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PROJECT

Energy Report for
172A Arlington Road,
London NW1 7HL

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CONTENTS

1 SUMMARY

This Energy Statement has been prepared by Edward Pearce LLP, in response to Camden Planning Guidance CPG3 for the proposed development at Arlington Road. In doing so the Energy Statement directly refers to achieving compliance with the July 2011 edition of The London Plan.

This Statement first establishes a baseline assessment of the energy demands of each dwelling, based on current Part L1A 2010 Building Regulations. In line with local and regional planning policies this outlines the energy saving measures that are to be taken in order to reduce the total energy demand, before consideration is given to a range of on-site low or zero carbon energy options.

It is the recommendation of this Energy Statement that individual gas-fired combi boilers are installed to meet space heating and hot water demands for the flats. Further to improving the building fabric and other such measures, the remainder of the 20% total carbon reduction target of the London Plan will be achieved by the introduction of solar photovoltaics. This solution is deemed to be technically feasible and is the best method by which to meet the 20% of total carbon reduction target of the London Plan.

2 INTRODUCTION

2.1 DEVELOPMENT OVERVIEW

The proposed development comprises six flats. The renovation of an existing office building will consist of six flats located on ground to third floors. To the rear of the existing building a ground floor roof covering to the courtyard shall be demolished and Flat One will be extended to incorporate ground and first floors.

2.2 POLICY AND GUIDANCE

National planning policy requirements relevant to this energy statement are given in the Government's Planning Policy Statement 22:

'Local planning authorities and developers should consider the opportunity for incorporating renewable energy projects in all new developments.'

The London Borough of Camden Sustainable Planning Guidance refers to guidance available in the London Plan, which states:

'tackling climate change will also require a move towards more sustainable energy sources, and the London Plan seeks to support the development of decentralised energy systems, including the use of low carbon and renewable energy.'

Policy 5.2 states:

'development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following hierarchy:

1. *Be lean: use less energy*
2. *Be clean: supply energy efficiently*
3. *Be green: use renewable energy'*

It is the intention to satisfy the requirements of all planning policies. Energy efficient measures taken in the design of the building as well as the introduction of LZC/Renewable Energy technologies will lower the total energy demand below that of a building which conforms to Part L of the 2010 Building Regulations.

3 ENERGY ASSESMENT

In order that an energy assessment can be conducted, a baseline for energy demand has primarily been calculated for the dwellings by the use of the Stroma SAP Software. This baseline is used as a basis to demonstrate the reductions in energy use that will result from conservation measures.

3.1 DWELLING REGULATION BASELINE COMPLIANT ASSESSMENT

3.1.1 Insulation Standards

The building will incorporate insulation in the building envelope (walls, roofs, floors and glazing) to achieve average U-values as set out in Part L (2010) Building Regulations as follows:

	Part L1A's Requirements
Wall U-Value	0.30
Party Wall U-Value	0.20
Ground Floor U-Value	0.25
Roof U-Value	0.20
Glazing U-Value	2.00
Door U-Value	2.00

3.1.2 Air Tightness

A design air permeability rate of 10m^3/h per m^2 will be targeted to comply with Part L 2010 guidance.

3.1.3 Thermal Bridging

Thermal bridges at junctions between building elements have not been investigated, hence the default value of 0.15 is assumed.

3.1.4 Lighting and Appliances

Lighting will be installed to meet the 75% low energy lighting requirement in accordance with Part L 2010 guidance. Pre-installed appliances will be A or A+ rated for energy efficiency.

3.1.5 Ventilation

Ventilation to the flats will generally be by natural means. Individual intermittent extract fans shall be installed to serve bathrooms and kitchens.

3.1.6 Space Heating

Space heating will be provided to the flats via gas condensing combi boilers, with an efficiency of 90% or more. The gas condensing combi boilers shall be enabled by individual programmers and room thermostats within each flat, which call for heat in the form of LTHW via underfloor heating manifolds.

