Energy Statement

Project: Wroxham House, Wroxham Gardens, London, N11 2AX
Date: 10/01/2024

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1. Executive Summary

- The application is for the erection of a 3x bedroom dwelling, set over 3x storeys, with a total floor area of approximately 184m^2.
- The London Plan Policy SI 2 requires a minimum of 35% improvement in CO_2 emissions compared against the baseline. Following the energy hierarchy; be lean, be clean, be green.
    - "Be lean" involves improvement to fabric and generates a total saving of 0.3 tonnes CO_2/year which is equivalent to 18%.
        - U Values specified
            - Floors = 0.12
            - Walls = 0.16
            - Roofs = 0.12
            - Openings = 1.20
            - Walk On Glass = 1.40
    - "Be clean" involves connection to a heat network. Unfortunately, there are no existing or planned networks within the vicinity of this site.
    - "Be green" involves incorporating renewable and or low carbon technologies. This development will utilise air source heat pumps and a solar photovoltaic array. This step generated a saving of 1.3 tonnes CO_2/year which is equivalent to 68%.
- The cumulative savings was 1.6 tonnes CO_2/year which is equivalent to 86%.
- A cash in-lieu contribution of £734 will be required.
- The design of the dwelling follows the cooling hierarchy as per London Plan policy SI 4. A full CIBSE TM59 assessment will be completed.

2. Introduction

This Energy Assessment has been prepared by Energytest ltd in support of a planning application for a new dwelling at Wroxham House, Wroxham Gardens, London, N11 2AX.

This statement provides an initial assessment of the CO2 emissions of the dwelling using approved standard calculation methods (SAP 10 and the corresponding GLA Emission Reporting Spreadsheet), reviews the various option for renewable technologies and demonstrate how compliance with The London Plan will be met by implementing appropriate fabric efficiency measures and renewable and/or low energy technologies.

2.1 Development

The application is for the erection of a 3x bedroom dwelling, set over 3x storeys, with a total floor area of approximately 184m^2.

The dwelling will have a high level of fabric efficiency, incorporating efficient levels of insulation as well as high performance double glazing. The dwelling will utilise an air source heat pump for space heating and hot water, as well as solar photovoltaic panels.

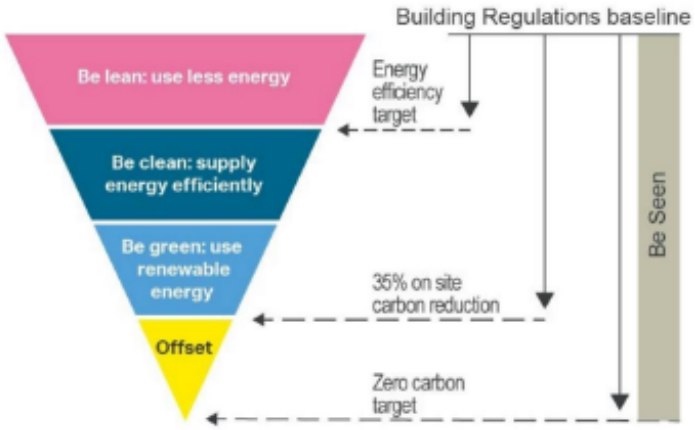
The project will be constructed to exceed the requirements of the 2021 version of Approved Document L1 of the Building Regulations



2.2 Planning Condition

- London Plan, policy SI 2, outlines how development is to make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

Figure 1: *The London Plan energy hierarchy*



1. ***Be lean:*** *use less energy and manage demand during operation through fabric and servicing improvements and the incorporation of flexibility measures*
2. ***Be clean:*** *exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly by connecting to district heating networks*
3. ***Be green:*** *maximise opportunities for renewable energy by producing, storing and using renewable energy on-site*
4. ***Be seen:*** *monitor, verify and report on energy performance through the Mayor's post construction monitoring platform.*

- Demonstrate how the net zero-carbon target for major residential and non-residential development will be met, with at least a 35 per cent on-site carbon reduction beyond Part L 2021.

Building Type	Min. on-site improvement over Part L 2021 (per cent)	Benchmark improvement over Part L 2021 (per cent)
Residential	35 per cent	50 per cent +

- Provide the value of the offset payment to make up any shortfall, where required.
- Commit that energy efficiency measures alone will reduce CO_2 emissions for residential uses by 10 per cent below those of a development compliant with Part L 2021 of the Building Regulations.

