VISION
ENERGY

ENERGY STATEMENT

01625 315040 info@vision-energy.co.uk

SAP05220 Energy Statement Proposed Development at Boundary Road,

Haverhill,

Suffolk,

CB9 7YH

Document Version

REV	DATE	DESCRIPTION	PREPARED	CHECKED
1	05/11//2025	First Draft V1	Dr Bilal Alsheglawi	D. Barsted

Contents

1.Executive Summary

1.1 Introduction

1.1.1 This energy strategy has been prepared on behalf of Jordan and Bateman Architects LTD, hereafter referred to as the Applicant, in support of a full planning application for the development known as Business Unit at Boundary Road, Haverhill, Suffolk, CB9 7YH, hereafter referred to as the Development.

1.2. Policies and Requirements

1.2.1 National Policies

1.2.2 Below outlines the national policies this energy statement has been developed in accordance with

1.2.3 National Planning Policy Framework

1.2.1.1 The National Planning Policy Framework, December 2023 (NPPF) sets out the Government's planning policies for England and how these should be applied. It provides a framework within which locally prepared plans can provide for sufficient housing and other development in a sustainable manner. Preparing and maintaining up-to-date plans should be seen as a priority in meeting this objective.

1.2.1.2 Paragraph 7 in the NPPF states that:

"The purpose of the planning system is to contribute to the achievement of sustainable development, including the provision of homes, commercial development, and supporting infrastructure in a sustainable manner. At a very high level, the objective of sustainable development can be summarised as meeting the needs of the present without compromising the ability of future generations to meet their own needs."

1.2.1.3 The NPPF outlines that plans and decisions should apply a presumption in favour of sustainable development. A set of core principles stated in Paragraph 11 underpin both plan-making and decision-making so that sustainable development is pursued in a positive way.

1.2.1.4 Meeting the challenge of climate change is addressed in section 14 and paragraph 157 states:

"The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimise vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure."

1.2.1.5 Further to the above, paragraph 164 states that local planning authorities should give significant weight to the need to support energy efficiency and low carbon heating improvements to existing buildings, both domestic and non-domestic (including through installation of heat pumps and solar panels where these do not already benefit from permitted development rights).

The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied1. It provides a framework within which locally prepared plans for housing and other development can be produced.

1.2.4 Building Regulations Approved Document Part L

1.2.4.1 Conservation of fuel and power: Approved Document Part L, Volume 2 provides guidance to comply with Part L of Schedule 1 to the Building Regulations 2010 (2021 version) and the energy efficiency requirements for dwellings. The SBEM Methodology, currently used by the government to estimate the energy performance of homes demonstrates compliance with Part L of the Building Regulations, has been followed in providing the SBEM calculations in Appendix B.

1.2.5 Local Polices

West Suffolk Local Plan 2024–2041 (Adopted July 2025)

The West Suffolk Local Plan 2024–2041, adopted in July 2025, sets out the spatial strategy and planning policies that will guide development across the district, including Haverhill, up to 2041. It replaces the previous development plan documents for the former Forest Heath and St Edmundsbury areas. The Local Plan provides the overarching framework for delivering sustainable growth, addressing the climate and environment emergency, and supporting the council's ambition to achieve net-zero carbon emissions by 2030.

The plan emphasises that all new development should contribute positively towards reducing greenhouse gas emissions, improving energy efficiency, and integrating renewable and low-carbon technologies. The policies relevant to energy and sustainability are found primarily in Section 4.1: Climate Change, Health and Wellbeing, and Design, which outlines how development should be resilient to the impacts of climate change and contribute to West Suffolk's wider environmental objectives.

The Local Plan works alongside the National Planning Policy Framework (NPPF, 2023), the Suffolk Climate Emergency Plan (2022), and the West Suffolk Climate Change and Sustainable Building Planning Advice Note (January 2023), which together establish a clear direction towards low-carbon and energy-efficient development.

Policy LP 1 – Sustainable Design and Construction

A. Development proposals will be expected to achieve a high standard of sustainable design and construction and should be designed to reduce their contribution to climate change, including by reducing greenhouse gas emissions.

B. All development should be designed to:

• optimise energy efficiency through siting, orientation, layout, and building form;

• minimise the need for energy through passive design measures such as natural ventilation and daylight;

• incorporate energy-efficient technologies, materials, and building services;

• maximise opportunities for renewable and low-carbon energy generation within the site;

• minimise embodied carbon and maximise use of recycled or low-impact materials; and

• adapt to climate change through measures such as sustainable drainage, water efficiency, and overheating mitigation.

C. Proposals for major development must be accompanied by a Sustainability Statement demonstrating how the scheme meets these principles and how it will minimise both operational and embodied carbon.

D. The council will support developments that meet recognised standards such as Passivhaus, BREEAM Excellent, or equivalent, or demonstrate that the design achieves comparable outcomes.

E. Developments that fail to address opportunities for sustainable design and construction will not be supported unless it can be demonstrated that they are unviable or impractical.

