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Kilburn Brondes Age

Redevelopment

Energy Strategy

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Project No: 18401

Date: July, 2017

Project No	Revision	Date	Prepared By	Checked By	Status
18401	-	10/07/2017	JT	AC	Final
18401		14/07/2017	JT	AC	Final

Contents

1 Executive Summary

This document has been prepared for the proposed redevelopment at BrondesAge, 328 Kilburn High Road, London, NW6 2QN in the London Borough of Camden. The proposed development will involve the demolition and redevelopment of the existing bar/restaurant and the construction of a mixed residential (C3) and commercial (A1-A5) use, four storey building to provide 8 residential units comprising 4 x 1 bed, 3 x 2 bed and 1 x 3 bed flats and commercial unit at ground floor level. The site extends to circa 0.03 Ha.

As the development is situated in London Borough of Camden it will have to comply with the newly adopted Camden Local Plan and the energy requirements of Part L1A 2013. Therefore, the following objectives have to be achieved for the development:

Targets:

- **Ensure the site complies with Part L2A 2013 (Amendments published November 2013, in effect April 2014) of the UK Building Regulations.**
- **Achieve a 19% reduction in regulated CO_2 emissions over the Baseline to show compliance with the new Camden Local Plan (adopted by Council on 3 July 2017)**
- **Achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation unless this is not feasible**

This strategy embraces the London Plan energy hierarchy as outlined throughout this document.

The analysis in this report has been conducted by utilising an actual SAP 2012 calculation for each dwelling and SBEM V5.3a on the commercial unit.

Based on the information available at this stage and the assumptions detailed in Section 3.2 of this report, the following baseline emissions have been calculated:

Table 1.1a: Target emission rate

Target Sitewide emissions	Total (tCO_2/yr)	Equation
Part L 2013 Baseline	18.03	A
19% CO_2 Target DER	14.61	B = A x (1-19%)
CO2 emissions to be offset	3.43	C = A - B

The development proposes to satisfy the above targets as far as possible onsite. This strategy embraces the London Plan energy hierarchy within the constraints of the site as follows:

- ✓ ***Be lean: use less energy.*** The enhanced building fabric specification outlined in Section 3 will minimise the heat demands of the development through passive design.
- ✓ ***Be clean: supply and use energy efficiently.*** The development will include high efficiency gas boiler and MEV for ventilation to further reduce the fossil fuel demands of the development.
- ✓ ***Be green: use Low or Zero Carbon technologies.*** The development will integrate high efficiency Solar Photovoltaic Panels (PV) to generate renewable energy to further offset the emission of the dwellings.

The outcomes of implementing this strategy are detailed below on a site wide basis across the development.

As shown in the tables, the implementation of the proposed solution should ensure an improvement of 25.24% relative to the Part L compliant baseline for the development.

In addition a total reduction of 16.19% in CO_2 emissions is achieved from LZC technologies through the implementation of 6.1kWp of Photvoltaic Panels

Table 1.1b: New-Build dwellings total tCO_2/yr for each hierarchy stage

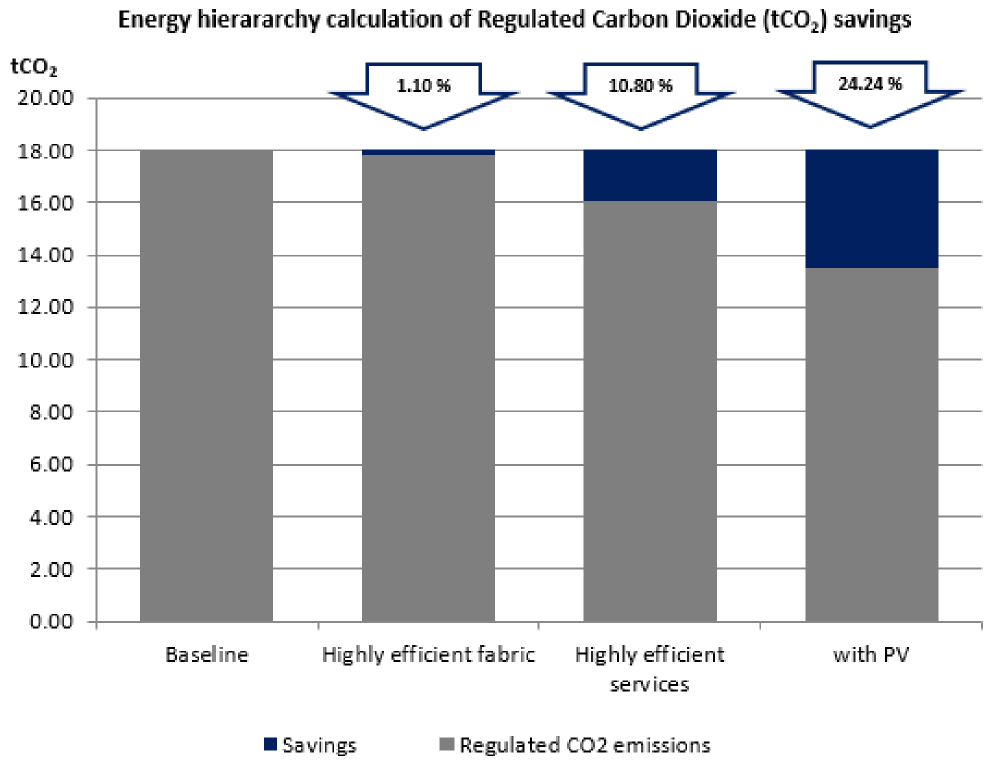
Regulated CO_2 Emissions	Part L Compliance Baseline CO_2 Emissions (TER)	Be Lean Improved Building Fabric (DER)	Be Clean Improved Building Services (DER)	Be Green Final Proposed Building including LZC (DER)
Total Regulated (tCO_2/yr)	18.03	17.83	16.08	13.48
%age Reduction over Baseline	N/A	**1.10%**	**10.80%**	**25.24%**
%age Reduction from LZC	N/A	N/A	N/A	**16.19%**

