Street. There are adjacent buildings to the West and North of the site adjoining the perimeter of Stephenson House with the streets and pavement bounding the South and East sides.

The building currently comprises 9710m² (NIA) of office space and it is intended that this be increased to 13891m² (NIA) of offices to provide greater lettable area to tenants along with flexible office/clinic areas. It is intended that the additional space is created through development and extension of the existing second to fifth floors on the Drummond Street side of the building, subject to a right to light agreement with the tenants of an adjacent building, and extension of the second and third floors adjoining adjacent buildings at the rear of the property. A new atrium will be constructed from basement up to fourth floor level open to the surrounding offices, with the exception of the fourth floor which is enclosed for fire protection purposes.

Plant space will be in the basement and on the roof of the building, with PV cells being located on the roof area above the seventh floor offices.

4.0 Policy and Planning

This Energy Statement is based on achieving compliance with the Building Regulations 2013 Part L2A.

Consideration has been given to the use of various low energy and renewable technologies available, in addition to current AD Part L U value properties of the building fabric on construction.

The Energy Statement makes reference to the London Plan Policy clauses 5.1, 5.5 and 5.7 and Camden Policies CS13 and DP22 whilst achieving compliance including Fabric U values and building services elements with AD L2A – 2013.

It has also been noted that a new Camden Local Plan is due to be adopted in late June 2017 and the proposed design aims to comply with the guidance given in Section 8 (Sustainability) of the draft Local Plan where feasible.

The London Plan 2015 – Policy 5.2 states that non-domestic developments should achieve an improvement on the '2010 Building Regulations' of 40% minimum improvement over the Target Emission Rate (TER).

<u>Note</u>: Building Regulations Part L 2013 were amended and strengthened to deliver a 12% carbon dioxide savings against the "offices" category under the new non-domestic buildings classifications relative to Part L 2010. Therefore the London Plan target of a 40% carbon emissions reduction against Part L2A 2010, would equate to a 28% reduction over the minimum improvement over the L2A 2013 Target Emission Rate. Discussions with the Camden Sustainability officer referenced a 20% CO_2 saving above the Part L2A 2013 BER (building energy rating). The current scheme improves on the Part L 2013 target by 8%, which when added to the 12% saving of 2013 Building Regulations for offices against 2010 regulations, equates to a 20% improvement against Part L2A 2010 against the Camden Plan target of 40%. However, due to the limited roof space available it does need seem feasible to install additional LZCT measures.

However, in reference to Camden DP22 – Sustainable design and construction measures as in clause 22.5, the proposed development has addressed the following sustainability

measures (further detailed below) – Levels of insulation, efficient heating, cooling and lighting systems, effective building management system, the source of energy used (air to air heat pumps), sub-metering, counteracting the heat expelled from plant equipment (thermal wheel air to air heat recovery on supply and extract air mechanical ventilation plant) and efficient use to water, to achieve a target EPC B rating utilising iSBEM software.

Solar thermal preheat is applied to the building. This technology uses heat from the sun to pre-heat the cold water feed to the hot water services calorifiers, reducing the heating load on the heating elements. This provides a 9.7% CO₂ saving utilising a small area of roof space.

In practical terms, PV cells could be installed on the roof plant deck facing south installed at an incline of 10-15°. We have therefore proposed $200m^2$ of PV cells applied to the available roof space on the Hampstead Road part of the building above the non-domestic areas. This has been calculated to achieve a further small percentage reduction of CO₂ over the L2A 2013 TER and equates to an EPC B33 rating, which will likely achieve a B rating on final detail design. The overall reduction of 11% on the Part L 2013 TER is less than the 20% required by the Camden Core Strategy, but represents use of a practicable amount of PV cells which could be installed given the limited roof space available on the building. Given the relatively small impact of the PV cells on the results, consideration may be given to installing less than 200m² of PV cells.

5.0 Simplified Building Energy Modelling iSBEM

The proposed development has been thermally modelled using iSBEM version 5.3a simulation modelling software to determine the annual energy demand and resultant CO_2 emissions for the proposed development.

This software contains all the construction fabric U-values for each of the building elements and outputs from the simulation program include hourly kW demands for heating, cooling, domestic hot water and small power. The model was simulated using the CIBSE weather data for London and the outputs from the software allow gas and electrical consumption and related CO_2 emissions to be calculated and the target reduction in CO_2 emissions to be established by application of renewables data.

6.0 The proposed building model - iSBEM data input

This section reflects the Be Lean and Be Clean part of the strategy of the London Plan to both "reduce energy demand" and to supply energy efficiently.

The iSBEM building model contains the thermal performance of the proposed development and the application of the plant and services low energy technologies as defined under ADL2A through the Non-Domestic Building Services Compliance Guide 2013 Edition.

The residential areas of the building are excluded from this analysis and are dealt with separately under the SAP (Standard Assessment Procedure) calculation report (in the document 2017.041 Resi Energy Briefing Note – Stephenson House)

1. Building Thermal Transmittance U values

The proposed building will have U values which surpass the ADL2A compliance guidelines as listed in table 2 below.

2. Air Permeability

Building Air permeability is as tabulated in Table 2 below.

3. Heating and Cooling

The building will utilise Mitsubishi High efficiency COP heat recovery VRF (variable refrigerant flow) Air Source Heat Pumps which have Energy Efficiency Ratios EER's above 3.6.

