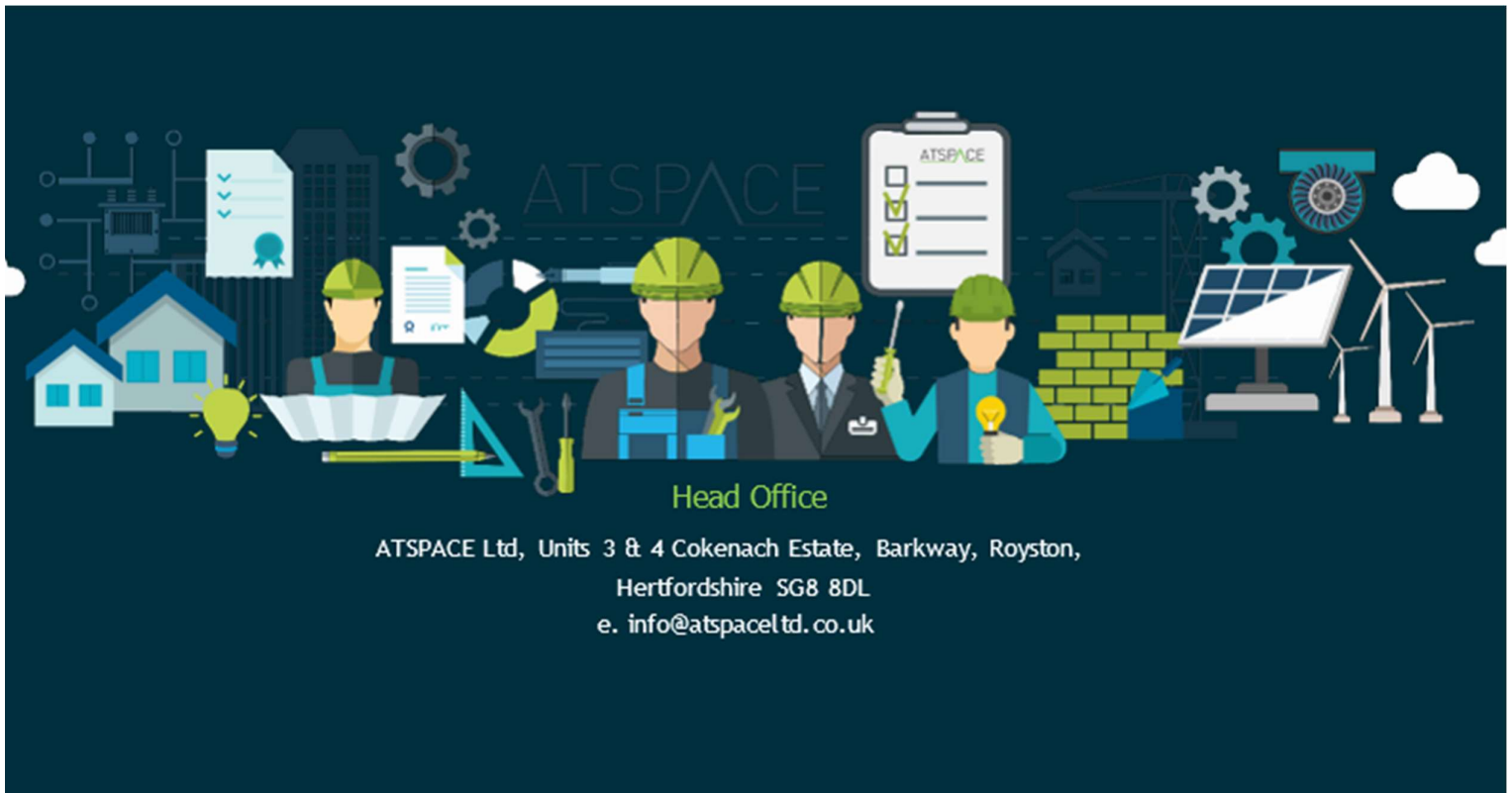


ENERGY STATEMENT:
74 Shepards Way, Rickmansworth, Hertfordshire, WD3 7NR

ENERGY STATEMENT

*74 Shepards Way,
Rickmansworth,
Hertfordshire,
WD3 7NR*

Date: 30/10/2023
Report Reference: Q-11337



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REVISION	DATE	PREPARED BY	REVIEWED BY	COMMENTS
1	30/10/2023	Atspace Ltd	Joe Ellison	Revision 1

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.