In summary, the proposed strategy offers the following savings from enhanced building fabric specifications and Low and Zero Carbon Technologies:

- ✓ A 25.24% reduction in regulated CO_2 emissions over the Part L1A 2013 baseline from fabric specifications, energy efficient services and the implementation of Low & Zero Carbon technologies (LZC).
- ✓ 16.19% reduction in regulated emissions from LZC sources by Implementing Solar Photovoltaic Panels (PV) – See Appendix A for roof layout
- ✓ A 12.38% reduction in all site CO_2 emissions from improved fabric specifications and Low & Zero Carbon technologies compared to the Baseline emissions, including both regulated CO_2 emissions (those measured for Part L) and the unregulated CO_2 emissions (those attributed to cooking & appliances as calculated by SAP).

The scheme has incorporated both the Camden and GLA guidance and will deliver the targets set out in the recently published Camden Local Plan as far as is feasible.

Figure 1.1a: New-Build dwellings total tCO_2/yr for each hierarchy stage



Please note that the PV array arrangement provided in this document is constrained by the requirements of CDM and the previous comments from the pre-application discussions which have reduced the building scale, thereby reducing the available roof space.

Currently this system provides a 16.9% reduction from LZC technologies relative to the 20% Camden request, however given the sites small scale this is still a significant reduction.

It should also be taken into account that the project is achieving a 25.24% reduction in overall CO2 emissions as opposed to the 19% required by Camden.

2 Introduction

2.1 SCHEME CONTEXT

This Energy Strategy has been prepared for Brondes Age to present the results of an early stage analysis to satisfy the Local and Regional Planning Policy requirements relating to energy and CO_2 emissions for the proposed redevelopment at BrondesAge, 328 Kilburn High Road, London, NW6 2QN in the London Borough of Camden.

The proposed development will involve the demolition and redevelopment of the existing bar/restaurant and the construction of a mixed residential (C3) and commercial (A1-A5) use, four storey building to provide 8 residential units comprising 4 x 1 bed, 3 x 2 bed and 1 x 3 bed flats and commercial unit at ground floor level. The site extends to circa 0.03 Ha.

The analysis in this report has been conducted by utilising an actual SAP 2012 calculation for each dwelling and SBEM V5.3a on the commercial unit.

2.2 DOCUMENT STRUCTURE

The first section provides the executive summary for this report and sets out what the objectives are.

This second section sets out the structure of the report, discusses the objectives and details any financial incentives available.

The third section sets out the base specifications for the site and details the further LZC requirements needed to comply with local planning requirements.

Section four gives information regarding the recommended LZC technologies, as well as giving information on why other technologies were discounted.

Section five goes into more detail regarding the recommended solution for the development and sets out the findings of the analysis.

2.3 OBJECTIVES

The development is situated in London Borough of Camden it will have to comply with the newly adopted Camden Local Plan and the energy requirements of Part L1A 2013. Therefore, the following objectives must be achieved for the development:

Targets:

- **Ensure the site complies with Part L2A 2013 (Amendments published November 2013, in effect April 2014) of the UK Building Regulations.**
- **Achieve a 19% reduction in regulated CO_2 emissions over the Baseline to show compliance with the new Camden Local Plan (adopted by Council on 3 July 2017)**
- **Achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation unless this is not feasible**

This strategy embraces the London Plan energy hierarchy as outlined throughout this document.

3 Baseline Energy Demands and CO_2 Emissions

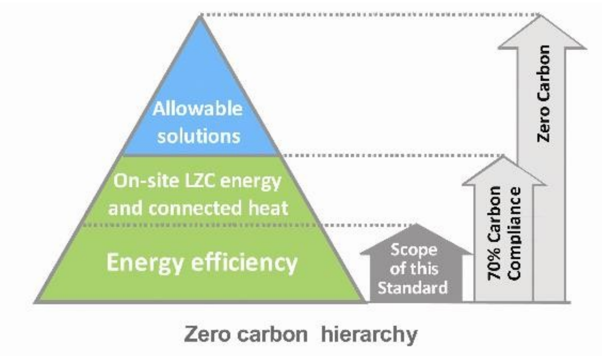
3.1 CONTEXT AND APPROACH

The recommendations in this Energy Strategy are proposed as they embrace the themes outlined in the recently adopted Camden Local Plan and the Mayor's energy hierarchy outlined in the London Plan 2016 (MALP), as well as following the current Zero Carbon trajectory:

- ✓ ***Be lean:*** *use less energy*
- ✓ ***Be clean:*** *supply and use energy efficiently*
- ✓ ***Be green:*** *use low or zero carbon technologies*

The Zero Carbon Hub is an independent workgroup that advise the UK Government on optimal solutions with the aim of achieving carbon neutral development. As shown in the diagram below, the Zero Carbon Hub identified the "**energy efficiency improvement first**" approach as the most appropriate way to drive the new house toward carbon neutrality.