Policy SI 4 of The London Plan requires that applicants should apply the cooling hierarchy in Policy SI 4 of the London Plan to the development. Whilst the cooling hierarchy applies to major developments, the principles can also be applied to minor developments.

1. Minimise internal heat generation through energy efficient design
2. Reduce the amount of heat entering the building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls
3. Manage the heat within the building through exposed internal thermal mass and high ceilings
4. Passive ventilation
5. Mechanical ventilation
6. Active cooling

3. Establishing CO2 Emissions

3.1 Baseline CO_2 Emissions

The baseline CO_2 emissions for this development have been calculated as per the minimum requirements of Part L Building Regulations, with heating and hot water to be provided via mains gas boilers.

The following Target Emission Rate (TER) was calculated:

10.33 $kgCO_2/year/m^2$

3.2 Be Lean CO_2 Emissions

The first step of the energy hierarchy is to "Be lean: use less energy". This involves improving the building fabric above and beyond the Building Regulations target to reduce the demand for energy in each individual unit.

The following specification / U Values have been used within the SAP calculations:

- Floors = 0.12
- Walls = 0.16
- Roofs = 0.12
- Glazing, Doors, Roof Windows = 1.20
- Walk On Glass = 1.30
- Thermal Bridging = Care and continuity of insulation at all junctions. Target Y-Value of 0.05
- Air tightness = Design air permeability of 5

This specification ensures the Dwelling Fabric Energy Efficiency (DFEE) exceeds the Target (TFEE):

TFEE ($kWh/m^2/year$)	DFEE ($kWh/m^2/year$)	% Variance
46.88	44.92	4.18%

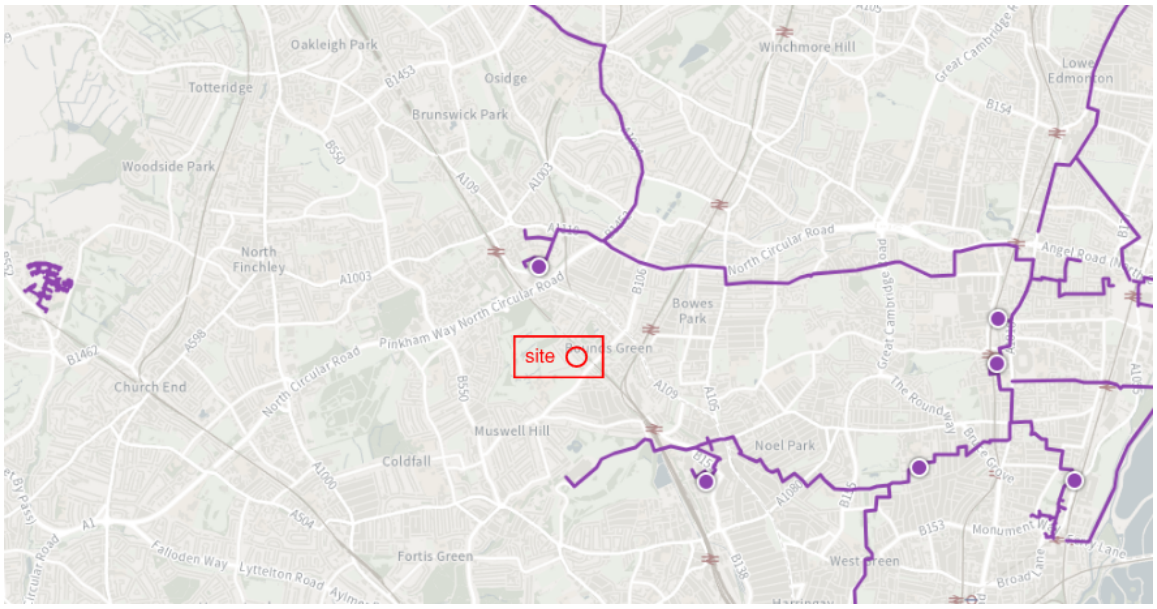
The following Dwelling Emission Rates (DER) were calculated after the “be lean” step:

11.30 kgCO_2/year/m^2

3.3 Be Clean CO_2 Emissions

The second step in The London Plan energy hierarchy is to “be clean: supply energy efficiently.'' This involves connecting to a District Energy Network.