Policy LP 6 – Renewable and Low-Carbon Energy

A. Proposals for renewable and low-carbon energy generation, including microgeneration, will be supported where the technology is appropriate to its location, and any adverse impacts are avoided or satisfactorily mitigated.

B. All new major developments will be expected to incorporate renewable or low-carbon energy generation to reduce predicted carbon emissions from regulated energy use.

C. The council will encourage developments to connect to existing or planned heat networks or to provide the infrastructure to enable future connection where feasible.

D. Cumulative impacts of renewable energy schemes will be considered, balancing benefits for carbon reduction with any local environmental effects.

E. The council will support community-led and shared-ownership renewable energy projects where they meet other policy requirements.

1.3 Assessment Methodology

1.3.1 As per the above national and local criteria, the below strategy has been adopted for the site.

1.3.2 As part of the net-zero local carbon target, the development will have no connection to a main gas supply.

1.3.3 To better reflect the emissions associated with the production of electricity, update fuel factors will be used as part of the assessment.

1.3.4 The energy hierarchy and a fabric first approach will be utilised.

1.4 Energy Efficiency Measures

1.4.1 The proposed development incorporates several energy efficiency measure and designs to ensure compliance & $C0^2$ reduction including:

1.4.2 Fabric Insulation improvements on Building Regulations Part L minimum standards,

1.4.3 Air permeability targets implemented as part of the project to minimise heat loss,

1.4.4 Low Energy lighting scheme adopted on site.

1.5 Low Carbon Energy Supply

1.5.1 The proposed development does not have a significant thermal demand and is not within an area of which allows for a decentralised energy network to be utilised, therefore this option will not be explored further within this energy statement.

1.5.2 The proposed site is not in a Heat Network Priority Area; therefore, it not been considered.

1.6 On-site renewable technologies

1.6.1 The proposed design of the development incorporates the use of **Air Source Heat Pump & Solar PV** to meet the requirements of the local authority. Further options have been reviewed to provide further carbon reductions; the use of on-site renewable technologies has been reviewed in further details within this statement.

1.7 Site Description

1.7.1 Business Unit Tenbury Wells Business Park, Bromyard Road, Tenbury Wells, Worcestershire WR15 8FA.

1.7.2 The proposed development is to incorporate a high level of thermal performance and incorporate low carbon heating to ensure the new development achieve the local policy requirements.

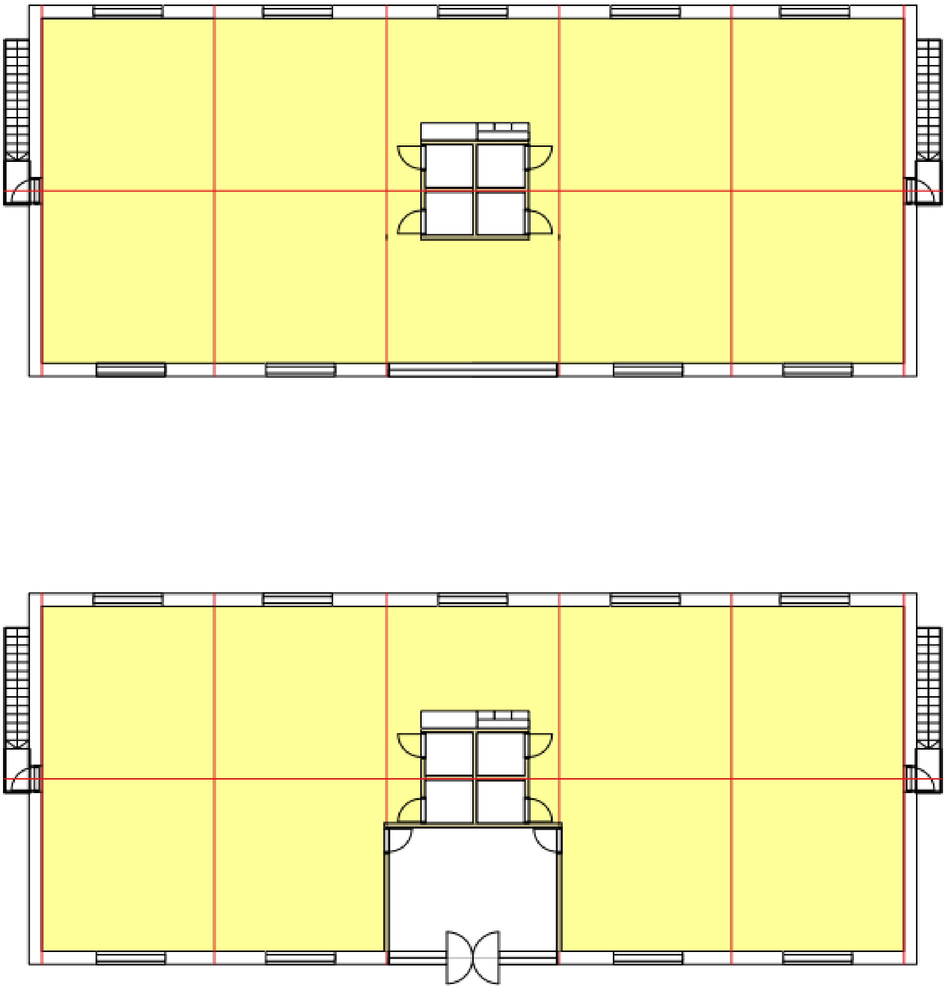


Figure 1 Proposed Ground floor and First floor.

