VISION
ENERGY

ENERGY STATEMENT

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SAP04579 Energy Statement Proposed Annexe at 3 Gyles Court

Newquay, Cornwall

TR7 3ER

Document Version

REV	DATE	DESCRIPTION	PREPARED	CHECKED
1	12/03/2024	First Draft V1	M. Páez	D. Barsted

Contents

1. Executive Summary

1.1 Introduction

1.1.1 This energy strategy has been prepared on behalf of Kairos Architecture, hereafter referred to as the Applicant, in support of a full planning application for the development known as 3 Gyles Court, Newquay, Cornwall, TR7 3ER, hereafter referred to as the Development.

1.2 Policies and Requirements

1.2.1 National Policies

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

1.2.2 National Planning Policy Framework

1.2.2.1 The National Planning Policy Framework sets out the Government's planning policies for England and how these should be applied.

1.2.2.2 It provides a framework within which locally-prepared plans for housing and other development can be produced.

1.2.3 Building Regulations Approved Document Part L

1.2.3.1 Part L of Building Regulations covers the conservation of fuel and power, Notional specifications have been designed as a benchmarking tool to assess against.

1.2.3.2 The DER (Dwelling Emission Rate) can therefore be assessed against the notional specification TER (Target Emission Rate).

1.2.3.3 As the proposed development contains existing structures, a notional baseline calculation has been calculated in the place of the TER (Target Emission Rate) targets.

1.2.4 **Local Policies**

1.2.4.1 Below outlines the local policies this energy statement has been developed in accordance with,

1.2.5 **Cornwall Local Plan 2010-2030**

1.2.5.1 Policy 1: Presumption in favour of sustainable development

1.2.5.1.1 When considering development proposals the Council will take a positive approach that refects the presumption in favour of sustainable development contained in the National Planning Policy Framework and set out by the policies of this Local Plan.

1.2.5.1.2 We will work with applicants, infrastructure providers and the local community to fnd solutions which mean that proposals will be approved wherever possible, and to secure development that improves the economic, social and environmental conditions in the area.

1.2.5.1.3 Planning applications that accord with the policies in this Local Plan and supporting Development Plan (including, where relevant, with policies in Neighbourhood Plans) will be regarded as sustainable development and be approved, unless material considerations indicate otherwise.

1.2.5.1.4 When considering whether a development proposal is sustainable or not, account will be taken of its location, layout, design and use against the three pillars of economic development, social development and environmental protection and improvement.

1.2.5.1.5 Where there are no policies relevant to the application or relevant policies are out of date at the time of making the decision the Council will grant permission unless material considerations indicate otherwise – taking into account whether: a) Any adverse impacts of granting permission would signifcantly and demonstrably outweigh the benefts, when assessed against the policies in the National Planning Policy Framework taken as a whole; or b) Specifc policies in that Framework indicate that development should be restricted.

1.2.5.2 Policy 14: Renewable and low carbon energy

1.2.5.2.1 1. To increase use and production of renewable and low carbon energy generation development proposals will be supported that: a. maximise the use of the available resource by deploying installations with the greatest energy output practicable taking into account the provisions of this Plan; b. make use, or ofer genuine potential for use, of any waste heat produced; and c. in the case of wind turbines, they are within an area allocated by Neighbourhood Plans for wind power and avoid, or adequately mitigate shadow ficker, noise and adverse impact on air trafc operations, radar and air navigational installations; and d. do not have an overshadowing or overbearing efect on nearby habitations. e. in the case of solar development, noise, glint and glare is mitigated adequately.

1.2.5.2.2 2.Support will be given to renewable and low carbon energy generation developments that: a. are led by, or meet the needs of local communities; and b. create opportunities for colocation of energy producers with energy users, in particular heat, and facilitate renewable and low carbon energy innovation.

1.2.5.2.3 3. When considering such proposals, regard will be given to the wider benefts of providing energy from renewable sources, as well as the potential efects on the local environment; including any cumulative impact of these proposals.

1.2.5.2.4 4. In and within the setting of Areas of Outstanding Natural Beauty and undeveloped coast, developments will only be permitted in exceptional circumstances and should generally be very small scale in order that the natural beauty of these areas may be conserved.

1.2.5.2.5 5. When considering proposals for renewables that impact upon the Area of Outstanding Natural Beauty and its setting and / or the World Heritage Site or other historic assets and their settings, applicants should apply other relevant policies in the Plan.

