

Carbon and Energy Statement

(To support planning application)

Spring Street, Tottington

Revision:

-

Site Address:

New Dwelling at: Spring Street, Tottington

Architect:

Thorp Design Services Ltd

Client:

Mr Paul Power

Project Reference:

2526/035 – Spring Street

Date:

14th October 2025

SAP Assessor:

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CARBON AND ENERGY STATEMENT

This statement has been prepared by Robmar Energy Solutions on behalf of the applicant in support of a planning application at the below site:

Address: New Dwelling at Spring Street, Tottington

Proposal: New 4 bedroom detached dwelling

In particular this statement addresses Policy JP-S2: Carbon and Energy Requirements, of the Council's 'The Places for Everyone Joint Development Plan Document'.

"Provide an energy statement to set out how the proposal complies with Policy JP-S2. The statement should set out how you intend to minimise energy demand and maximise energy efficiency unless it can be demonstrated that it is not practicable or financially viable. Development should comply with the 2022 Part L Building regulations."

Development Description

The proposed development consists of 1 no. four bedroom new build detached dwelling on land at; Spring Street, Tottington.

The completed dwelling will be highly energy efficient with carbon dioxide emissions from regulated energy uses lower than the building regulations minimum standards. This will be achieved by installing high levels of insulation and the use of renewable technologies.

Proposed Energy Strategy

Reductions in CO2 emissions lower than building regulations standard

It is predicted that the proposed design and specifications of the dwelling will produce 1290.0 kgs of CO2 emissions per year, this equates to an overall reduction of the CO2 emissions by 2.35%. This will be achieved by following the energy hierarchy:

- i. Minimise energy demand
- ii. Maximise energy efficiency
- iii. Use renewable energy
- iv. Use low carbon energy
- v. Utilise other energy sources

The intention is to improve the thermal performance of the building(s) beyond the levels required to comply with the current regulations. This will include a highly insulated building envelope, high specification windows and doors and excellent levels of air tightness. This 'fabric first' approach reduces emissions by lowering the demand for heating. The dwelling will also include high efficiency heating systems with enhanced control systems.

Further Information

This report has been prepared by Matthew Jones of Robmar Energy Solutions, On Construction Domestic Energy Assessor accreditation number EES/032701. It is based upon proposed drawings and other information provided by the architect and client.

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Technology Feasibility Study

In this section we will look at the various strategies available that could be utilised to reduce the CO2 emissions of the dwelling. These will include renewable technologies and passive measures.

Wind Turbines

Small scale on-site wind turbines can have the potential to make a contribution to on-site renewables targets. However barriers such as noise, and visual impact (planning issues), can severely restrict their use.

The space available for locating wind turbines on this development is limited and is restricted solely to the use of roof mounted units. The performance of roof mounted turbines is considerably reduced when compared with freestanding models. Recent studies have also found that wind speeds actually seen in urban environments are considerably less than given in meteorological data.

In light of the visual impact, turbulence problems caused by the urban environment, and the low contribution to the renewables requirements, we would consider that wind turbines are not viable for this development.

Ground Source Heat Pumps

Ground source heating takes advantage of the stable ground temperature of 12°C to heat either air or water to provide energy efficient heating (and optional comfort cooling) to a building.

The system involves the installation of underground pipework laid in a horizontal or vertical pattern in land adjacent to the dwelling, usually underneath the garden or driveway.

The size of the adjacent gardens to the dwelling mean that a ground source heat pump system is technically feasible on this site, however, the installation costs are very high therefore we would not recommend ground source heat pumps for this development.

Air Source Heat Pumps

Air source heat pumps work in the same manner as ground source heat pumps, but instead of extracting low temperature heat from the ground, they extract it from the air. They can do this even when the outside temperature is -15°C.

Whilst the installation costs of these systems are not as high as with ground source heat pumps, they are still significant. It should also be noted that efficient running of the system can only be achieved with careful management of the controls by the house holder. There are many cases of heat pumps actually increasing energy use and costs when compared to traditional solutions.

The proposed dwelling has a suitable outside area for the external unit to be located. This could be at the side of the dwelling thereby mitigating the noise impact to the dwelling occupants and surrounding neighbours.