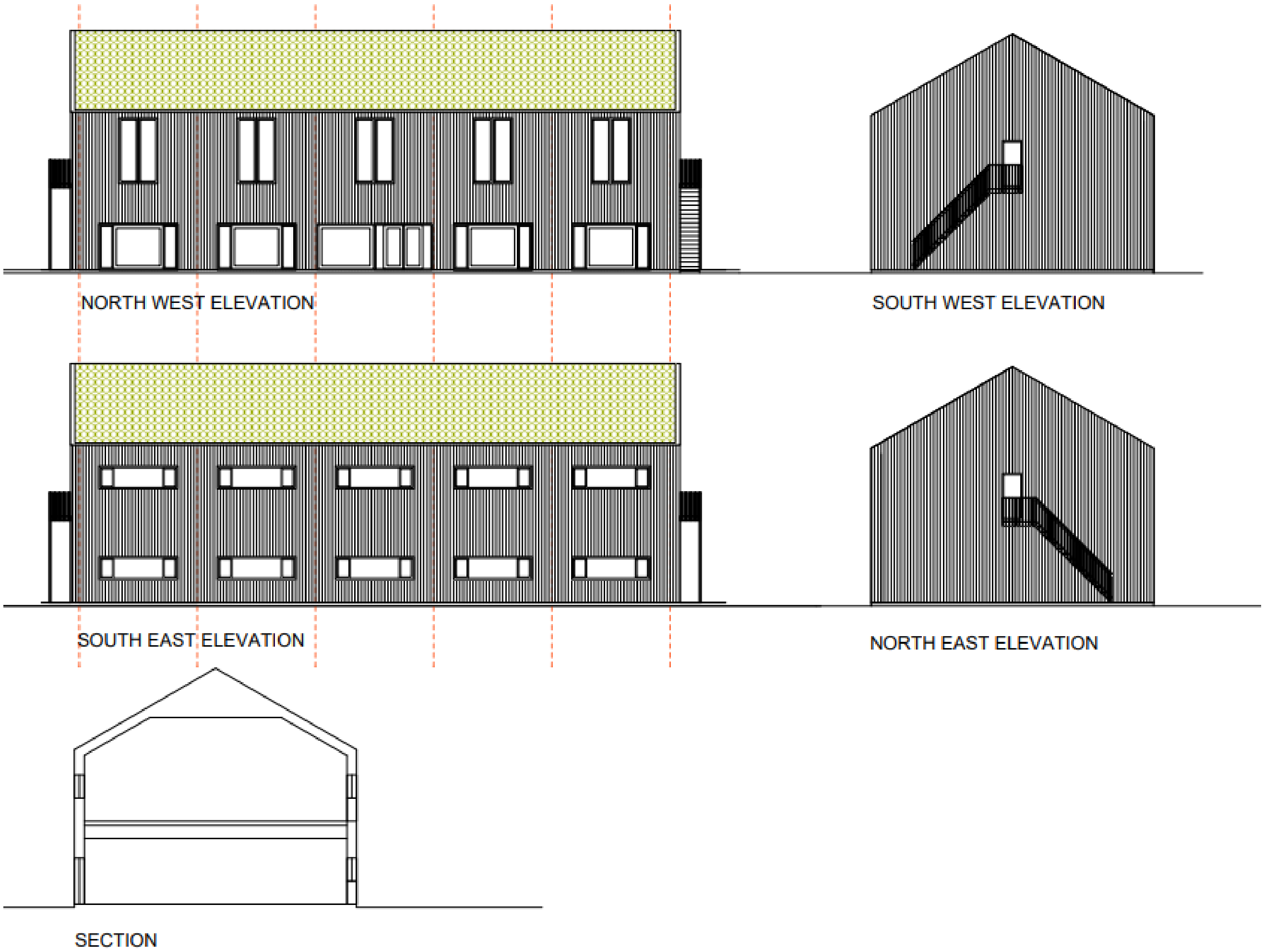


Figure 2 Proposed Elevations

1.8 Renewable and Low Carbon Energy

1.8.1 The below associated carbon emissions are based upon a notional specification mains gas boiler as per the approved document. the reductions in carbon emissions are mainly achieved by decarbonising the site and installation of heat pump technologies.