4. Mechanical Ventilation

The mechanical ventilation requirements to the offices will incorporate thermal wheel or run around coil air to air heat recovery.

5. Hot Water Supply

Hot water provision will be from high efficiency hot water heaters to office and retail areas.

6. Lighting

It is proposed that high efficiency LED lighting will be utilised throughout the offices to maximise the provision of low energy lighting with PIR dimming control on daylight levels.

7. BMS (Building Management System)

A new BMS system will be installed to auto-control the main HVAC plant and equipment and individual fan-coil units for local environmental control on heating, cooling and ventilation.

8. Water Consumption

Whilst water consumption is not a program input in the iSBEM model, water saving technology will be utilised in the form of the following, to ensure compliance with BREEAM requirements and to achieve credits on this scheme:

- WC flush volumes at 4.5 litres.
- Taps with minimum low flow regulators.
- Showers with a nominal flow rate of 8 litres/minute.

9. PV Cells

We have utilised 200m² of photovoltaic panels applied to the available un-shaded space on the Hampstead Road section of the building above the office areas. This is shown on the roof plan drawing.

10. Solar Thermal Preheat

Roof mounted solar thermal panels and a preheat vessel (utilising approximately 10m² of roof space) has been applied to the water heating system. A space allowance for this equipment is shown on the roof layout drawing.

Table 2: iSBEM Data Input					
Item. (design stage)	ADL2A 2013 – Minimum*	Proposed Development			
Thermal Property U valves	W/m²K	W/m²K			
External wall	0.35	0.27			
Roof	0.25	0.15			
Ground Floor	0.25	0.25			
Windows	2.2	1.6			
Air Permeability	m³/hm² at 50 Pa	m ³ /hm ² at 50 Pa			
Air permeability	10	10			
HVAC plant efficiency*					
Heating/Cooling EER	2.6 (260%)	3.6 (360%)			
Hot Water efficiency	80%	90%			
AHU fan power with heat recovery W/l/s	1.6	1.6			
Central Balanced Mechanical Ventilation system with heating only (toilet areas)	1.5	1.5			
Local balanced supply and extract ventilation system such as wall/roof units serving a single area with heat recovery W/l/s	1.6	1.6			
Zonal Extract fan system (fan remote from zone) or other local ventilation supply or extract SFP W/l/s	0.5	0.5			
Lighting luminaire lumens per circuit Watt	60 luminaire lumens per circuit Watt.	100 luminaire lumens per circuit Watt.			
*ADL2A values taken from the DCLG Non-Domestic Building Services Compliance Guide 2013					

Table 3: Stephenson House – Proposed Scheme to achieve AD 2LA 2013 compliance					
Item	TER KWh/m²/yr	BER KWh/m²/yr	% Improvement		
Heating	0.47	0.48			
Cooling	9.11	7.11			
Auxiliary	11.42	13.8			
Lighting	21.06	16.65			
Hot Water	6.99	5.96			
200m ² PV systems	0.00	(0.49)			
Solar pre-heat	0.00	(0.79)			
Total	49.06	44	10.3%		

The above Table 3 results are taken from the iSBEM calculation BRUKL output as attached.

7.0 Application of Alternative energy technologies and Renewables to reduce CO₂ emissions

The iSBEM model for the property has utilised low thermal property U values and low energy technologies for the building services in line with achieving a Building Regulations Part L2A 2013 compliance.

In practical terms, the alternative technologies considered in reference to current Part L guidelines have been aimed at building fabric, heating, cooling, ventilation and lighting as reflected in the values as table 2 in compliance with AD L2A 2013.

The energy technologies discounted from the scheme as not viable or cost effective given the energy targets achieved by practical technologies include biomass boilers, ground source heat pumps and wind turbines.

Reference was made to the Camden Environment web-site to address the future proposals for "Decentralised Energy in Camden", which includes a map displaying decentralised energy clusters with Stephenson House site covered under the Euston Area Plan. Information relating to the Euston Area Plan (January 2015 final document figure 3.7) shows a potential future network, but this is indicative only. If constructed, the indicated network would run close to the Stephenson House site, but as the proposed scheme intends to heat the majority of the office space by high efficiency VRF units the potential for use of district heating would be limited. In any case, at present District Heating is not available and potential scope for its future use, even in the event of a nearby network being constructed, is limited. Therefore District Heating has been discounted in terms of current assessment of potential CO_2 reductions to the scheme.

The current proposal for the residential development is the use of a wet underfloor heating system for the residential flats, with a provision for connection to any district system which may be installed in future where a benefit may be obtained. This connection provision would typically be blanked off connections to install a heat exchanger to connect the wet underfloor heating system to future district heating network.

The HVAC system for the property as a whole will incorporate BMS monitoring and control for efficient time and temperature operation.

The viable alternative energy technologies for this scheme in both reference to the London Plan under the Be Green strategy element and Camden Core Strategy 2010 CS13 and the emerging Camden Local Plan would be PV cells for electrical energy generation and solar thermal preheat for hot water heating. These systems can utilise the available un-shaded space on the Hampstead Road part of the building as shown on the roof plan drawing.

The scheme as proposed shows a 10.3% improvement on the AD L2A 2013 TER (which equates to approximately 22% improvement over the AD L2A 2010 TER).