Air source heat pumps would be suitable for this development however the cost implications and likelihood of efficient use would need careful consideration.

Biomass

The use of biomass systems to provide heating and hot water often lends itself towards a district heating approach whereby a central system is provided which distributes low temperature hot water to each unit. Smaller units are available for installation in individual dwellings but, despite their continual development, these are still quite large and require a dedicated plant room equivalent to the size of a typical utility room.

One of the key downsides of the use of biomass in development of this nature is the space required for the storage and delivery of fuel for both the district and individual systems. The costs of the systems is also very high when compared to traditional mains gas heating.

Therefore we do not feel that a biomass scheme is suitable for use in this development.

Combined Heat and Power

Combined Heat and Power (CHP) is the simultaneous production of heat and electricity. Using a reliable internal combustion engine fed from a single source of fuel, such as natural gas or LPG, a CHP system can produce usable amounts of both heat and electricity.

The Government's Micro-generation Strategy has identified Micro-CHP as one of the key technologies which offers a realistic alternative to centrally generated electricity.

Previously, CHP systems have only been suitable for large developments due to the size and complexity of the systems available. Small scale CHP systems are now on the market for individual dwellings. These systems are not much larger than a typical gas boiler, and have a built-in turbine to produce electricity for the home.

However it is recommended that CHP is not installed in newly built dwellings. The system only produces electricity when the boiler is producing heat. In a new build the heating demand will be considerably less due to a tighter build quality and better u-values of heat loss elements. The system would not be able to generate enough power to be considered financially viable.

We would therefore consider that combined heat and power is not viable for this development.

Enhanced Efficiency Heating Systems

The heating system is usually the main generator of CO₂ emissions of a dwelling. Traditional mains gas boilers produce significantly lower emissions when compared to electric, oil and LPG systems.

The addition of flue gas heat recovery systems and improved heating controls are proven to bring effective reductions in emissions. They also have the advantage that most house holders would not consider this an unfamiliar technology when compared to other renewable options.

The costs of these options are not significant therefore this option is suitable for this development.

Photovoltaics (PV)

The cost of producing electricity by photovoltaics (PV) was once seen as being prohibitive. However, with improved efficiencies, reduced costs, and the introduction of feed-in tariffs in the UK, the use of PV is now considered a viable renewable technology and is serious competition for solar water heating for available roof space.

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To achieve maximum output from photovoltaic's they should ideally be located on south facing surfaces, with clear, unobstructed views of the sky.

The proposed roof design, layout and orientation means that there is limited space for the installation of photovoltaics, especially on the optimal south facing roof surface. The east / west elevation provides the majority of 'suitable' roof space, however, this is suboptimal.

The installation of PV is technically feasible and could lead to CO2 reductions for this dwelling however the costs of the installations are high. We would consider that PV is suitable for this development but the cost implications would need careful consideration.

Solar Water Heating

Solar water heating systems use the energy from the sun to heat water for domestic hot water needs. Solar water heating systems use a heat collector that is usually mounted on a roof in which a fluid is heated by the sun, this fluid being used to heat water that is stored in a hot water cylinder.

Domestic installations usually comprise of 4m² collection area, which can provide 50%-70% of the hot water requirement for a typical home if provided on south facing roofs at the optimum 30° pitch.

The CO2 savings are not as great as those achieved through PV, that coupled with the roof design and orientation of this development limiting the available 'optimal' roof space we consider that solar water heating is not suitable for this development.

Enhanced Construction

The use of enhanced insulating materials, high specification glazing, composite insulated doors and improved air tightness can significantly reduce the energy demand of the dwellings. Indeed the current Building Regulations Approved Document L1A has introduced a target fabric energy efficiency that must be achieved in addition to the target emissions rate.

Using this method alone will have significant cost implications. However the use of improved construction in combination with other options will achieve the required emissions reductions and therefore is suitable for this development.

Proposed Energy Strategy

It is proposed that the dwellings will incorporate enhanced construction and enhanced efficiency heating systems to reduce CO2 emissions.