	Regulated Residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: Savings from energy demand reduction	0.0	0%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	0.8	44%
Cumulative on site savings	**0.8**	**44%**
Annual savings from off-set payment	1.1	-
	(Tonnes C02)	
Cumulative savings for off-set payment	32	-
Cash in-lieu contribution (£)	3.002	

Energy Demands

	Actual (kWh/m²)	Notional (kWh/m²)
Heating	10.5	13.91
Cooling	0	0
Auxiliary	2.11	1.01
Lighting	9	5.56
Hot Water	3.54	3.54
Equipment	39.92	39.92
Total	25.15	24.01

Energy Production

	Actual (kWh/m²)	Notional (kWh/m²)
Photovoltaic Systems	7.68	0
ASHP	10.5	13.91
Total Energy Demand	18.18	
Renewable Technology Supply	7.68	
% Of demand supplied via renewable technology	**42.25%**	

2. Methodology

2.1 Limitations

2.1.1 The calculations and figures utilised within this energy statement are based on Building regulations Part L methodology and should not be understood as a predictive assessment of likely future energy requirements. Other external factors will be present such as occupant system operation patterns and weather patterns.

2.2 Energy Hierarchy

2.2.1 The assessment has been carried out in accordance to the energy hierarchy method in line with GLA policy/s.

2.2.2 The energy hierarchy method has been utilised to ensure the design of the development has reduced the demand for energy as far as reasonably practicable prior to the consideration of integrating Low or Zero Carbon technologies.

2.3 Carbon Factors

2.3.1 The below emissions factors have been used within the calculations based on SAP10 emission factors.

Fuel	Emission Factor (kgC0^2/KWh)
Gas	0.210
Electricity	0.213

3. Be Lean Measures

3.1 Thermal insulation

3.1.1 In order to reduce the overall heating and cooling requirements for the development it is imperative that the development incorporates an efficient thermal envelope. The below elements have been considered for the development.

3.1.2 Fabric Insulation improvements on Building Regulations Part L minimum standards,

3.1.3 Improved glazing U & G Values for the development,

3.1.4 Low Energy lighting scheme adopted on site.

The table below outlines the u-value targets for the development in comparison to the limiting factor set out in Building regulations Part L.

Element	U-Value (W/m2K) Part L Limiting Factor Development
Ground Floor	0.18
External Façade	0.22
Pitched Roof	0.16
Ceiling	0.11
Glazing	1.4
Doors	1.6
Air Permeability	8
Low Energy Lighting	130 lm/W

4. Be Clean Measures

1.4 Low Carbon Energy Supply

1.4.1 The proposed development is not on the route of an existing heat network, and costs associated with connecting to and existing heat network have not been reviewed further within this document.

1.4.2 It is recommended that the site is development in a manner that will allow to connection to a district heating system in the future is one is to become feasible.

5. Be Green Measures

The following sections discuss the renewable energy generation measures that have been considered, and those which will be implemented at the Development.

Renewable technologies harness energy from the environment and convert this to a useful form. Many renewable technologies are available. However, not all these are commercially viable, suitable for city-centre locations or appropriate for the Development.

Technologies considered for the Development include:

- Solar Hot Water Panels (Solar Thermal)
- Photovoltaic (PV) Cells
- Combined Heat and Power (CHP) and Micro-CHP (mCHP)
- Ground Source Heat Pumps (GSHP)
- Air Source Heat Pumps (ASHP)
- Wind Turbines

5.1 Solar Hot Water Panels

5.1.1 Solar Hot Water Panels or, Solar Panels as they are commonly known, are used to supplement the energy required for the domestic hot water requirement. The system will collect and absorb solar radiation and transfer the heat directly to the storage tank.

5.1.2 The circulation may then be either 'passive' thus relying on the natural convection or 'active' using a pump which increases a system's efficiency but has additional costs for the controls and energy requirement.

5.1.3 There are two main types of solar panel collector available to the UK market. The first is Flat Plate Collectors which consist of a dark absorber sheet with pipes built into the sheet encased in a weatherproof box.

5.1.4 This will pump the collected solar radiation to the storage device to heat the water for use. The second main system is Evacuated Tube Collectors. These devices are more efficient and are effective under a "...wider range of conditions..." (TM38:2006) due to the energy being drawn from "...light rather than outside temperature..." This therefore allows this type of system to adapt to cooler climes.

5.1.5 Solar Hot Water Panels have been deemed possible for this development due to the available roof space. However, due the low demand on DHW, an alternative technology has been selected to further reduce the carbon emissions on site and to meet the financial and on-site feasibility.

5.2 Photovoltaic (PV) Cells

5.2.1 Solar panel electricity systems, also known as solar Photovoltaics' (PV), capture the sun's energy using photovoltaic cells. These cells do not need direct sunlight to work - they can still generate some electricity on a cloudy day. The cells convert the sunlight into electricity, which can be used to run household appliances and lighting.

5.2.2 PV cells are made from layers of semi-conducting material, usually silicon. When light shines on the cell it creates an electric field across the layers. The stronger the sunshine, the more electricity is produced. Groups of cells are mounted together in panels or modules that can be mounted on your roof.