Zero carbon Hub recommended approach to carbon neutral housing

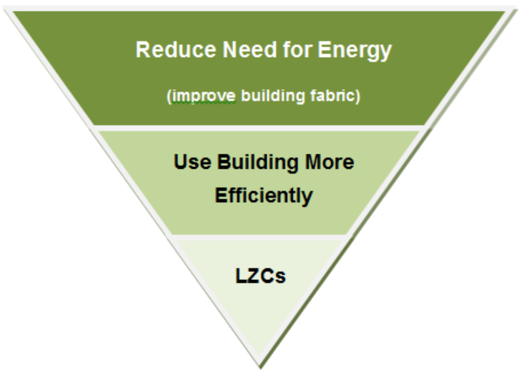


This approach consists of reducing the energy demand and CO_2 emissions by improving the energy efficiency of the building envelope and the mechanical and electrical services first. Once the energy demand of the building has been reduced from energy efficiency improvements then Low and Zero Carbon (LZC) technologies can be considered. It is widely accepted that the most effective way to reduce energy consumption (and therefore carbon emissions) is to follow the energy hierarchy (shown overleaf).

This approach is the most appropriate because energy efficiency improvements can be more cost effective and longer lasting than LZC systems and can provide significant energy and CO_2 savings especially over the lifetime of a product. In addition, energy efficiency improvements reduce the energy demand of the building and therefore contribute to reducing the size of LZC systems required to achieve low carbon buildings.

The energy efficiency of the development can first be improved by adopting passive design measures, such as enhancing the building fabric or designing the building so as to improve passive solar gains through windows.

Energy Hierarchy:



Therefore, improving the energy efficiency of the development before implementing Low or Zero Carbon technologies is considered a preferred strategy as this follows the Mayor's energy hierarchy.

3.2 BASE SPECIFICATIONS – RESIDENTIAL

The analysis in this report has been conducted by utilising an actual SAP 2012 calculation for all 8 of the new build dwellings. Once permission has been granted, the findings of this report will be confirmed upon the completion of the detailed design process.

The baseline demands for the New-Build dwellings are represented by the Part L1A 2013 Target Emission Rate, calculated using SAP 2012. Details of the limiting U-Values are given in Table 3.1 below:

Table 3.1 U-Values of building elements for all New-Build dwellings

Element	Part L2A 2013 Limiting U-Values (W/m^2K)
Walls	0.35
Floors	0.25
Roof	0.25
Windows	2.20

3.3 BASE SPECIFICATIONS – COMMERCIAL

As above, the analysis in this report has been conducted by utilising an actual SBEM for the commercial unit. Once permission has been granted, the findings of this report will be confirmed upon the completion of the detailed design process.

The baseline demands for non-residential units are represented by the Part L2A 2013 Target Emission Rate, calculated using SBEM. Details of the limiting U-Values are given in Table 3.2 below:

Table 3.2 U-Values of building elements for all non residential buildings

Element	Part L2A 2013 Limiting U-Values (W/m^2K)
Walls	0.35
Floors	0.25
Roof	0.25
Windows	2.20

3.4 SETTING THE TARGETS

As previously noted there is a planning target within this document that the site will comply with the targets Camden Council recently published in its Minor Modifications to the Camden Local Plan. These changes were adopted on the 7th July 2017 and as such are the main driver for setting targets on this project.

Policy CC1 Climate change mitigation Paragraph sets out the following targets:

Paragraph 8.8

All developments involving five or more dwellings and/or more than 500 sqm of (gross internal) any floorspace will be required to submit an energy statement demonstrating how the energy hierarchy has been applied to make the fullest contribution to CO_2 reduction. All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L 2013 Building Regulations (in addition to any requirements for renewable energy).

Paragraph 8.11

Council will expect developments of five or more dwellings and/or more than 500 sqm of any gross internal floorspace to achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation (which can include sources of site related decentralised renewable energy), unless it can be demonstrated that such provision is not feasible.

Policy CC2 Adapting to climate change sets no specific targets but does state the following but since the commercial spaces of this project are significantly lower than 500sqm then we have made no allowance for BREEAM energy targets and no BREEAM pre-assessment or BREEAM assessment will be undertaken.

> *... 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.*

Therefore the above corresponds to a 19% CO_2 reduction over Part L1A 2013 Building Regulations and a 20% reduction in carbon dioxide emissions from on-site renewable energy generation as far as is technically and economically feasible.

Based on the information available at this stage and the assumptions detailed in this report, the baseline emissions have been calculated and are shown in Table 3.3 below.