1.3 Assessment Methodology

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

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

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

1.3.1.3 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 Improved glazing U & G Values for the development,

1.4.5 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,

1.5.2 Therefore, this option will not be explored further within this energy statement.

1.5.3 The proposed site sits within a Heat Network Priority Area; therefore, 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.

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.

1.6.2 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 The proposed development is set as 3 Gyles Court, Newquay, Cornwall, TR7 3ER

1.7.2 The proposed works to the site is the construction of a 1no. new build dwelling.

1.7.3 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.

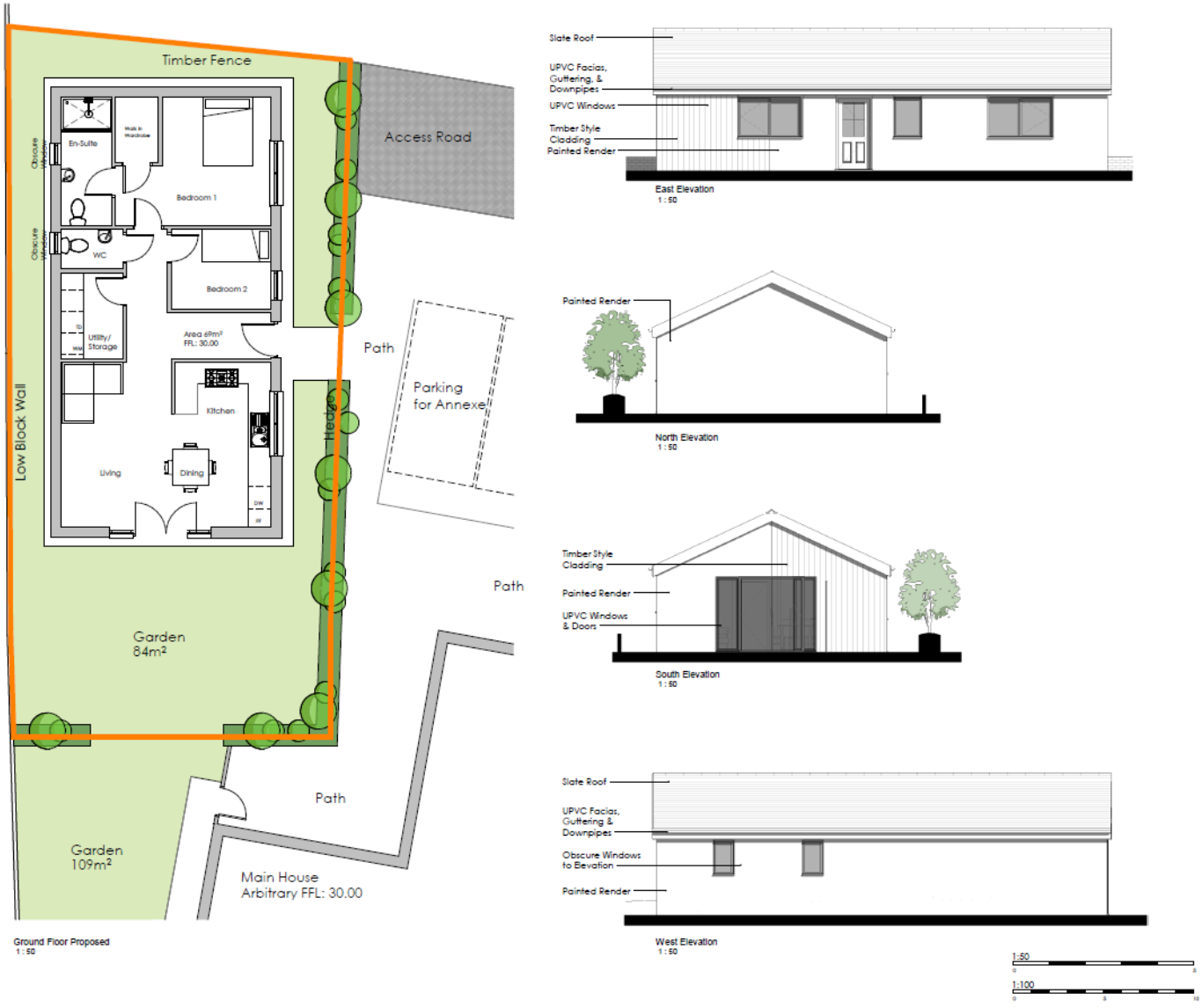


Fig.1 Proposed Floor Plans

1.8 Renewable and Low Carbon Energy

	Regulated domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.2	25%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.6	91%
Cumulative on site savings	0.8	117%