5.2.3 The power of a PV cell is measured in kilowatts peak (kWp). That is the rate at which it generates energy at peak performance in full direct sunlight during the summer. PV cells come in a variety of shapes and sizes. Most PV systems are made up of panels that fit on top of an existing roof, but you can also fit solar tiles.

5.2.4 **Photovoltaic (PV) Cells have been considered and have been deemed viable for this site, the available roof space available would allow for a solar PV array.**

Location	Roof Mounted
Acoustic considerations	No acoustic considerations
Groundworks	No groundwork considerations
Export possible	Yes export possible to grid
Service Life	25-30 Years

5.3 Combined Heat and Power (CHP) and Micro-CHP (mCHP)

5.3.1 Micro-CHP' stands for micro combined heat and power. This technology generates heat and electricity simultaneously, from the same energy source, in individual homes or buildings. The main output of a micro-CHP system is heat, with some electricity generation, at a typical ratio of about 6:1 for domestic appliances.

5.3.2 A typical domestic system will generate up to 1kW of electricity once warmed up: the amount of electricity generated over a year depends on how long the system is able to run. Any electricity you generate and don't use can be sold back to the grid.

5.3.3 Domestic micro-CHP systems are currently powered by mains gas or LPG; in the future there may be models powered by oil or bio-liquids. Although gas and LPG are fossil fuels rather than renewable energy sources, the technology is still considered to be a 'low carbon technology' because it can be more efficient than just burning a fossil fuel for heat and getting electricity from the national grid. Micro-CHP systems are similar in size and shape to ordinary, domestic boilers and like them can be wall hung or floor standing. The only difference to a standard boiler is that they are able to generate electricity while they are heating water.

5.3.4 For the householder, there is little difference between a micro-CHP installation and a standard boiler. If the dwelling already has a conventional boiler then a micro-CHP unit should be able to replace it as it's roughly the same size. However, the installer must be approved under the Micro generation Certification Scheme. Servicing costs and maintenance are estimated to be similar to a standard boiler – although a specialist will be required.

5.3.5 **CHP and mCHP have been considered for the project, in order to house the system, an external additional plant area would be required and therefore the feasibility of the CHP has not been deemed acceptable or viable due to planning restrictions. Additionally the carbon reductions for the mCHP system does not meet the Local Authority requirements due to the low heat demand.**

5.4 Ground Source Heat Pumps (GSHP)

5.4.1 Ground source heat pumps use pipes which are buried in the garden to extract heat from the ground. This heat can then be used to heat radiators, underfloor or warm air heating systems and hot water in the home.

5.4.2 A ground source heat pump circulates a mixture of water and antifreeze around a loop of pipe - called a ground loop - which is buried in the garden. Heat from the ground is absorbed into the fluid and then passes through a heat exchanger into the heat pump. The ground stays at a constant temperature under the surface, so the heat pump can be used throughout the year - even in the middle of winter.

5.4.3 The length of the ground loop depends on the size of the home and the amount of heat needed. Longer loops can draw more heat from the ground, but need more space to be buried in. If space is limited, a vertical borehole can be drilled instead. Running costs will depend on several factors - including the size of the dwelling and how well insulated it is.

5.4.4 **Ground Source Heat Pump has been considered for this project and has not been deemed viable due to the available external space. A more suitable technology has been selected to reduce the carbon emissions as well as financial and on-site feasibility.**

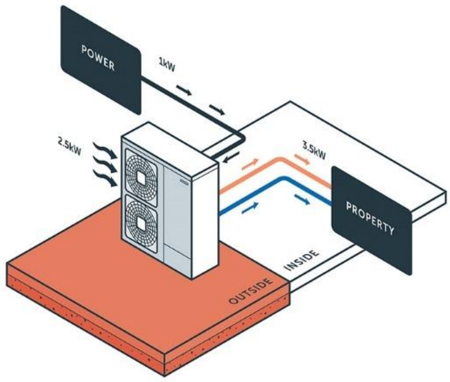
5.5 Air Source Heat Pumps (ASHP)

5.5.1 Air source heat pumps absorb heat from the outside air. This heat can then be used to heat radiators, underfloor heating systems, or warm air convectors and hot water in dwellings.

5.5.2 An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can get heat from the air even when the temperature is as low as -15° C. Heat pumps have some impact on the environment as they need electricity to run, but the heat they extract from the ground, air, or water is constantly being renewed naturally.

5.5.3 Running costs will vary depending on several factors - including the size of the home, and how well insulated it is, and what room temperatures are achieved.

5.5.4 **Air Source Heat Pump has been considered for the project and deemed a viable option for the project, the carbon reductions of the installation of a ASHP exceed the council requirements in carbon emissions. Therefore, this technology has been adopted for the main heating and DHW for this site.**



Location	Ground/External Façade/internally Mounted
Acoustic considerations	Noise impacts of Air source heat pumps should be considered due to pumps and plant located Externally.
Groundworks	No groundwork requirements
Export possible	Export of electricity to the grid is not possible for this technology
Maintenance	heat pumps are a low-maintenance heating option, it is still important to have them serviced regularly to make sure they are performing safely and efficiently
Service Life	20-25 years

*Proposed location of ASHP only, to be confirmed for feasibility and suitability.