There are no existing or proposed District Energy Network within the vicinity of the site, as indicated by the London Heat Map. https://maps.london.gov.uk/heatmap



The developers will make every effort so to supply energy efficiently within this development:

- Space heating via a highly efficient air source heat pump
- Hot water via an efficient cylinder with a low standing heat loss
- Ventilation via efficient intermittent extract fans
- Low energy lighting throughout
- Any appliances that are provided, will be efficient models

3.4 Be Green CO_2 Emissions

The final step in the London Plan energy hierarchy is to “be green: use renewable technology”.

After some feasibility study, the developers are going to implement the following renewable / low carbon technologies:

- **Air Source Heat Pump**
    - To provide space heating and domestic hot water
    - For the purpose of this exercise, a Mitsubishi Ecodan 14kW has been specified (actual make/model to be confirmed at a later date)
    - Due to the high efficiency of this technology, it is considered to be a low carbon technology.
- **Solar Photovoltaic (PV) Panels**
    - Solar PV harnesses the sun's energy to produce electricity
    - 2x arrays are proposed
        - 2.80kWp on the South West elevation
        - 1.40kWp on the South East elevation
    - These arrays are likely to be in the form of solar tiles, rather than traditional panels

The following Dwelling Emission Rate (DER) were calculated after the “be green” step:

1.40 $kgCO_2/year/m^2$

3.5. Table 2: Regulated Carbon Dioxide Savings From Each Stage Of The Energy Hierarchy For Domestic Buildings

The following savings were calculated at each stage of the energy hierarchy:

	Regulated domestic carbon dioxide savings	
	Total tonnesCO_2/year	**%**
Be Lean	0.3	18%
Be Clean	-	-
Be Green	1.3	68%
Cumulative Savings	**1.6**	**86%**
Annual savings from off-set payment	0.3	
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**8**	-
Cast in-lieu contribution (£)	**734**	-

3.6. EUI & space heating demand (predicted energy use)

Use	EUI (kWh/m^2/year)	Space heating demand ((kWh/m^2/year)	Methodology used
Resi	25.41	13.66	SAP 10

- The EUI is lower than the GLA benchmark
- The space heating demand is lower than the GLA benchmark

4. Heating and Cooling

As per Policy SI 4 of The London Plan, the cooling hierarchy has been followed:

- Minimise internal heat generation through efficient design
    - Cross ventilation possible
    - Hot water cylinder is within a separate store, away from the bedroom
    - Compliance with Part O will be sought (passive means)
- Reduce the amount of heat entering the building
    - Cross ventilation possible
    - Sufficient openable areas
    - The glazing has a low U Value and G Value (1.20 and 0.45)
    - Balcony / walkway provides shading to bedrooms on lower ground floor
    - Landscaping around the building helps to reduce external temperatures
- Passive ventilation
    - Sufficient background ventilation (i.e. trickle vents)
    - Openable windows and cross ventilation possible
- Mechanical ventilation
    - Exceeding Part F requirements

4.1 Overheating Checklist

The “Early Stage Overheating Risk Tool” has been completed. A result of 12 was calculated which means there is a medium risk of overheating. As such, design changes and/or a CIBSE TM59 assessment is recommended. TM59 will be performed for Part O Building Regulations which will seek to mitigate any overheating via natural means.

EARLY STAGE OVERHEATING RISK TOOL

Version 1.0, July 2019

This tool provides guidance on how to assess overheating risk in residential schemes at the early stages of design. It is specifically a pre-detail design assessment intended to help identify factors that could contribute to or mitigate the likelihood of overheating.

The questions can be answered for an overall scheme or for individual units. Score zero wherever the question does not apply. Additional information is provided in the accompanying guidance, with examples of scoring and advice on next steps.

Find out more information and download accompanying guidance at goodhomes.org.uk/overheating-in-new-homes.