The dwellings will adopt a 'fabric first' approach to energy efficiency following the principle that the demand for energy should first be minimised before addressing how the energy is produced. The building fabrics will be highly insulated and the target air tightness is high performing yet achievable when using high quality workmanship. This will mean that energy efficiency will be embedded within the dwelling throughout its lifetime rather than placing over reliance upon renewable technologies with a restricted working life.

The following u-values and air tightness rates are being proposed which significantly improve upon those required for Building Regulations Part L1A compliance, and therefore will provide high levels of energy efficiency.

Thermal Transmittance (U-Values): Wall: 0.18 W/m²K

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Roof: 0.15 W/m²K

Floor: 0.18 W/m²K

Glazing: 1.20 W/m²K

Doors: 1.40 W/m²K

Roof windows: 1.30 W/m²K

Design air tightness: 4.00 m³/hr.m²

The dwellings will also incorporate building materials that have been independently assessed for thermal bridging leading to reduced heat loss at construction junctions. This detailed analysis of the construction details is often overlooked in energy assessments but it gives significant reductions in CO₂ emissions.

The building services within the dwelling will use proven efficient technologies.

The heating and hot water system are currently proposed to be by means of highly efficient gas boiler, so to provide a reduction in the overall CO₂ emissions for the dwelling whilst providing the client with a suitable heating system for their energy usage and way of living.

The heating controls will be fully zoned so that the timing of the heating and the temperature settings can be changed in the various rooms of the houses. This will mean that the heating will not operate in at a time when the room is not used. Delayed start thermostats will also be incorporated that will further reduce the time when the heating is operating.

All internal and external light fittings will have low energy lamps / bulbs. The external lighting will also have controls that restrict operation to 'dusk to dawn' periods.

Comfort cooling will not be installed. Good design of the glazing system and the ability to naturally cross ventilate the dwelling means that comfort cooling will not be required.

Energy Assessment Method

CO₂ calculations have been carried out using Elmhurst Energy Systems SAP 10 programme which is in compliance with Approved Document L Volume 1 Dwellings 2021.

The SAP method assesses the energy demand of particular dwelling design. It then calculates the resulting CO₂ emissions based upon the proposed building services technologies, mainly the heating system. For each dwelling it calculates a target emissions rate of CO₂ which is referred to as the TER and a predicted as designed dwelling emission rate CO₂ which is referred to as the DER. To comply with basic building regulations the DER must be no greater than the TER.

The proposed energy strategy of this development will significantly reduce the designed dwelling CO₂ emissions below the building regulations target emissions rates.

Predicted Energy and CO2 Emissions

A baseline total target emissions rate has been calculated for the proposed dwelling within the development as **1396.36 kgCO₂/year** as summarised in the table below:

Floor Level	Floor Area (m ²)	Emissions (kg CO ₂ /yr/m ²)	Total emissions (kg CO ₂ /yr)
Ground Floor	46.10	10.63	490.04
First Floor	42.63	10.63	453.16
Second Floor	42.63	10.63	453.16
Total target emissions for full development			1396.36

The proposed energy strategy that is to be adopted on this development will reduce the predicted CO₂ emissions for the dwelling. The total as designed predicted CO₂ emissions for the dwelling within the development is **1363.52 kg CO₂/year** as summarised in the following table:

Floor Level	Floor Area (m ²)	Emissions (kg CO ₂ /yr/m ²)	Total emissions (kg CO ₂ /yr)
Ground Floor	46.10	10.38	478.52
First Floor	42.63	10.38	442.50
Second Floor	42.63	10.38	442.50
Total target emissions for full development			1363.52

By comparing the total target emissions and the total predicted emissions, the predicted reduction in CO₂ emissions is calculated as follows:

$$\text{Predicted CO}_2 \text{ reduction} = (1 - (1363.52/1396.36)) \times 100 = 2.35\%$$

The overall 'DER' CO₂ emissions for the dwelling is as follows:

$$\text{Predicted CO}_2 \text{ emissions} = 1363.52 \text{ kg CO}_2 / \text{year}$$

A copy of the predicted energy assessment is included in this report.