5.6 Wind Turbines

5.6.1 Wind turbines harness the power of the wind and use it to generate electricity. Forty percent of all the wind energy in Europe blows over the UK, making it an ideal country for domestic turbines (known as 'microwind' or 'small-wind' turbines). A typical system in an exposed site could easily generate more power than a dwelling’s lights and electrical appliances use.

5.6.2 Wind turbines use large blades to catch the wind. When the wind blows, the blades are forced round, driving a turbine which generates electricity. The stronger the wind, the more electricity produced. There are two types of domestic-sized wind turbine:

5.6.3 **Pole mounted:** these are free standing and are erected in a suitably exposed position, often around 5kW to 6Kw

5.6.4 **Building mounted:** these are smaller than mast mounted systems and can be installed on the roof of a home where there is a suitable wind resource. Often these are around 1kW to 2kW in size. Wind turbines are eligible for the UK government’s Feed-in-Tariffs which means money can be earned from the electricity generated by the turbine. Payments for the electricity not use and export to the local grid are available as well. To be eligible, the installer and wind turbine product must be certified under the Microgeneration Certification Scheme (MCS). If the turbine is not connected to the local electricity grid (known as off grid), unused electricity can be stored in a battery for use when there is no wind. Please note that the Feed-in Tariffs scheme is not available in Northern Ireland.

5.6.5 **Wind Turbines have been considered for this project, Pole mounted wind turbine has been excluded due to nature of the development and building mounted would not achieve the required reductions on site to meet the local requirements, therefore this has not been explored further.**

5.7 Biomass

5.7.1 Energy from Biomass is produced by burning organic matter. Biomass fuel sources include trees, crops or animal dung are “...harvested and processed to create energy in the form of Electricity, Heat and Steam.” (TM38:2006) Biomass is carbon based and when used as a fuel, produces carbon emissions. However, the carbon emitted during the combustion process is “...equivalent to the amount absorbed during growth...” (TM38:2006) The only carbon emissions associated with this energy source is treatment and transportation costs of the fuel to the end user.

5.7.2 Carbon savings that can be attributed to this technology type are significant. Biomass boiler installation can “...deliver all of the heating requirements for a building...using an almost carbon neutral fuel source.” (TM38:2005) Biomass can be cost effective when directly compared to convention as oil and electricity heating sources. The benefit can be increased when the biomass source, for example wood chips, is diverted from the waste stream. However, maintenance requirements of a biomass system are higher and should be taken into account when installing one. Additionally, the UK introduced the Clean Air Act (1993) (www.uksmokecontrolareas.co.uk) to control the smoke pollution in areas caused by burning of smoky fuels.

5.7.3 **Biomass been considered for the project, in order to house the system, an external additional plant area would be required and therefore the feasibility of the CHP has not been deemed acceptable or viable due to planning restrictions. If planning restrictions are limited on Biomass it is recommended to review the financial feasibility as the Biomass option exceeds the planning requirements.**

5.8 Summary of Be Green Measures

Technology	**Deemed Viable**	**Adopted on site**
Solar Hot Water Panels (Solar Thermal)	✔	✖
Photovoltaic (PV) Cells	✔	✔
Combined Heat and Power (CHP) and Micro-CHP (mCHP)	✖	✖
Ground Source Heat Pumps (GSHP)	✖	✖
Air Source Heat Pumps (ASHP)	✔	✔
Wind Turbines	✖	✖
Biomass	✖	✖

	Regulated Residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: Savings from energy demand reduction	0.0	0%
Be clean: Savings from heat network	0.0	0%
Be green: Savings from renewable energy	0.8	44%
Cumulative on site savings	**0.8**	**44%**
Annual savings from off-set payment	1.1	-
	(Tonnes C02)	
Cumulative savings for off-set payment	32	-
Cash in-lieu contribution (£)	3,002	

Energy Demands

	Actual (kWh/m²)	Notional (kWh/m²)
Heating	10.5	13.91
Cooling	0	0
Auxiliary	2.11	1.01
Lighting	9	5.56
Hot Water	3.54	3.54
Equipment	39.92	39.92
Total	25.15	24.01

Energy Production

	Actual (kWh/m²)	Notional (kWh/m²)
Photovoltaic Systems	7.68	0
ASHP	10.5	13.91

6. Conclusion

6.0.1 After reviewing the above renewable technologies, Air source Heat Pump and Solar PV has been identified as the most viable options to achieve the criteria set out by the local authority. The key focus on site was to minimise heat loss and reduce the regulated energy consumption on-site through utilisation of the energy hierarchy.