Table 3.3 CO_2 reduction target for the site

Target Site wide emissions	Total (tCO_2 /yr)	Equation
Part L2A 2013 Baseline (TER)	**18.03**	A
London Plan 2016: Site 19% CO_2 Target BER	**14.61**	B = A x (1-19%)
CO2 emissions reduction to be achieved	**3.43**	C = A - B

3.5 MEETING THE TARGETS – IMPROVED FABRIC

Satisfying the 19% Camden Local Plan target will be achieved primarily by passive design measures, such as building fabric improvements, or through the implementation of on-site Low and Zero Carbon technologies.

This early stage energy modelling is based on the following specifications, which may be subject to change during detailed design and is therefore provided for **illustration to show that compliance with the targets is achievable**. The specifications below are those that have been modelled for the dwellings and are shown to illustrate that the scheme can satisfy the Planning requirements.

One of the primary aims of Part L1A 2013 was to reduce the resultant CO_2 emissions of a dwelling by 6% compared to Part L1A 2010, which was expected to roughly reflect a 40% improvement over dwellings built to 2002 standards. Achieving Part L1A 2013 compliance through an enhanced fabric specification, without the reliance on Low or Zero Carbon Technologies, will ensure that the dwellings have low energy demands, helping towards the protection of occupants from energy price rises in the future.

Adopting the proposed Building Fabric Specifications and Energy Efficiency Measures alone follows the Energy Hierarchy of **"*being lean*".** Details of the U-Values used are given in Table 3.4 for the residential elements and 3.5 for the commercial elements below.

In addition to these target air permeability standards as follows are sought

- ✓ Residential = 3 $m^2/hr/m^2$
- ✓ Commercial = 5 $m^2/hr/m^2$

Table 3.4: U-Values of building elements – Residential

Element	Modelled U-Values (W/m²K)	Part L2A 2013 Limiting U-Values (W/m²K)	%age improvement	Implementation Risk
Walls	**0.18**	0.30	**40%**	**LOW**
Floors	**0.13**	0.25	**48%**	**LOW**
Roof	**0.13**	0.20	**35%**	**LOW**
Windows	**1.40**	2.00	**30%**	**LOW**

Table 3.5: U-Values of building elements – Commercial

Element	Modelled U-Values (W/m²K)	Part L2A 2013 Limiting U-Values (W/m²K)	%age improvement	Implementation Risk
Walls	**0.18**	0.35	**49%**	**LOW**
Floors	**0.13**	0.25	**48%**	**LOW**
Roof	**0.13**	0.25	**48%**	**LOW**
Windows	**1.40**	2.20	**36%**	**LOW**

3.6 MEETING THE TARGETS – IMPROVED SPECIFICATIONS

The above U-values all push the fabric as far a technically and economically viable, as any further they will reach the point of diminishing returns and would be cost prohibitive. These U values have been used for each of the scenarios we have modelled which are detailed in Table 3.4 below.

Adopting these proposed Energy Efficiency Measures follows the next step in the Energy Hierarchy of *"being clean".*

Table 3.6: U-Values of building elements – Residential

Parameter	Assumptions/Values used for the assessment
Heating system and controls	Gas Combi boiler or similar Time and temperature zone control Delayed start thermostat System with radiators
Domestic Hot Water	From main heating system
Ventilation	MEV – Vent Axia Multivent A
Low Energy Light Fittings	100%
Corridors	Un-Heated

Table 3.7: U-Values of building elements – Commercial

Parameter	Assumptions/Values used for the assessment
Heating system and controls	Gas Combi boiler or similar Central time control Local time control Local temperature control

Parameter	Assumptions/Values used for the assessment
	System with radiators
Domestic Hot Water	From main heating system
Low Energy Light Fittings	2.5W/m2/100lux
Cooling	ASHP – cooling COP assumed @ 3.5

3.7 MEETING THE TARGETS – RENEWABLE ENERGY

As can be seen in Section 4 the opportunities to apply renewable energy technologies to the 328 Kilburn High Road scheme is limited. We have selected a small Photovoltaic (PV) array, maximised to the roof area, using high efficiency panels connected to the landlords supply for the whole building.

A total array size of circa 6.1kWp has been used within this document to achieve a 16.19% reduction in CO_2 emissions from on-site renewable energy generation.

This falls slightly short of the 20% target set out in the Local Plan however we have reviewed all other options and on a scheme of this size the only option is the Photovoltaic array.

Adopting this proposed Renewable Energy technology follows the next step in the Energy Hierarchy of

"being green".

4 Overview of LZC Technologies

Below is a brief overview of the available LZC Technologies which are commonly used and are accepted as such by DECC and BRE. A traffic light system is used to denote whether the systems are technically appropriate for the development.

Description	Traffic Light
Technology is technically and economically feasible with few barriers to implementation	
Technology is technically and economically feasible, but there are barriers to implementation	
Technology is technically or economically unfeasible and has been discounted	

The table below outlines the justification behind the discounting of technologies. A detailed review of each technology can be found in the Appendices.

4.1 DISCOUNTED TECHNOLOGIES

Below is the rationale for discounting a variety of technologies.

