DELIVERING BEYOND COMPLIANCE

ENERGY STATEMENT

Apartment 1 - 6,
80 Church Street,
Edmonton,
London,
N9 9PB

Date: 28/02/2024
Report Reference: Q-13948

Head Office

ATSPACE Ltd, Units 3 & 4 Cokenach Estate, Barkway, Royston,
Hertfordshire SG8 8DL
e. info@atspaceltd.co.uk

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REVISION	DATE	PREPARED BY	REVIEWED BY	COMMENTS
1	28/02/2024	Atspace Ltd	Joe Dillon	

This statement outlines the opportunities for reducing carbon output/energy demand through optimizing fabric fit-out and using renewable energy.

It is not intended as detailed design advice, and is purely for the demonstration of the relevant reduction requirement.

As such data and information should only be treated as INDICATIVE at this stage of the process. Further investigation can be undertaken when more accurate and detailed information is required on specific measures.

1.0 Introduction

Units 3 & 4 The Cokenach Estate, Barkway, Royston, Herts SG8 8DL | T: 01763 268 685
Registered in England No. 8086772. VAT No. 934 3705 24 E: info@atspaceltd.co.uk www.atspaceltd.co.uk

1.1 Introduction to Developments

ATSPACE Ltd has been instructed to prepare an Energy Statement for the residential new build project at 80 Church Street, Edmonton.

This statement will demonstrate how the CO_2 emissions of the development have been reduced by at least 35% compared with a typical 2022 Building Regulations Part L compliant building, as required by Enfield Council.

The project is the erection of 2 new top floor flats, and the conversion of 4 existing units in the same complex.

The site is located in a residential area of Edmonton, London.

1.3 Methodology

The methodology that has been applied in this report is as follows:

1.3.1 Prepare SAP calculations for the site based on construction specification provided by the developer.

1.3.2 From the SAP calculations, the energy demand for the development in kWh/year and baseline CO_2 emissions in $kgCO_2$/year for the site can be established.

1.3.3 Reduction target CO_2 emission rates based on the reduction requirements can then be calculated from the baseline values.

1.3.4 A renewable energy feasibility study to ascertain which LZC technologies would be suitable for the development is carried out.

1.3.5 Where the actual CO2 emissions does not meet the reduction target emission rate, feasibility of various options for improvement are discussed with the developer.

1.3.6 SAP calculations are modified with the agreed improvements. The reduced energy demand for the development in kWh/year and the predicted CO_2 emissions for the site can be established, and shown to achieve the reduction target.

The following CO_2 related planning condition in the Enfield Council Local Plan (policy DM SE5) applies to this Energy Statement:

Table 4.4: On-site carbon reduction targets

	Minimum on-site total reduction in CO2	Residual emissions carbon offset fund contribution
Major residential development of ten or more dwellings (including new build, change of use, conversions and major refurbishments)	Net-zero with minimum 45% on-site reduction	Tiered offset
Minor new build residential development of one or more dwellings	45% minimum on-site reduction with	£1,500 flat fee per dwelling
Minor residential change of use and conversions resulting in the creation of one or more dwellings	35% minimum on-site reduction	£1,000 flat fee per dwelling
Non-residential development of 500sqm GIA or more (including new build, change of use and major refurbishments)	Net-zero with minimum 45% on-site reduction	Tiered offset

2.0 Predicted Annual Carbon Emissions

SAP 2012 calculations and final calculations were prepared based on the construction specification shown in **Table 1** below:

Table 1: Specification Table

Aspect	
Existing External Walls	0.33 W/m^2 K
New Cavity Walls	0.18 W/m^2 K
Dormer Walls	0.15 W/m^2 K
Plane roofs	0.11 W/m² K
Flat roof	0.14 W/m^2 K
Sloped roof	0.15 W/m^2 K
Glazing	1.2 W/m² K (G-value 0.63)
Roof lights	1.3 W/m^2 K
Thermal Bridging (New builds only)	Flat 4 & 5 assumed y-values (0.085 and 0.075)**
Air Tightness	Conversions - 6.00 m^3.h^{-1}.m^2 New Builds - 4.00 m^3.h^{-1}.m^2
Ventilation	Intermittent Extracts
Main Heating System	Ideal Logic Combi ESP1 24
Heating Controls	Time & Temperature Zone Control
Hot Water	From the main heating system
Renewable technologies:	Solar PV

*** PSI Value Calculations may need to be carried out to get these values when spec is confirmed*

The conducted SAP calculation shows that the baseline emissions for proposed whole development is **6380 kgCO_2/year.** To satisfy the planning policies on CO_2 reduction, the developer has committed to reducing predicted site-wide CO_2 emissions by a minimum of 35% of this value. This equates to a reduction of **2234 kgCO_2/year.**

Therefore, a total site emission rate of **4146 kgCO_2/year** or lower, proves that the minimum 35% reduction has been met.

This can be seen in **Table 2** below.