7. Summary of energy efficient measures

Element	U-Value (W/m2K) Part L Limiting Factor Development
Ground Floor	0.18
External Façade	0.22
Pitched Roof	0.16
Glazing	1.4
Doors	1.6
Air Permeability	8
Low Energy Lighting	130 lm/W

7.1 Summary of renewable or Low Carbon measures

Element	
Main Heating System	Air Source Heat Pump
Hot Water System	Instant hot water no storage
Renewable Technologies	8 kWp Solar PV and 4.5 SCOP ASHP
Mechanical Ventilation Heat Recovery System	N/A

BRUKL Output Document

HM Government

Compliance with England Building Regulations Part L 2021

Project name

Offices space-Be Green

As designed

Date: Wed Nov 05 11:12:22 2025

Administrative information

Building Details

Address: Boundary Road, Haverhill, Suffolk, Postcode

Certifier details

Name: Dr Bilal Alsheglawi

Telephone number: 01625 315040

Address: Suite F6.3 (B), Adelphi Mill, Grimshaw Lane, Bollington. , Macclesfield, SK10 5JB

Certification tool

Calculation engine: SBEM

Calculation engine version: v6.1.e.2

Interface to calculation engine: Virtual Environment

Interface to calculation engine version: v7.0.29

BRUKL compliance module version: v6.1.e.1

Foundation area [m²]: 393.05

The CO_2 emission and primary energy rates of the building must not exceed the targets

Target CO_2 emission rate (TER), $kgCO_2/m^2.annum$	3.47	
Building CO_2 emission rate (BER), $kgCO_2/m^2.annum$	2.68	
Target primary energy rate (TPER), $kWh_{PE}/m^2.annum$	36.26	
Building primary energy rate (BPER), $kWh_{PE}/m^2.annum$	27.41	
Do the building's emission and primary energy rates exceed the targets?	BER =< TER	BPER =< TPER

The performance of the building fabric and fixed building services should achieve reasonable overall standards of energy efficiency

Fabric element	$U_{a-Limit}$	U_{a-Calc}	U_{i-Calc}	First surface with maximum value
Walls*	0.26	0.26	0.26	GF000000_W1
Floors	0.18	0.18	0.18	GF000000_F
Pitched roofs	0.16	0.16	0.16	FF000000_C
Flat roofs	0.18	-	-	No heat loss flat roofs
Windows** and roof windows	1.6	1.34	1.34	GF000000_W2_O0
Rooflights***	2.2	-	-	No external rooflights
Personnel doors^	1.6	1.55	1.55	GF000000_W1_O0
Vehicle access & similar large doors	1.3	-	-	No external vehicle access doors
High usage entrance doors	3	-	-	No external high usage entrance doors

$U_{a-Limit}$ = Limiting area-weighted average U-values [W/(m²K)]
U_{a-Calc} = Calculated area-weighted average U-values [W/(m²K)]
U_{i-Calc} = Calculated maximum individual element U-values [W/(m²K)]

* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.

** Display windows and similar glazing are excluded from the U-value check.

*** Values for rooflights refer to the horizontal position.

^ For fire doors, limiting U-value is 1.8 W/m²K

NB: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	8

Building services

For details on the standard values listed below, system-specific guidance, and additional regulatory requirements, refer to the Approved Documents.

Whole building lighting automatic monitoring & targeting with alarms for out-of-range values	YES
Whole building electric power factor achieved by power factor correction	<0.9

1- ASHP-4.5

	Heating efficiency	**Cooling efficiency**	**Radiant efficiency**	**SFP [W/(l/s)]**	**HR efficiency**
This system	4.5	-	-	-	-
Standard value	2.5*	N/A	N/A	N/A	N/A
Automatic monitoring & targeting with alarms for out-of-range values for this HVAC system					NO

* Standard shown is for all types >12 kW output, except absorption and gas engine heat pumps.

1- SYST0001-DHW

	Water heating efficiency	**Storage loss factor [kWh/litre per day]**
This building	1	-
Standard value	1	N/A

Zone-level mechanical ventilation, exhaust, and terminal units

ID	**System type in the Approved Documents**
A	Local supply or extract ventilation units
B	Zonal supply system where the fan is remote from the zone
C	Zonal extract system where the fan is remote from the zone
D	Zonal balanced supply and extract ventilation system
E	Local balanced supply and extract ventilation units
F	Other local ventilation units
G	Fan assisted terminal variable air volume units
H	Fan coil units
I	Kitchen extract with the fan remote from the zone and a grease filter

NB: Limiting SFP may be increased by the amounts specified in the Approved Documents if the installation includes particular components.

