

ENERGY STATEMENT:

9 High Street, Barkway, Royston, SG8 8EA

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*9 High Street,
Barkway,
Royston,
SG8 8EA*

Date: 26/03/2025

Report Reference: S34875



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Contents Page

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1.0 Introduction3

1.1 Introduction to Developments3

1.2 Methodology3

2.0 Predicted Annual Carbon Emissions4

3.0 Reducing Carbon Emissions through Energy Reduction5

4.0 Feasibility Study of Renewable Technologies6

REVISION	DATE	PREPARED BY	REVIEWED BY	COMMENTS
1	26.03.2024	Atspace Ltd	Oliver Summerfield	For Comment

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

1.1 Introduction to Developments

ATSPACE Ltd has been instructed to prepare an Energy Statement for the residential new build project at 9 High Street, Barkway.

This statement will demonstrate the dwelling emission rate and its CO₂ emissions meet the requirements of Part L Building Regulations.

The project is the conversion of an existing barn to a 2-storey dwelling.

The site is located in a residential area of Barkway, Royston.

1.2 Methodology

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

- 1.2.1 Prepare Preliminary SAP calculations for the site based on notional specification of new dwellings in Building Regulations Part L, with the inclusion of Recognised Construction Details (RCD's) Psi-values.
- 1.2.2 From the SAP calculations, the energy demand for the development in kWh/year and CO₂ emissions (DER) in kgCO₂/year/m² for the site can be established.
- 1.2.3 A renewable energy feasibility study to ascertain which LZC technologies would be suitable for the development is carried out.
- 1.2.4 SAP calculations are modified with the agreed improvements. The reduced energy demand for the development in kWh/year and the predicted CO₂ emissions for the site can be established, and shown to achieve the reduction target.

2.0 Predicted Annual Carbon Emissions

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

Table 1: Specification Table

Aspect	
External Walls	0.18 W/m ² K
Plane roofs	0.11 W/m ² K
Ground Floors	0.18 W/m ² K
Glazing	1.4 W/m ² K (G-value 0.63)
Solid Doors	1.4 W/m ² K
Thermal Bridging	N/A
Air Tightness	N/A
Ventilation	Intermittent Extracts
Main Heating System	Air Source Heat Pump
Heating Controls	Programmer, room thermostat and TRV's
Hot Water	From the main heating system
Renewable technologies:	N/A

The conducted SAP calculation shows that the total energy usage for the Dwelling (DER) is 5.97 kgCO₂/yr/m², while producing only 0.7 tones/yr in CO₂ Emissions. Given the factors that the building is a conversion and is also listed, the Dwelling still has a low CO₂ emissions rate despite limitations in Fabric and availability of Renewable technologies.

Due to this building being both a conversion and listed, it unfortunately cannot comply completely with the minor residential schemes less than 10 dwellings performance requirements in the North Herts Sustainability Supplementary Planning Document. However, the dwelling still reaches a predicted EPC rating of a C, and includes renewable technology where possible.

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

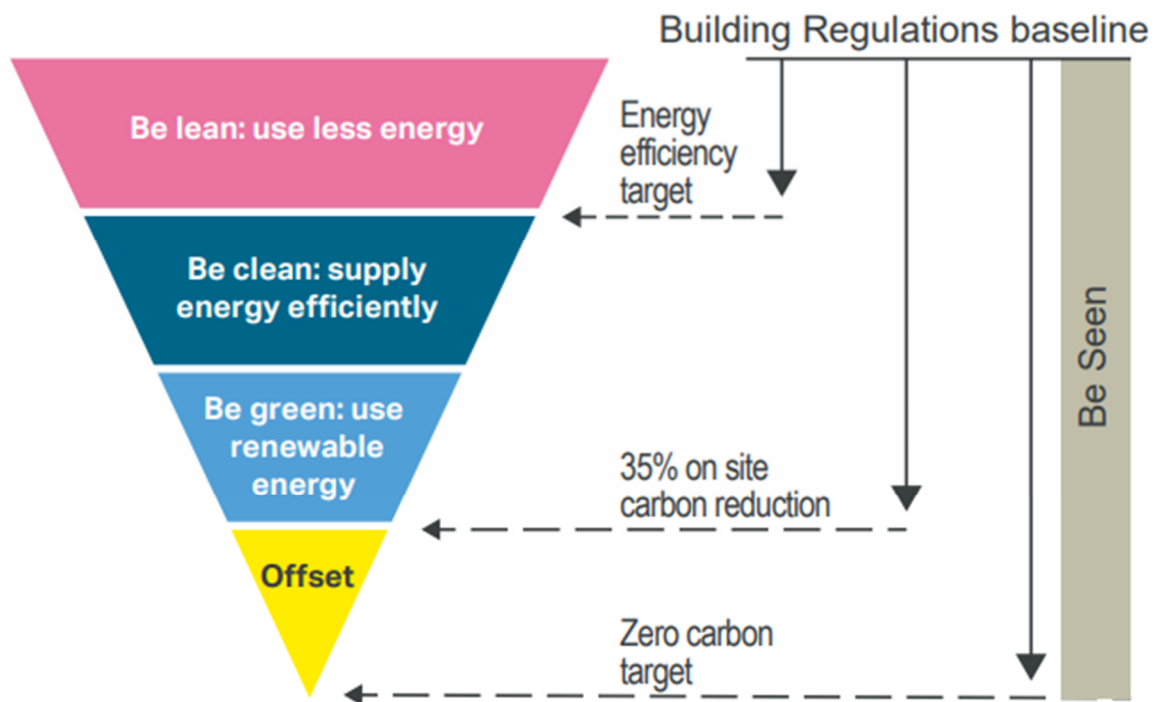
Table 2: CO₂ Emission Rate Breakdown

Dwelling Report		
SAP Rating	CO ₂ Emission (t/yr)	Dwelling Emission Rate (kgCO ₂ /yr/m ²)
72 C	0.70	5.97

3.0 Reducing Carbon Emissions through Energy Reduction

The Energy Hierarchy sets out the most effective way to reduce a dwelling's CO₂ 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 CO₂ emissions of the development by making the following fabric and energy efficiency improvements to their standard Part L 2013 building specification:

Energy reduction strategies include:

- Incorporating 100% energy-efficient lighting: with the Lumens per Circuit Watt exceeding 90
- Using an ASHP for General and Water Heating

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.

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 5m/s at 10m, 5.8m/s at 25m, and 6.3m/s at 45m height for the property postcode (SG8 8EA). Therefore, the wind speeds are not sufficient for a mast-mounted wind turbine to be viable.

ENERGY STATEMENT:

9 High Street, Barkway, Royston, SG8 8EA

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 roof mounted 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 5m/s at 10m, 5.8m/s at 25m, and 6.3m/s at 45m height for the property postcode (SG8 8EA). Therefore, the wind speeds are not sufficient for a mast-mounted wind turbine to be viable.
Solar PV (Photovoltaic) Panels/Tiles	No	- The proposed development has a sufficient pitched roof area for solar panel accommodation, however due to the building being listed it would not be viable.
Solar Thermal Collectors	No	- The proposed development has a sufficient pitched roof area that can accommodate solar thermal panels, however due to the building being listed it would not be viable.
ASHP (Air Source Heat Pump)	Yes	- The proposed development could accommodate the space for a hot water cylinder and associated pipework - The buildings are 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.

ENERGY STATEMENT:

9 High Street, Barkway, Royston, SG8 8EA

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.
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.

- Air Source Heat Pump

For any further questions regarding the Energy Statement please contact Oliver Summerfield on:

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