KEY FACTORS INCREASING THE LIKELIHOOD OF OVERHEATING	KEY FACTORS REDUCING THE LIKELIHOOD OF OVERHEATING

Geographical and local context

#1 Where is the scheme in the UK? See guidance for map	South east	4	4
	Northern England, Scotland & NI	0	
	Rest of England and Wales	2	
#2 Is the site likely to see an Urban Heat Island effect? See guidance for details	Central London (see guidance)	3	2
	Grtr London, Manchester, B'ham	2	
	Other cities, towns & dense sub-urban areas	1	

#8 Do the site surroundings feature significant blue/green infrastructure? Proximity to green spaces and large water bodies has beneficial effects on local temperatures; as guidance, this would require at least 50% of surroundings within a 100m radius to be blue/green, or a rural context	1	0

Site characteristics

#3 Does the site have barriers to windows opening? - Noise/Acoustic risks - Poor air quality/smells e.g. near factory or car park or very busy road - Security risks/crime - Adjacent to heat rejection plant	**Day** - reasons to keep all windows closed	8	4
	Day - barriers some of the time, or for some windows e.g. on quiet side	4	
	Night - reasons to keep all windows closed	8	4
	Night - bedroom windows OK to open, but other windows are likely to stay closed	4	

#9 Are immediate surrounding surfaces in majority pale in colour, or blue/green? Lighter surfaces reflect more heat and absorb less so their temperatures remain lower; consider horizontal and vertical surfaces within 10m of the scheme	1	1
#10 Does the site have existing tall trees or buildings that will shade solar-exposed glazed areas? Shading onto east, south and west facing areas can reduce solar gains, but may also reduce daylight levels	1	1

Scheme characteristics and dwelling design

#4 Are the dwellings flats? Flats often combine a number of factors contributing to overheating risk e.g. dwelling size, heat gains from surrounding areas; other dense and enclosed dwellings may be similarly affected - see guidance for examples	3	0
#5 Does the scheme have community heating? i.e. with hot pipework operating during summer, especially in internal areas, leading to heat gains and higher temperatures	3	0

#11 Do dwellings have high exposed thermal mass AND a means for secure and quiet night ventilation? Thermal mass can help slow down temperature rises, but it can also cause properties to be slower to cool, so needs to be used with care - see guidance		1	0
#12 Do floor-to-ceiling heights allow ceiling fans, now or in the future? Higher ceilings increase stratification and air movement, and offer the potential for ceiling fans	>2.8m and fan installed	2	1
	> 2.8m	1	

Solar heat gains and ventilation

#6 What is the estimated average glazing ratio for the dwellings? (as a proportion of the facade on solar-exposed areas i.e. orientations facing east, south, west, and anything in between). Higher proportions of glazing allow higher heat gains into the space	>65%	12	4
	>50%	7	
	>35%	4	
#7 Are the dwellings single aspect? Single aspect dwellings have all openings on the same facade. This reduces the potential for ventilation	Single-aspect	3	0
	Dual aspect	0	

#13 Is there useful external shading? Shading should apply to solar exposed (E/S/W) glazing. It may include shading devices, balconies above, facade articulation etc. See guidance on "full" and "part". Scoring depends on glazing proportions as per **#6**		Full	Part	1
	>65%	6	3	
	>50%	4	2	
	>35%	2	1	

#14 Do windows & openings support effective ventilation? Larger, effective and secure openings will help dissipate heat - see guidance		Openings compared to Part F purge rates		2
		= Part F	+50%	+100%
	Single-aspect	minimum required	3	4
	Dual aspect		2	3

TOTAL SCORE	12	=	Sum of contributing factors:	18	*minus*	Sum of mitigating factors:	6

High 12 Medium 8 Low

score >12:
Incorporate design changes to reduce risk factors and increase mitigation factors
AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)

score between 8 and 12:
Seek design changes to reduce risk factors and/or increase mitigation factors
AND Carry out a detailed assessment (e.g. dynamic modelling against CIBSE TM59)

score <8:
Ensure the mitigating measures are retained, and that risk factors do not increase (e.g. in planning conditions)

5. Conclusion

With the specification as outlined in this report, this development will achieve a cumulative saving of 1.6 tonnes CO_2 / year which is equivalent to a 86% improvement on the baseline.

A cash in-lieu payment of £734 will be required.

Therefore the 35% improvement over the baseline emissions as stipulated by London Plan policy SI 2, **is satisfied.**

The design of the dwelling follows the cooling hierarchy as per London Plan policy SI 4. An initial overeating assessment using the Good Homes Alliance Early Stage Overheating Risk Tool indicates there to be a “medium” risk of overheating. A full CIBSE TM59 assessment will be completed at the technical design stage which will seek to mitigate any overheating via natural means.

Any revisions of the aforementioned specification must be communicated with Energytest to ensure the planning condition will remain in perpetuity.