Zone name	**SFP [W/(l/s)]**									**HR efficiency**	
ID of system type	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**H**	**I**		
Standard value	0.3	1.1	0.5	2.3	2	0.5	0.5	0.4	1	**Zone**	**Standard**
GF-WC	0.2	-	-	-	-	-	-	-	-	-	N/A
FF-WC	0.2	-	-	-	-	-	-	-	-	-	N/A

General lighting and display lighting	**General luminaire**	**Display light source**	
Zone name	**Efficacy [lm/W]**	**Efficacy [lm/W]**	**Power density [W/m²]**
Standard value	95	80	0.3
GF-Office	130	-	-
GF-WC	130	-	-
GF-Tea Point	130	-	-
GF-Tea Point	130	-	-
GF-Lift	130	-	-
FF-Office space	130	-	-
FF-WC	130	-	-
FF-Tea Point	130	-	-

General lighting and display lighting	General luminaire	Display light source	
Zone name	Efficacy [lm/W]	Efficacy [lm/W]	Power density [W/m²]
Standard value	95	80	0.3
FF-Tea Point	130	-	-
FF-Lift	130	-	-
FF-Hallway	130	-	-
FF-Stairs	130	-	-
GF-Lobby	130	-	-

The spaces in the building should have appropriate passive control measures to limit solar gains in summer

Zone	Solar gain limit exceeded? (%)	Internal blinds used?
GF-Office	NO (-38.4%)	NO
GF-Tea Point	N/A	N/A
GF-Tea Point	N/A	N/A
FF-Office space	NO (-50.1%)	NO
FF-Tea Point	N/A	N/A
FF-Tea Point	N/A	N/A

Regulation 25A: Consideration of high efficiency alternative energy systems

Were alternative energy systems considered and analysed as part of the design process?	NO
Is evidence of such assessment available as a separate submission?	NO
Are any such measures included in the proposed design?	NO

Technical Data Sheet (Actual vs. Notional Building)

Building Global Parameters

	Actual	Notional
Floor area [m^2]	786.1	786.1
External area [m^2]	1529.7	1529.7
Weather	NOR	NOR
Infiltration [m^3/hm^2@ 50Pa]	8	3
Average conductance [W/K]	445.58	560.25
Average U-value [W/m^2K]	0.29	0.37
Alpha value* [%]	23.39	16.99

* Percentage of the building's average heat transfer coefficient which is due to thermal bridging

Building Use

% Area	Building Type
	Retail/Financial and Professional Services
	Restaurants and Cafes/Drinking Establishments/Takeaways
100	**Offices and Workshop Businesses**
	General Industrial and Special Industrial Groups
	Storage or Distribution
	Hotels
	Residential Institutions: Hospitals and Care Homes
	Residential Institutions: Residential Schools
	Residential Institutions: Universities and Colleges
	Secure Residential Institutions
	Residential Spaces
	Non-residential Institutions: Community/Day Centre
	Non-residential Institutions: Libraries, Museums, and Galleries
	Non-residential Institutions: Education
	Non-residential Institutions: Primary Health Care Building
	Non-residential Institutions: Crown and County Courts
	General Assembly and Leisure, Night Clubs, and Theatres
	Others: Passenger Terminals
	Others: Emergency Services
	Others: Miscellaneous 24hr Activities
	Others: Car Parks 24 hrs
	Others: Stand Alone Utility Block

Energy Consumption by End Use [kWh/m^2]

	Actual	Notional
Heating	10.5	13.91
Cooling	0	0
Auxiliary	2.11	1.01
Lighting	9	5.56
Hot water	3.54	3.54
Equipment*	39.92	39.92
TOTAL**	**25.15**	**24.01**

* Energy used by equipment does not count towards the total for consumption or calculating emissions.
** Total is net of any electrical energy displaced by CHP generators, if applicable.

Energy Production by Technology [kWh/m^2]

	Actual	Notional
Photovoltaic systems	7.68	0
Wind turbines	0	0
CHP generators	0	0
Solar thermal systems	0	0
Displaced electricity	*7.68*	*0*

Energy & CO_2 Emissions Summary

	Actual	Notional
Heating + cooling demand [MJ/m^2]	229.27	208.13
Primary energy [kWh_{PE}/m^2]	27.41	36.26
Total emissions [kg/m^2]	2.68	3.47

HVAC Systems Performance

System Type		Heat dem MJ/m2	Cool dem MJ/m2	Heat con kWh/m2	Cool con kWh/m2	Aux con kWh/m2	Heat SSEEF	Cool SSEER	Heat gen SEFF	Cool gen SEER
[ST] Central heating using water: radiators, [HS] ASHP, [HFT] Electricity, [CFT] Electricity										
	Actual	151.8	77.5	10.5	0	2.1	4.01	0	4.5	0
	Notional	132.2	75.9	13.9	0	1	2.64	0	----	----

Key to terms

Heat dem [MJ/m2]	= Heating energy demand
Cool dem [MJ/m2]	= Cooling energy demand
Heat con [kWh/m2]	= Heating energy consumption
Cool con [kWh/m2]	= Cooling energy consumption
Aux con [kWh/m2]	= Auxiliary energy consumption
Heat SSEFF	= Heating system seasonal efficiency (for notional building, value depends on activity glazing class)
Cool SSEER	= Cooling system seasonal energy efficiency ratio
Heat gen SSEFF	= Heating generator seasonal efficiency
Cool gen SSEER	= Cooling generator seasonal energy efficiency ratio
ST	= System type
HS	= Heat source
HFT	= Heating fuel type
CFT	= Cooling fuel type