Table 2: CO_2 Emission Rate Breakdown

CO_2 Emission Breakdown (kg CO_2/yr)			
	Baseline (Building regs max)	35% reduction Target	Reduction
	6380	**4146**	**2234**

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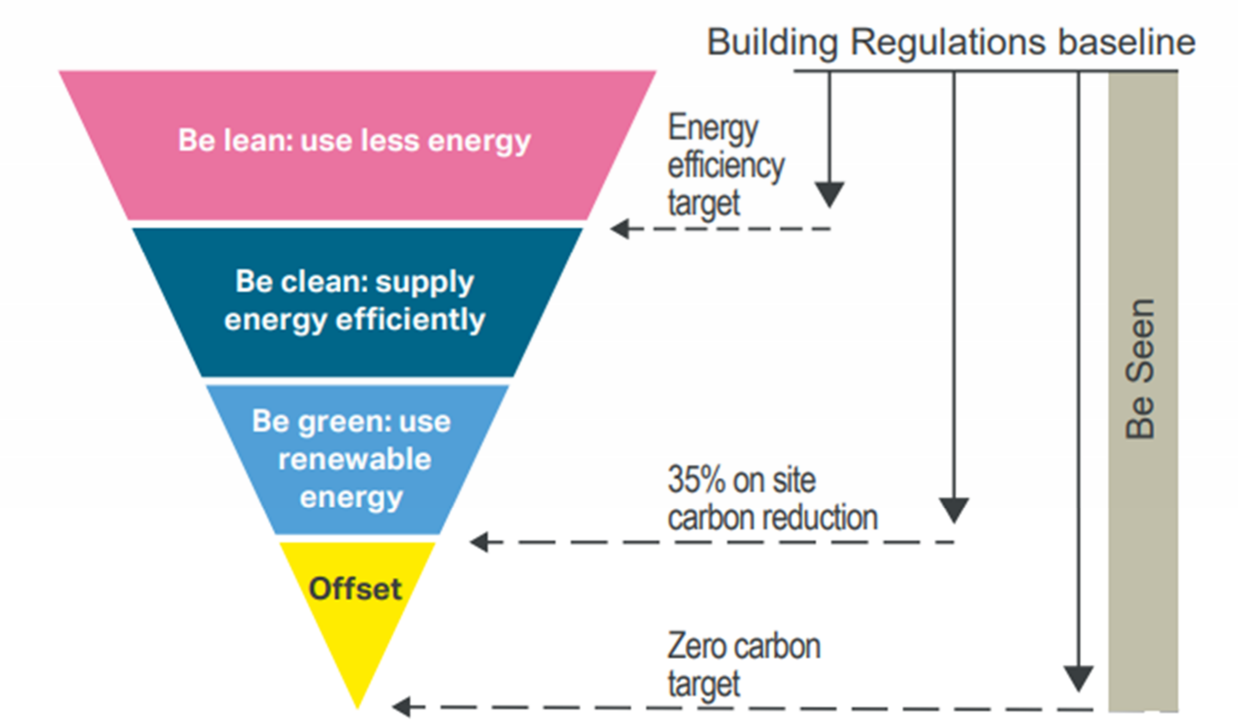
3.0 Reducing Carbon Emissions through Energy Reduction

The Energy Hierarchy sets out the most effective way to reduce a dwelling's CO_2 emissions. Firstly, by reducing energy demand, then by using energy efficiently, and lastly by incorporating LZC/Renewable technologies.

Figure 1: The Energy Hierarchy



Reducing the need for energy usage in the dwelling's design:

The first and most cost-beneficial action is to reduce the amount of energy needed by the occupants of the dwelling whilst still maintaining or even improving the comfort conditions. A lot can be achieved through passive design, improving the dwelling's external fabric, and following principles to reduce air infiltration.

The developer is attempting to reduce the energy demand and CO_2 emissions of the development by making the following fabric and energy efficiency improvements to their standard Part L 2022 building specification:

Energy reduction strategies include:

- Incorporating 100% energy-efficient lighting: with the Lumens per Circuit Watt exceeding 90
- All new windows will be double-glazed with Low-E Coatings
- Solar PV technology

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4.0 Feasibility Study of Renewable Technologies

This section will assess the technical viability of the following renewable energy technologies for the site to rule out unfeasible options:

- Mast mounted wind turbines
- Roof-mounted wind turbines
- Solar PV (Photovoltaic) Panels
- Solar Thermal Panels
- ASHP (Air Source Heat Pump)
- GSHP (Ground Source Heat Pump)
- Biomass
- CHP

The following observations have been made concerning the technical feasibility of integrating renewable energy technologies into this development.