6. Appendix

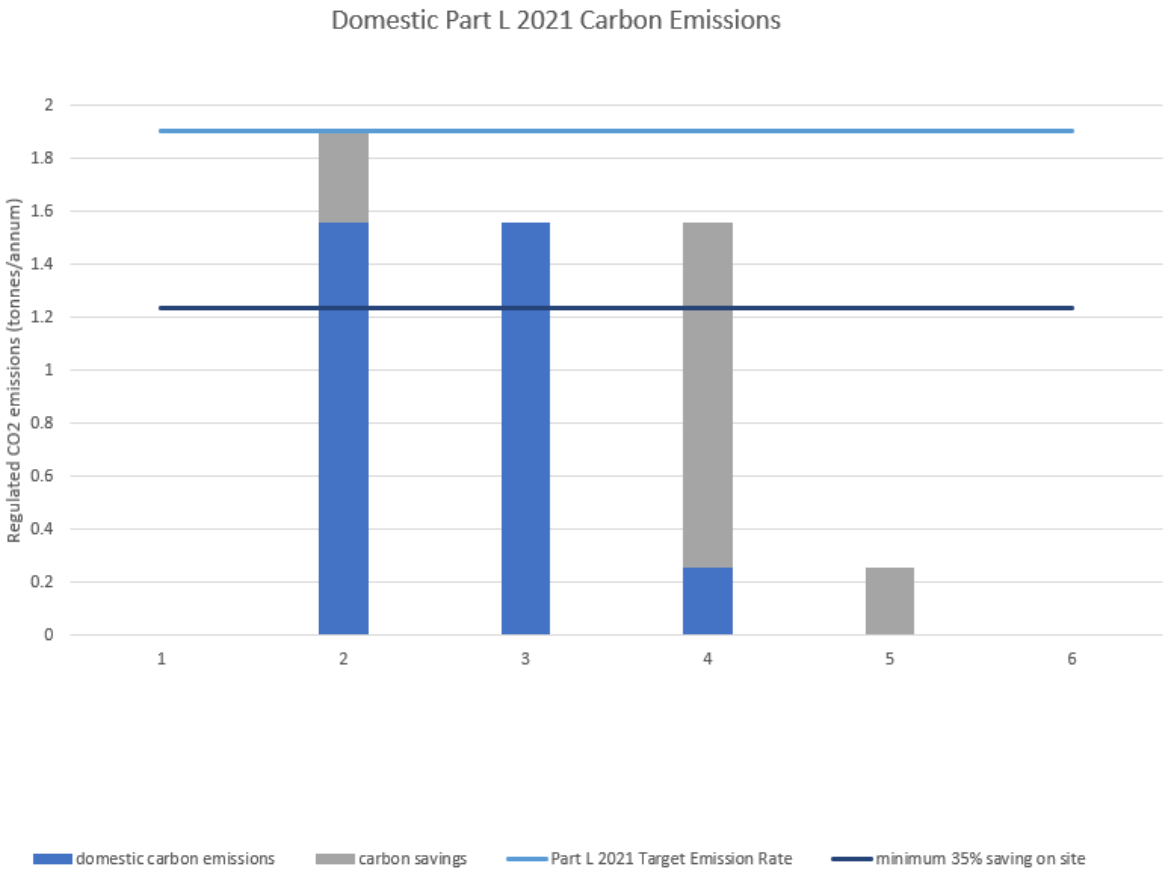
5.1 Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

	Carbon Dioxide Emissions for residential buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	1.9	
After energy demand reduction (be lean)	1.6	
After heat network connection (be clean)	1.6	
After renewable energy (be green)	0.3	

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

	Regulated residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.3	18%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	1.3	68%
Cumulative on site savings	**1.6**	**86%**
Annual savings from off-set payment	0.3	-
	(Tonnes CO_2)	
Cumulative savings for off-set payment	**8**	-
Cash in-lieu contribution (£)	**734**	

*carbon price is based on GLA recommended price of £95 per tonne of carbon dioxide unless Local Planning Authority price is inputted in the 'Development


Domestic Part L 2021 Carbon Emissions
Regulated CO2 emissions (tonnes/annum)
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1
2
3
4
5
6
domestic carbon emissions
carbon savings
Part L 2021 Target Emission Rate
minimum 35% saving on site