Technology	Description	Traffic Light
Small scale wind	In light of the configuration of the site and the character of the location, there is a risk that this technology will not receive consent from Local Planning Authorities because of potential noise and aesthetical issues. Moreover, field trials have shown that small scale wind turbines often achieve much lower performances than expected in urban areas because of local wind turbulences. As well as the maintenance cost of this system, there is also a risk that implementing small wind turbines on this development will be economically unviable. Therefore, this technology has been discounted at this stage.	
Biomass	The implementation of a biomass heating system requires a large accessible space for fuel storage and the logistics of delivery could pose an issue in such a residential area. Therefore, this solution has been discounted at this stage.	
Ground Source Heat Pumps (GSHP)	The implementation of a GSHP is more risky than the proposed solutions with the ground conditions being unknown. Moreover, a vertical ground loop will probably be required for this development which will be very capital intensive due to drilling costs. Therefore it is discounted at this stage.	
Photovoltaic Thermal (PVt)	Hybrid solar systems that combine both photovoltaic cells with solar thermal collectors are an extremely effective technology. PV-t panels can be combined with a water to water heat pump in order to provide additional CO_2 offsets. However, as this system is more expensive than the proposed solutions that satisfy the targets it has been discounted at this stage.	

4.2 TECHNOLOGIES CONSIDERED

The table below offers further solutions that are considered as potentially suitable for the development

Photovoltaic panels (PV)		
	Photovoltaic Cells (PV) generate electricity from sunlight using semiconductor cells linked together to form a module. Electricity can still be generated in cloudy and overcast conditions although more can be generated in direct sunlight. The conditions that provide optimal generation in the UK are with South facing panels with a 30º elevation and no overshadowing. PV is considered a good solution for the development and follows the "*be green*" element of the London Plan. A circa 6.1 kWp scheme will be installed on the rooftop for each scenario this will deliver 2.6 Tonnes of CO_2 savings.	
Air Source Heat Pump (ASHP)		
	Air Source Heat Pumps (ASHP) systems absorb heat energy from the outside air to heat buildings. There are two types of air-source heating systems; Air-to-air systems and more efficient Air-to-water systems. These systems have been considered primarily for the commercial element however there is the potential to apply them to the residential unit as well. The commercial unit would benefit from an ASHP to deliver space heating as long as there is limited requirement for Hot Water as the ASHP systems deliver heat more efficiently at lower temperature. However the systems require an outdoor unit and there can be noisy in some cases. Given the likely need for cooling an ASHP may prove to be a more CO_2 efficient technology than the current gas boilers, however for now this has not been taken further.	

5 Proposed Solution

5.1 HIGH EFFICIENT FABRIC AND SERVICES WITH PV SYSTEM

This scenario embraces the energy hierarchy as laid out in Policy 5.2 of the London Plan. This states that new developments should minimise carbon dioxide emissions by using less energy (be lean), supplying energy efficiently (be clean), and utilising renewable energy (be green).

As noted in Section 3 we have analysed in detail three potential solutions, all of which are technically feasible, and all of which have been measured against the same gas baseline.

Using data from the SAP and SBEM calculations with the specifications outlined in Section 3 the high efficiency fabric specification has been chosen to reduce the heat demands of the dwellings in the first instance. The resultant savings from all of these measures is presented in the table below:

Table 5.1: Proposed solution for New-Build dwellings – Individual CO_2 savings

	Technology	Details	tCO_2 saved
being lean	**Enhanced Building Fabric**	Highly energy efficient building fabric to achieve Part L Compliance.	0.20
being clean	**High efficiency services**	High efficiency gas boilers to provide domestic hot water with improved heating system controls with MVHR ventilation	1.75
Being green	**Low and Zero Carbon Technology**	High efficiency Solar PV Array	2.60
	TOTAL		**4.55**

Table 5.1 above shows that the enhanced building fabric with Gas Boilers, the installation MVHR and PV provided a saving of over 2.90tCO_2/yr.

A 6.1kWp scheme will be installed on the rooftop to deliver a 2.60 Tonnes of CO_2 saving.

5.2 RESULTS AND RECOMMENDATIONS

As can be seen in Section 5.1 three steps have been modelled. In each step there are advantages and disadvantages however the recommendation solution is the implementation of Gas Boilers for this non major site, achieving an overall reduction of **19% over the Part L baseline**, as this is the most practical and economically feasible solution to satisfy the targets for this site. The following tables set out the results from the analysis and are self-explanatory and in line with any major proposal in terms of detail.

Table 5.2: Table to show regulated CO_2 emissions

Regulated CO_2 Emissions	Regulated CO_2 emissions (tCO_2/yr)	CO_2 emissions saving over Part L baseline (tCO_2/yr)	% Reduction
New build baseline (Part L1A 2013)	18.03	0.00	0.0%
Be Lean	17.83	0.20	1.1%
Be Clean	16.08	1.95	9.8%
Be Green	13.48	4.55	16.2%

As can be seen from Table 5.2 the overall reduction achieved is **4.55tCO_2/yr**.