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Table 5: Feasibility Study of Low Carbon Technologies

Renewable Technology	Feasible	Reasons
Mast Mounted Wind Turbine	No	- The site is situated in a suburban area. Surrounding properties are not far enough away to be unaffected by turbine noise, reflections, and shadow flicker, however, surrounding trees may create shadow flickering for the occupant or nearby residents - The site area is surrounded by trees and nearby dwellings that could cause uneven and turbulent wind patterns. Turbulent air conditions may reduce the lifespan of components. - Currently, the BWEA suggests a large wind turbine to be viable where wind speed is 7m/s or above. According to the NOABL database, the average wind speeds for the site are 3.5m/s at 10m, 4.4 m/s at 25m, and 5.0 m/s at 45m height for the property postcode (N9 9PB). Therefore, the wind speeds are not sufficient for a mast-mounted wind turbine to be viable.
Roof Mounted Wind Turbine	No	- There is sufficient roof space for a roof-mounted wind turbine to be installed on-site. - The site is situated in a suburban area. Surrounding properties are not far enough away to be unaffected by turbine noise, reflections, and shadow flicker, however, surrounding trees may create shadow flickering for the occupant or nearby residents - The site area is surrounded by trees and nearby dwellings that could cause uneven and turbulent wind patterns. Turbulent air conditions may reduce the lifespan of components. - Currently, the BWEA suggests a large wind turbine to be viable where wind speed is 7m/s or above. According to the NOABL database, the average wind speeds for the site are 3.5m/s at 10m, 4.4 m/s at 25m, and 5.0 m/s at 45m height for the property postcode (N9 9PB). Therefore, the wind speeds are not sufficient for a Roof-mounted wind turbine to be viable.
Solar PV (Photovoltaic) Panels/Tiles	Yes	- The proposed development has a sufficient pitched roof area for solar panel accommodation. - Most of the roofs will be free from overshadowing for most of the day by other buildings, structures, or trees. - The site is located in a region with a high level of global horizontal irradiation (2.95 kWh/m^2/day)

Solar Thermal Collectors	Yes	- The proposed development has a sufficient pitched roof area that can accommodate solar thermal panels. - Most of the roofs will be free from overshadowing for most of the day by other buildings, structures, or trees. - The site is located in a region with a high level of global horizontal irradiation (2.95 $kWh/m^2/day$) - Solar thermal collectors would be compatible with the planned heating system. - There will be a year-round hot water demand
ASHP (Air Source Heat Pump)	No	- The proposed development could not accommodate the space for a hot water cylinder and associated pipework - The buildings are not suitable for a low-grade heat distribution system (e.g. underfloor water system, oversized radiators). - Condenser units can be noisy and also blow out colder air to the immediate environment causing a nuisance to the residents. However logistically there is availability on the site to position the systems away from neighboring residents - An external ASHP won't have to be installed close to the bedrooms, causing noise issues.
GSHP (Ground Source Heat Pump)	No	- It would not be possible to drill vertical boreholes or horizontal loops for a GSHP on the site. - The development can not accommodate a low-grade heat distribution system (e.g. underfloor water system, oversized radiators). - The site and neighborhood contain mature trees. Drilling boreholes on the site creates the risk of damaging their roots. - There is insufficient space inside the proposed dwelling for the heat pump equipment.
Biomass Boiler	No	- There is an established fuel supply chain for the area: https://www.biomass-energy.org.uk/pellets/wood - There is no space for a delivery vehicle (vehicular access to fuel storage, turning circle, etc). - There is not sufficient space in the proposed buildings for a wood-fuel boiler and associated auxiliary equipment. - There is not sufficient space for fuel storage to allow a reasonable number of deliveries. - Biomass systems are management intensive (fuel sourcing, transport, storage) and require adequate expertise from users.

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CHP	No	- Given the proposed building use there won't be a high demand for heat for most of the year, therefore CHP won't be suitable. - A CHP unit only generates economic and environmental savings when it is running at least 4,500 hours per year. This equates to an average heat demand of about 17 hours a day for five days a week throughout the year. The proposed development energy and heat demand profile do not match this requirement due to low energy requirements because of fabric optimization. - CHP is typically utilized on buildings with high electricity and heating demand for most of the year such as local authority buildings, leisure centers, universities, hotels, and district heating schemes where CHP is used to provide electricity, space, and water heating. - CHP should be considered wherever there is a demand for electricity and an appropriate demand for heat in the near vicinity.

Based on the feasibility study in **Table 5** above, the following technologies have been identified as being feasible for the proposed development.

- Solar P.V.
- Solar thermal

5.0 Options to Provide 35% CO_2 Reduction

The developer is proposing to install the following technology within the building to achieve a 35% reduction in CO_2 output

- Solar PV (12.7 kWp)

The proposed installations generate the following CO_2 reductions in **Table 6** below:

Table 6: Associated CO_2 reductions of either technology:

CO_2 Emission Breakdown (kg CO_2/yr)				
No.	Improvement	Baseline emissions	Reduction Target	Dwelling emissions
Site-wide	Solar PV	6380	4146	4117

With the addition of solar PV, the site surpasses the 35% CO_2 reduction target, achieving a site-wide reduction of 35.49%.

These improvements, therefore, achieve the requirements set put by Enfield Council.

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Table 7: Percentage reduction in CO_2 following the proposed Installation and improvements

Aspect	Associated Total CO_2 ($kgCO_2/yr$)
Baseline	6380
Dwelling emissions	4117
Reduction in CO_2	2263
% Reduction	**35.49%**

For any further questions regarding the Energy Statement please contact Karim Meraga on:

Email: joe.dillon@atspaceltd.com
Phone: 01763 793961