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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 Shepards Way, Rickmansworth.

This statement will demonstrate how the CO₂ emissions of the development have been reduced by at least 5% compared with a typical 2013 Building Regulations Part L compliant building, as required by Three Rivers District Council.

The project is the erection of 1no two-storey residential building.

The site is located in a residential area of Rickmansworth, Hertfordshire.

1.2 Methodology

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

- 1.2.1 Prepare SAP calculations for the site based on construction specification provided by the developer.
- 1.2.2 From the SAP calculations, the energy demand for the development in kWh/year and baseline CO₂ emissions (TER) in kgCO₂/year/m² for the site can be established.
- 1.2.3 Reduction target CO₂ emission rates based on the reduction requirements can then be calculated from the baseline values.
- 1.2.4 A renewable energy feasibility study to ascertain which LZC technologies would be suitable for the development is carried out.
- 1.2.5 Where the actual dwelling emission rate (DER) does not meet the reduction target emission rate, feasibility of various options for improvement are discussed with the developer.
- 1.2.6 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.

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The following CO₂ related planning condition applies to this Energy Statement:

“From 2013, applicants will be required to demonstrate that development will produce 5% less carbon dioxide emissions than Building Regulations Part L having regards to feasibility and viability. This may be achieved through a combination of energy efficiency measures, incorporation of on-site low carbon and renewable technologies, connection to a local, decentralized, renewable or low carbon energy supply

Reason: Policy DM4 is critical to helping to address climate change and reflects national and regional policy and the local high priority to tackle this issue. Buildings such as houses and offices account for approximately 40% of all carbon dioxide emissions in the UK and the Council will encourage all new development to be as energy efficient as possible”

2.0 Predicted Annual Carbon Emissions

SAP 2020 calculations and final calculations were prepared based on the construction specification shown in **Table 1** below:

Table 1: Specification Table

Aspect	74 Shepards Way
External Walls	0.12 W/m ² K
Plane roofs	0.11 W/m ² K
Ground Floors	0.13 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	Recognised Construction Details
Air Tightness	5.00 m ³ .h ⁻¹ .m ²
Ventilation	Intermittent Extracts
Main Heating System	ASHP
Heating Controls	Time and Temperature Zone Controlled
Hot Water	From heating system (Water Cylinder)
Renewable technologies:	ASHP

The conducted SAP calculation shows that the baseline emission rate (TER) for proposed whole development is **7.59 kgCO₂/year/m²**. To satisfy the planning policies on CO₂ reduction, the developer has committed to reducing predicted site-wide CO₂ emissions by a minimum of 5% of this value. This equates to a reduction of **0.38 kgCO₂/year/m²**.

Therefore, a total site emission rate of **7.21 kgCO₂/year/m²** or lower, proves that the minimum 5% reduction has been met.