Table 5.3: Regulated & Unregulated CO_2 emissions after each stage of the Energy Hierarchy

	CO_2 emissions (Tonnes CO_2 per annum)		Percentage Reduction
	Regulated	Unregulated	
Baseline: Part L 2013 compliant	18.03	37.45	0.0%
Be Lean	17.83	37.25	0.5%
Be Clean	16.08	35.50	5.2%
Be Green	13.48	32.89	12.2%

As shown in the tables, the implementation of the proposed solution should ensure an improvement of 25.24% relative to the Part L compliant baseline for the development.

In addition a total reduction of 16.19% in CO_2 emissions is achieved from LZC technologies through the implementation of 6.1kWp of Photvoltaic Panels

Table 5.4: New-Build dwellings total tCO_2/yr for each hierarchy stage

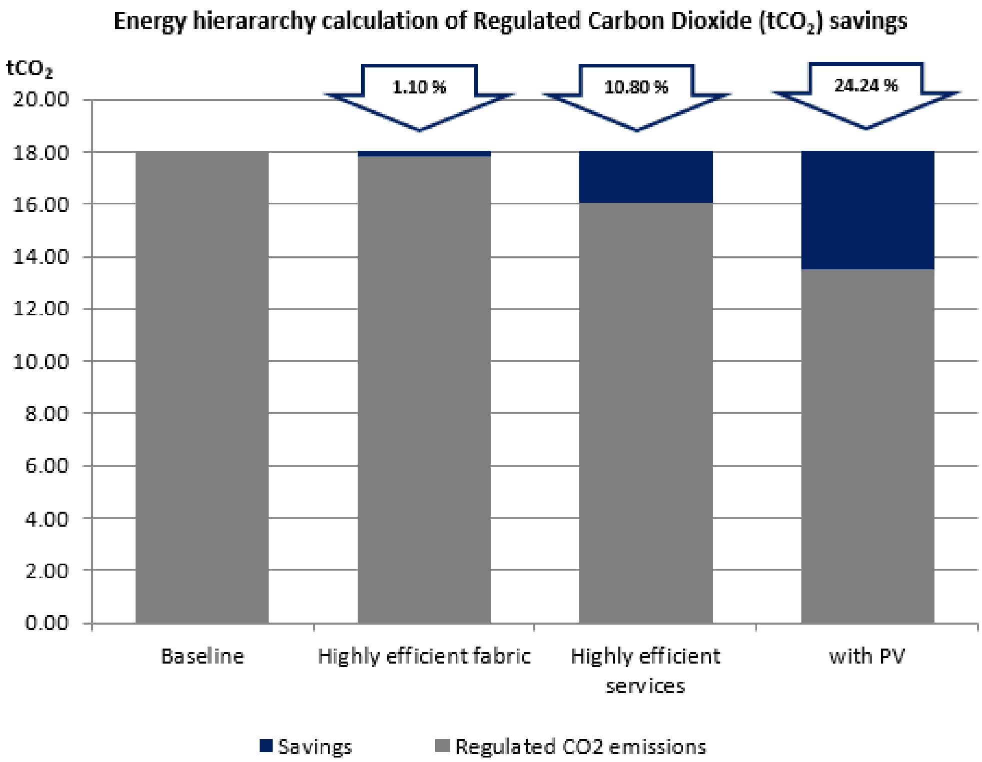
		Be Lean	Be Clean	Be Green
Regulated CO_2 Emissions	Part L Compliance Baseline CO_2 Emissions (TER)	Improved Building Fabric (DER)	Improved Building Services (DER)	Final Proposed Building including LZC (DER)
Total Regulated (tCO_2/yr)	18.03	17.83	16.08	13.48
%age Reduction over Baseline	N/A	**1.10%**	**10.80%**	**25.24%**
%age Reduction from LZC	N/A	N/A	N/A	**16.19%**

In summary, the proposed strategy offers the following savings from enhanced building fabric specifications and Low and Zero Carbon Technologies:

- ✓ A 25.24% reduction in regulated CO_2 emissions over the Part L1A 2013 baseline from fabric specifications, energy efficient services and the implementation of Low & Zero Carbon technologies (LZC).
- ✓ 16.19% reduction in regulated emissions from LZC sources by Implementing Solar Photovoltaic Panels (PV)
- ✓ A 12.38% reduction in all site CO_2 emissions from improved fabric specifications and Low & Zero Carbon technologies compared to the Baseline emissions, including both regulated CO_2 emissions (those measured for Part L) and the unregulated CO_2 emissions (those attributed to cooking & appliances as calculated by SAP).

The scheme has incorporated both the Camden and GLA guidance and will deliver the target, as far as is feasible on site as set out in the recently published Camden Local Plan.

Figure 5.1: New-Build dwellings total tCO_2/yr for each hierarchy stage



5.3 CONNECTION TO LOCAL DISTRICT HEATING NETWORK

As part of this feasibility the London Heat Map tool was consulted and there are at present no existing networks that can feasibly be connected to, as shown in the screen shot below.

- ✓ In terms of connectivity to existing potential source of heat, no existing district energy networks have been identified in the vicinity of the site.
- ✓ District energy is therefore not proposed as part of the energy strategy; however, all buildings will be designed to ensure compatibility with such a system; should one be developed in the future.