	Regulated domestic carbon dioxide
	(Tonnes CO_2 per annum)
Baseline Carbon Emissions (Part L2021 standards)	0.7
After Be Lean Measures	0.5
After Be Green Measures	-0.1

	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	42.52	37.36	12%

	Space Heat Demand	**Total Energy Use**	**Renewable Generation**	**Renewable Deficit**
	kWh/m2 tfa/yr	**kWh/m2 GIA/yr**	**% total energy**	**kWh/year**
	Required Values			
	>30	>40	100%	0
Plot 1	28.6	38	118	0

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.

2.1.2 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

3.0.1 The following sections details the design measures that have been considered/to be implemented at the development.

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.

3.1.2 The below elements have been considered for the development.

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

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

3.1.5 Improved glazing U & G Values for the development,

3.1.6 Low Energy lighting scheme adopted on site.

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

	U-Value (W/m2K)
Element	Development
Ground Floor (New Element Table 4.2)	0.11
External Façade (New Element Table 4.2)	0.16
Cold Roof (New Element Table 4.2)	0.11
Glazing	1.2
Doors	1.2
Air Permeability	0.6
Low Energy Lighting	120 lm/W
Thermal Bridging (Y-Value)	Y=0.049 Target

4. Be Clean Measures

4.1 Low Carbon Energy Supply

4.1.1 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.

4.1.2 Therefore, this option will not be explored further within this energy statement.

5. Be Green Measures

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

5.0.2 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.

5.0.3 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.

5.1.5 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.

5.1.6 **Solar Hot Water Panels have been deemed possible for this development due to the available roof space and DHW demand, the available roof space would allow the design to fully support the DHW. However, 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, and therefore this technology has been adopted alongside other technologies.**

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.**

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.**

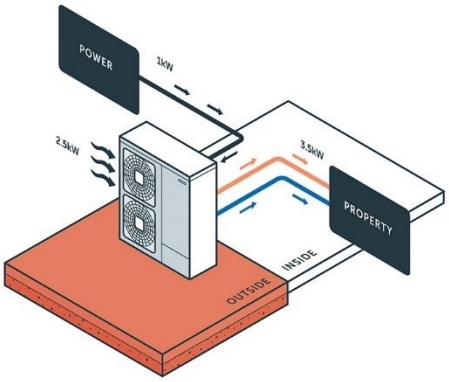
5.5 Air Source Heat Pumps (ASHP)

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 in conjunction with solar PV. 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 domestic carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.2	25%
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	Target Fabric Energy Efficiency (kWh/m²)	Dwelling Fabric Energy Efficiency (kWh/m²)	Improvement (%)
Development total	42.52	37.36	12%

	Space Heat Demand	**Total Energy Use**	**Renewable Generation**	**Renewable Deficit**
	kWh/m2 tfa/yr	**kWh/m2 GIA/yr**	**% total energy**	**kWh/year**
	Required Values			
	>30	>40	100%	0
Plot 1	28.6	38	118	0

6. Conclusion

6.1.1 After reviewing the above renewable technologies, Air source Heat Pump & Solar PV have been identified as the most viable options to achieve the criteria set out by the local authority.

6.1.2 The development has been deemed viable for additional measures and therefore it is recommended to explore the financial feasibility of these options to maximise the reduction in carbon emissions on site.

6.1.3 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) Development
Ground Floor (New Element Table 4.2)	0.11
External Façade (New Element Table 4.2)	0.16
Cold Roof (New Element Table 4.2)	0.11
Glazing	1.2
Doors	1.2
Air Permeability	0.6
Low Energy Lighting	120 lm/W
Thermal Bridging (Y-Value)	Y=0.049 Target

7.1 Summary of renewable or Low Carbon measures

Element	
Main Heating System	Mitsubishi Ecodan 5.0kW ASHP or equivalent
Hot Water System	Provided via Main Heating System with 150L cylinder
Renewable Technologies	4kWp Solar PV facing West
Mechanical Ventilation Heat Recovery System	Vent Axia Sentinel Kinetic B or Equivalent

7.2 Appendix 1 – SAP Documents

7.2.1 SAP documentation has been included in a separate folder and is to be used in conjunction with this document to validate figures and reductions.