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

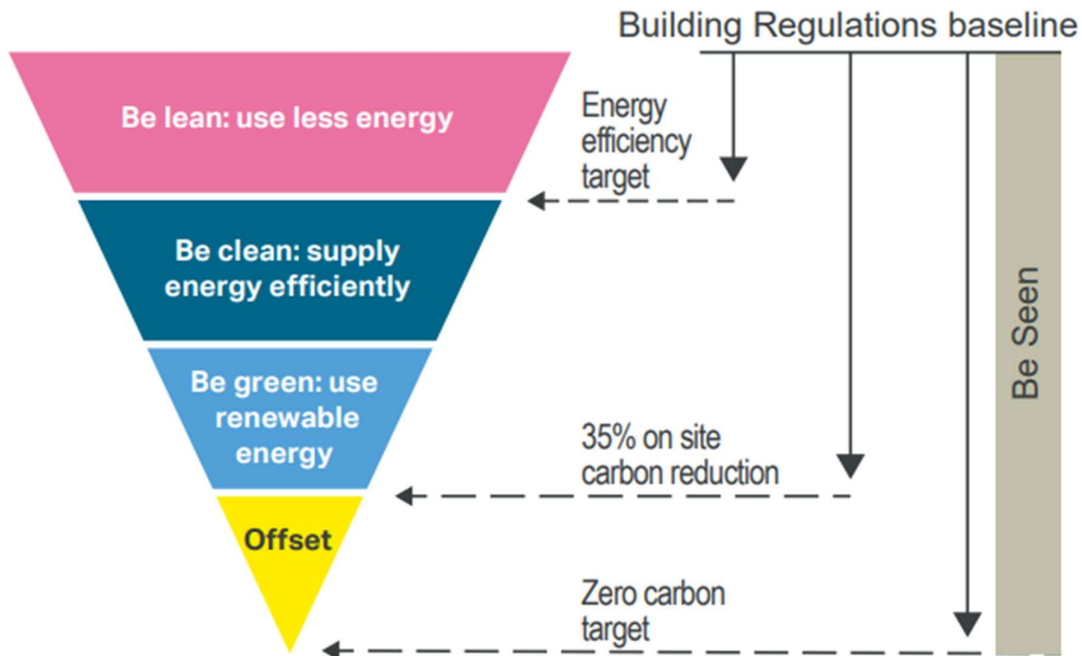
Table 2: CO₂ Emission Rate Breakdown

CO ₂ Emission Rate Breakdown (kg CO ₂ /yr/m ²)			
	Baseline (Building regs max)	5% reduction Target	Reduction
	7.59	7.21	0.38

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



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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 80
- All new windows will be double-glazed with Low-E Coatings
- Recognised Construction Thermal Bridging Details
- ASHP

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	<ul style="list-style-type: none"> - 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 4.5m/s at 10m, 5.3 m/s at 25m, and 5.8 m/s at 45m height for the property postcode (WD3 7NR). Therefore, the wind speeds are not sufficient for a mast-mounted wind turbine to be viable.
Roof Mounted Wind Turbine	No	<ul style="list-style-type: none"> - 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 4.5m/s at 10m, 5.3 m/s at 25m, and 5.8 m/s at 45m height for the property postcode (WD3 7NR). Therefore, the wind speeds are not sufficient for a mast-mounted wind turbine to be viable.
Solar PV (Photovoltaic) Panels/Tiles	Yes	<ul style="list-style-type: none"> - 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 (2.80 kWh/m²/day)

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Solar Thermal Collectors	Yes	<ul style="list-style-type: none"> - 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 (2.80 kWh/m²/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)	Yes	<ul style="list-style-type: none"> - The proposed development could accommodate the space for a hot water cylinder and associated pipework - The building is 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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - 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	<p>- 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.</p> <p>- 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.</p> <p>- 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.</p> <p>- CHP should be considered wherever there is a demand for electricity and an appropriate demand for heat in the near vicinity.</p>
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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
- ASHP

5.0 Options to Provide 5% CO₂ Reduction

The developer is proposing to install the following technology within the building to achieve a 10% reduction in CO₂ output

- ASHP

The proposed installations generate the following CO₂ reductions in **Table 6** below:

Table 6: Associated CO₂ reductions of either technology:

CO ₂ Emission Rate Breakdown (kg CO ₂ /yr/m ²)				
No.	Improvement	Baseline emission rate (TER)	Reduction Target	Dwelling emission rate (DER)
Site-wide	ASHP	7.59	7.21	3.69

With the addition of solar PV, the site surpasses the 5% CO₂ reduction target, achieving a site-wide reduction of 51.38%.

These improvements, therefore, achieve the requirements set put by Three Rivers District Council.

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Table 7: Percentage reduction in CO₂ following the proposed Installation and improvements

Aspect	Associated Total CO ₂ (kgCO ₂ /yr/m ²)
TER Baseline (2)	7.59
DER dwelling emissions	3.69
Reduction in CO ₂ (1)	3.90
% Reduction (1) / (2) x 100	51.38%

For any further questions regarding the Energy Statement please contact Joe Ellison on:

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