5.4 RESIDENTIAL OVERHEATING

Building Regulations (Part L) Overheating Part L of the Building Regulations focuses on levels of solar gain permitted into a space through facade / glazing. Under Part L1A for residential development this is expressed as a range of risk. To note, this criterion of Part L is not mandatory, i.e. it is not a strict requirement but is seen as good design practice.

Property	Overheating Risk
101	Medium
102	Slight
103	Slight
201	Medium
202	Slight
203	Slight
301	Slight
302	Slight

For Building Control and Part L of the Building Regulations the dwellings have a 'slight' to 'medium' overheating risk, this is acceptable to demonstrate compliance.

6 BRUKL Calculations

The following are direct extracts from the BRUKL calculation noted above.

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2013

Project name — **Shell and Core**

Kilburn Commerical — As designed

Date: Thu Jul 06 13:19:51 2017

Administrative information

Building Details

Address: 328 Kilburn High, London, NW6 2QN

Certification tool

Calculation engine: SBEM

Calculation engine version: v5.3.a.0

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.7

BRUKL compliance check version: v5.3.a.0

Owner Details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Certifier details

Name: Name

Telephone number: Phone

Address: Street Address, City, Postcode

Criterion 1: The calculated CO_2 emission rate for the building must not exceed the target

CO_2 emission rate from the notional building, $kgCO_2/m^2$.annum	39.8
Target CO_2 emission rate (TER), $kgCO_2/m^2$.annum	39.8
Building CO_2 emission rate (BER), $kgCO_2/m^2$.annum	39
Are emissions from the building less than or equal to the target?	BER =< TER
Are as built details the same as used in the BER calculations?	Separate submission

Criterion 2: The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Values which do not achieve the standards in the Non-Domestic Building Services Compliance Guide and Part L are displayed in red.

Building fabric

Element	$U_{a-Limit}$	U_{a-Calc}	U_{i-Calc}	Surface where the maximum value occurs*
Wall**	0.35	0.18	0.18	RT000000_W-1
Floor	0.25	0.13	0.13	RT000000_F
Roof	0.25	-	-	"No heat loss roofs"
Windows***, roof windows, and rooflights	2.2	1.4	1.4	RT000000_W3_O0
Personnel doors	2.2	1	1	RT000001_W4_O0
Vehicle access & similar large doors	1.5	-	-	"No external vehicle access doors"
High usage entrance doors	3.5	-	-	"No external high usage entrance doors"

$U_{a-Limit}$ = Limiting area-weighted average U-values [W/(m²K)]

U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]

U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* There might be more than one surface where the maximum U-value occurs.

** Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

*** Display windows and similar glazing are excluded from the U-value check.

N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air Permeability	Worst acceptable standard	This building
$m^3/(h.m^2)$ at 50 Pa	10	10

Malachy Walsh and Partners
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Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Area [m²]	215.7	215.7
External area [m²]	349.7	349.7
Weather	LON	LON
Infiltration [m³/hm²@ 50Pa]	10	5
Average conductance [W/K]	82.54	155.18
Average U-value [W/m²K]	0.24	0.44
Alpha value* [%]	22.42	16.04

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
100	**A1/A2 Retail/Financial and Professional services**
	A3/A4/A5 Restaurants and Cafes/Drinking Est./Takeaways
	B1 Offices and Workshop businesses
	B2 to B7 General Industrial and Special Industrial Groups
	B8 Storage or Distribution
	C1 Hotels
	C2 Residential Institutions: Hospitals and Care Homes
	C2 Residential Institutions: Residential schools
	C2 Residential Institutions: Universities and colleges
	C2A Secure Residential Institutions
	Residential spaces
	D1 Non-residential Institutions: Community/Day Centre
	D1 Non-residential Institutions: Libraries, Museums, and Galleries
	D1 Non-residential Institutions: Education
	D1 Non-residential Institutions: Primary Health Care Building
	D1 Non-residential Institutions: Crown and County Courts
	D2 General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger terminals
	Others: Emergency services
	Others: Miscellaneous 24hr activities
	Others: Car Parks 24 hrs
	Others: Stand alone utility block

Energy Consumption by End Use [kWh/m²]

	Actual	Notional
Heating	24.1	15.41
Cooling	7.7	7.24
Auxiliary	11.68	8.18
Lighting	46.53	55.78
Hot water	2.03	1.96
Equipment*	20.26	20.26
TOTAL**	**92.03**	**88.58**

* Energy used by equipment does not count towards the total for calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m²]

	Actual	Notional
Photovoltaic systems	0	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0