3.1.7 Domestic Hot Water

Domestic hot water will be supplied to each flat by the condensing combi boiler.

The dwellings achieve the following Dwelling Emission Rate (DER) and are compared to the Target Emission Rate (TER) for reference:

Dwelling	TER kg CO_2/m^2.year	DER (Baseline) kg CO_2/m^2.year
Flat One	18.62	24.44
Flat Two	21.46	27.65
Flat Three	20.32	24.85
Flat Four	19.47	24.45
Flat Five	17.30	22.32
Flat Six	19.57	26.45

The energy consumption within the building relates to the total carbon emissions of all seven dwellings. It has been assumed that the communal areas are to be unheated, which is reflected in the SAP calculations for the flats. It has also been assumed that the energy consumption due to lighting in the communal areas will be minimal as it will be low energy and automatically controlled to maximise use of natural daylight and switched off when unoccupied.

3.2 IMPROVED BUILDING REGULATION COMPLIANT ASSESSMENT

3.2.1 U-Values

A reduction to the U-Values of the external elements by 20% beyond the Part L 2010 Building Regulations requirements shall be achieved as follows:

	Part L1A's Requirements	Enhanced U-Values
Wall U-Value	0.30	0.27
Party Wall U-Value	0.20	0.20
Ground Floor U-Value	0.25	0.23
Roof U-Value	0.20	0.18
Glazing U-Value	2.00	1.80
Door U-Value	2.00	2.00

3.2.2 Air Tightness

The likelihood of reducing the air permeability rate beyond the $10m^3/h$ per m^2 required to comply with Building Regulations will be investigated when a Main Contractor has been appointed and consulted.

3.2.3 Thermal Bridging

Thermal bridging between building retained elements is to be investigated further, but has been assumed to be to an equal or improved standard as Accredited Construction Details. An indicative value of 0.08 has been assumed.

3.2.4 Lighting and Appliances

Energy efficient lighting will be installed throughout as opposed to the Building Regulations requirement of 75% low energy lighting. Pre-installed appliances will be A or A+ rated for energy efficiency.

3.2.5 Heating Controls

The design to the heating system within each flat will comprise heating controls capable of time and temperature zoning as opposed to a standard control system of a programmer and two thermostats.

3.2.6 Comparison of Energy Use Before and Following Conservation Measures

The impact of the above measures on annual carbon emissions within the dwellings is as follows:

Dwelling	(Before) Baseline kg CO_2/m^2.year	(After) Enhanced Design kg CO_2/m^2.year
Flat One	24.44	20.55
Flat Two	27.65	24.04
Flat Three	24.85	22.11
Flat Four	24.45	21.73
Flat Five	22.32	19.41
Flat Six	26.45	22.36

3.3 COMBINED HEAT & POWER AND DISTRICT HEATING SCHEMES

Although several types of LZC / Renewable Energy technologies will be considered to reduce the development's carbon emissions, CHP and District Heating will be investigated first.

3.3.1 District Heating Scheme

There are no known existing district heating schemes within the vicinity of the development.

3.3.2 Combined Heat & Power

SAP Calculations have demonstrated that micro-CHP within each flat would not achieve compliance with Part L 2010 Building Regulations alone. Further LZC / Renewable Technologies would be required to achieve compliance.

Communal CHP is not a viable solution for the development as there is inadequate Plant Space within the Courtyard for the CHP Plant, Standby Gas-Fired Boilers, ancillaries and the possibility that the Plant Room may need to be acoustically treated. Locating the Plant Room on the roof will not be feasible as the building and roof structure have been designed to integrate with the existing surroundings. The size of Plant Room required would increase the overall height of the building and be visible from neighbouring properties.

4 PROPOSED ON-SITE LOW OR ZERO CARBON / RENEWABLE TECHNOLGIES

This energy assessment has considered a number of LZC / Renewable Energy Technologies in order to satisfy the 20% reduction in carbon emissions.

4.1 DISTRICT HEATING

This energy source has already been considered. Refer to 3.3.2

4.2 COMBINED HEAT AND POWER

This energy source has already been considered. Refer to 3.3.2

4.3 BIOMASS FUELLED HEATING

This form of heating to provide space heating and hot water to the flats would result in a substantial reduction in carbon emissions from the development.

Biomass fuelled heating is not a viable solution for the development as there is inadequate Plant Space within the Courtyard. Locating the Plant Room on the roof will not be feasible as the building and roof structure have been designed to integrate with the existing surroundings. The size of Plant Room required would increase the overall height of the building and be visible from neighbouring properties.

Regular deliveries of wood pellets would also be required to site. Due to the location of the Courtyard, deliveries would only be possible in the form of bags not pumped from a silo lorry and carried through one of the Ground Floor Flats. This would clearly be a Security Risk as well as a Safety Risk.

4.4 WIND

The site is in an enclosed urban area surrounded on all sides by buildings of a similar size. It is considered that any wind reaching a proposed turbine would be turbulent and not generate useful energy.

4.5 GROUND SOURCE HEAT PUMP

The site does not have sufficient space to install a ground source heat pump as the total area of the Courtyards is inadequate for collector loops and the development is, in the main, a renovation of an existing building so inadequate space is available for vertical bores.

4.6 AIR SOURCE HEAT PUMP

The site has sufficient space to install an air source heat pump to serve the 2 No. ground floor flats. In order to achieve the 20% carbon emission reduction the types of air source heat pumps available will be investigated further if more feasible technologies are insufficient.

4.7 PHOTOVOLTAICS (PV)

Photovoltaic generation is suitable for the building, however space requirements on the roof will need to be investigated further to determining the number of panels required.

In order to avoid overshading by neighbouring properties, the solar photovoltaic panels would need to be located on the main roof only.

4.8 SOLAR WATER HEATING

In order to avoid overshading by neighbouring properties, the solar thermal panels would need to be located on the main roof only.

We do not consider this a viable option, as experience shows that solar thermal installations alone would not be adequate to reduce the carbon emissions to the required levels.

4.9 RENEWABLE ENERGY COMPLIANT ASSESSMENT

Gas-fired combi boilers and Solar Photovoltaics (PV) are proposed to all Flats. The Architect's Proposed Roof Layout drawings indicate that 13No. PV panels will fit on the main roof of the building. The installation of 13No. 333Wp PV panels have been assumed to meet the remainder of the 20% carbon emission reduction. The installation will offset carbon emissions as a whole and used on-site when possible, however with regard to the inclusion in the SAP calculations, the total kWp of the installation will be apportioned to each flat according to the flat's floor area.

The impact of this improvement represents a reduction in carbon emissions exceeding the 20% requirement as set out in the Local Planning and London Plan Guidance as follows:

Dwelling	Baseline Design kg CO_2/m^2.year	Enhanced Design with PV kg CO_2/m^2.year	Percentage Reduction by LZC / Renewable Technologies
Flat One	24.44	17.48	28.4
Flat Two	27.65	21.41	22.6
Flat Three	24.85	19.01	23.5
Flat Four	24.45	18.63	23.8
Flat Five	22.32	16.31	26.9
Flat Six	26.45	19.26	27.2

All flats also comply with Part L1A 2010 Building Regulations.

5 CONCLUSION

5.1 BE LEAN

The use of solar photovoltaics has been investigated and with the use of SAP software, has been demonstrated to achieve compliance with Part L 2010 Building Regulations.

5.2 BE CLEAN

After reviewing the U-Values, leakage rates, heating controls and amount of lighting provided by low-energy luminaires, the reduction of carbon emissions by LZC / Renewable Energy Technologies has been investigated.

5.3 BE GREEN

It has been established that solar photovoltaics would effectively reduce carbon emissions by more than 20%.