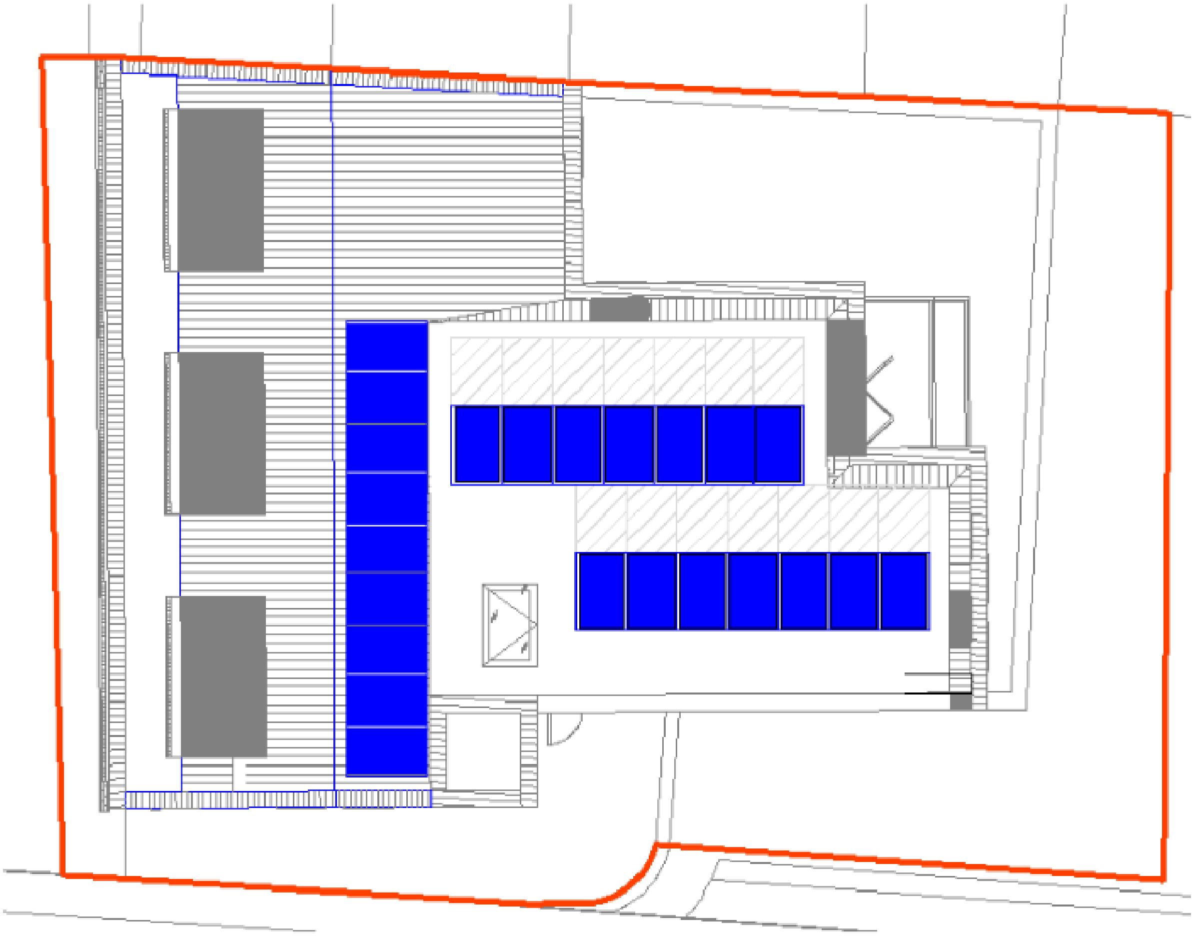
Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m²]	237.17	293.68
Primary energy* [kWh/m²]	229.13	234.34
Total emissions [kg/m²]	39	39.8

* Primary energy is net of any electrical energy displaced by CHP generators, if applicable.

Appendix A – PV Layout

The indicative drawing identifies the 23no of PV Panels that are proposed on the top roof of the building.
9 panels on the sloping roof @ 30 ° SE
14 panels on the flat roof @ 15° SW



NOTE: The PV array arrangement is constrained by the requirements of CDM and the previous comments from the pre-application discussions which have reduced the building scale, thereby reducing the available roof space. Currently this system provides a 16.9% reduction from LZC technologies relative to the 20% Camden request, however given the sites small scale this is still a significant reduction.

Appendix B – CHP Appraisal

Combined Heat & Power (CHP)

CHP generates heat for space heating or hot water requirements whilst simultaneously generating electricity for on-site use or exporting to the grid. The systems are usually 'heat led' with much more heat generated than electricity. CHP works best with buildings that require a high demand of heat for a sustained period of time, such as hospitals, swimming pools and hotels.

Based on the SAP calculations it has been concluded that the size of the development and ultimately the heating base loads do not allow for the efficient operation of a CHP plant. Specifically, the hot water loads are minimal and will not ensure that a CHP unit would operate for the optimal number of hours during the year to be financially feasible over its lifetime.

Advantages

- Electricity generated from existing heating needs.
- Fewer transport/distribution losses than electricity from the grid.

Disadvantages

- Most suited to buildings with a prolonged high heating demand
- Works best when run for long hours to improve efficiency, therefore requiring a constant heat demand. In this instance, the CHP would not have large enough heat loads throughout the year to justify its implementation
- Regular expensive maintenance required and full overhaul after 10 to 15 years depending on yearly hours run
- Pollution should be considered in urban areas

Appendix C – Connection to offsite District Heating

As part of the CHP feasibility the London Heat Map tool was consulted and there are at present no existing CHP networks that can feasibly be connected to, as shown in the screen shot below. The potential (red line) is an extension to the Euston Road proposed network. The red marker represents Bayham Place.

This potential connection is broadly 1,100 m away on the heatmap if the feasibility has been implemented. The distance at present is unfortunately likely to be uneconomical however they are hopeful for future plans in the area to extend the network.