# Sustainability and Energy Strategy

**20 Crediton Hill**
Prepared for Scenario Architecture
May 2023

envision

| Revision | Date |
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| Author | Signature |
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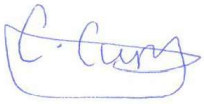
| Hayden Shipp BEng (Hons) |  |
| **Checked & Authorised** | **Signature** |
| Charlie Curry OCDEA |  |

**London Office 0207 486 0680** **Oxford Office 01865 598698**

**contact@envisioneco.com**

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# EXECUTIVE SUMMARY

1. This Sustainability and Energy Statement, has been prepared by Envision on Scenario Architecture's behalf and is submitted in support of a full planning application for the construction of a 3 storey, 4 bedroom house.

2. The primary purpose of this document is to explain how the scheme can meet the London Borough of Camden's sustainability policies. Envision has undertaken a review of the relevant policies and worked with the design team to determine and agree the relevance and approach that should be taken to fulfil each policy.

## Summary of Sustainability Strategy

3. The scheme will deliver a series of sustainability measures which are compatible with both the London Plan and Camden's requirements for sustainable design and construction:

- Sustainable material selections with timber to be procured with Forest Stewardship Council accreditation and the main contractor to adopt best practice measures to reduce water and energy use through construction;
- The development of a Site Waste Management Plan to ensure waste generation is minimised during construction;
- Cycle storage and EV charging stations to promote sustainable modes of transport, have been incorporated.
- Development of a sustainable procurement plan by the contractor to maximise the environmental performance of chosen materials; and
- Water conservation measures within the units to comply with 105 litres / bedspace per day.

## Summary of Energy Strategy

4. In line with the policy CC1, the applicant has sought to make the fullest contribution to minimising $CO_2$ emissions in line with the London Plan Energy Hierarchy.

5. Envision has produced Part L1 2021 compliant SAP model in order to determine the energy and $CO_2$ emissions for the proposed development. These have been calculated using FSAP 10.2 Software version 1.0.78. with detailed calculations provided in Appendix II. This is in line with the *'Part L 2021 and the Energy Assessment Guidance 2022'*

6. Policy CC1 requires all developments to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation.

- This will be achieved through the incorporation of passive design measures, and efficient fabric including triple-glazed windows.
- Reduced Air Permeability, lower than standard Buildings Regulations;
- Reduction in solar gain through the use of lower g-values on glazing;

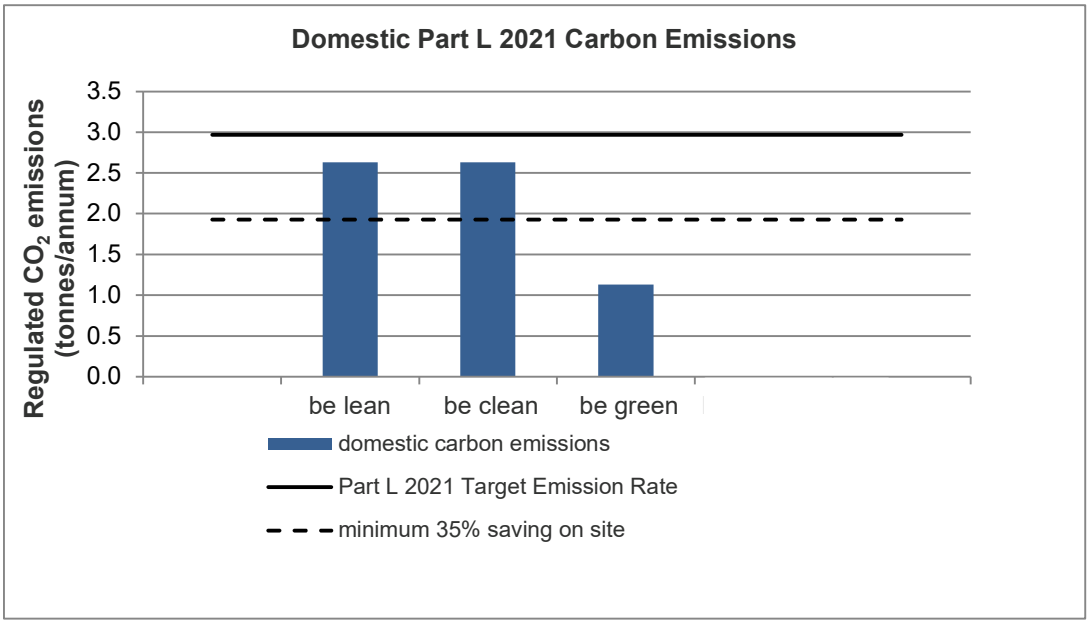
- High efficiency LED throughout the development;
- Efficient, electric systems have been specified including two highly efficient heat pump systems for the heating and hot water.

## Carbon Savings Predicted

7. As seen in the table below, the development reduces $CO_2$ emissions by 1.1 tonnes.$CO_2$.year, equal to a 62% saving beyond the Part L Target and thereby complying with Camden's Local Policy of achieving a 19% reduction in dwelling emissions below the building regulations Part L.

**Table A.1 – Final $CO_2$ Reductions Chart**

| | Regulated residential carbon dioxide savings | |
|---|---|---|
| | (Tonnes CO2 per annum) | (%) |
| **Be lean: savings from energy demand reduction** | 0.3 | 11% |
| **Be clean: savings from heat network** | - | - |
| **Be green: savings from renewable energy** | 1.5 | 51% |
| **Cumulative on site savings** | 1.8 | 62% |



# 1 INTRODUCTION

1.1 Envision has been appointed by the client, Sendi & Daniel Young to produce a Sustainability and Energy Statement in support of a full planning application for the demolition of an existing residential dwelling to construct a new, sustainable, 4 bedroom house.

1.2 Full planning permission is sought for the following works: "Demolition of the existing building and the erection of a 2 storey (plus basement) family dwellinghouse."

## Scope

1.3 The primary purpose of this statement is to explain how best practice sustainable design and construction measures would be incorporated in the proposed development to ensure alignment with local planning policy.

1.4 Section 4 (Energy Assessment) sets the parameters of detailed design, but remains at a strategic level. The calculations in this document are an indication of system size and carbon emissions based on guidance documents, approved software and practical experience. They are not design calculations but establish the viability and feasibility of various technologies for the proposed development.

1.5 This statement is structured as follows:

- The remainder of this section provides a description of the site and the development proposals;
- Section 2 provides a description of the main sustainability and energy policies relevant to the application;
- Section 3 details the sustainable design measures incorporated into the design;
- Section 4 includes the Energy Statement, including measures proposed to reduce energy demand and carbon dioxide in operation;
- Section 5 provides a concluding summary.

## Site Location and Existing Situation

1.6 The site comprises of an existing building which compromises a number of individual residential flats, with the land being developed located to the rear which contains and existing shed/garage to be demolished.

1.7 The overall site is approximately 560m² with the existing dwelling's footprint consisting of approximately 20% of this.


Figure 1.1 – Site Location

## The Proposed Development

1.8 The proposal entails the demolition of the existing building and the erection of a new family dwelling sited at the rear of no.20 Crediton Hill. The dwelling proposes a lower ground floor, plus ground and mezzanine with 4 bedrooms.

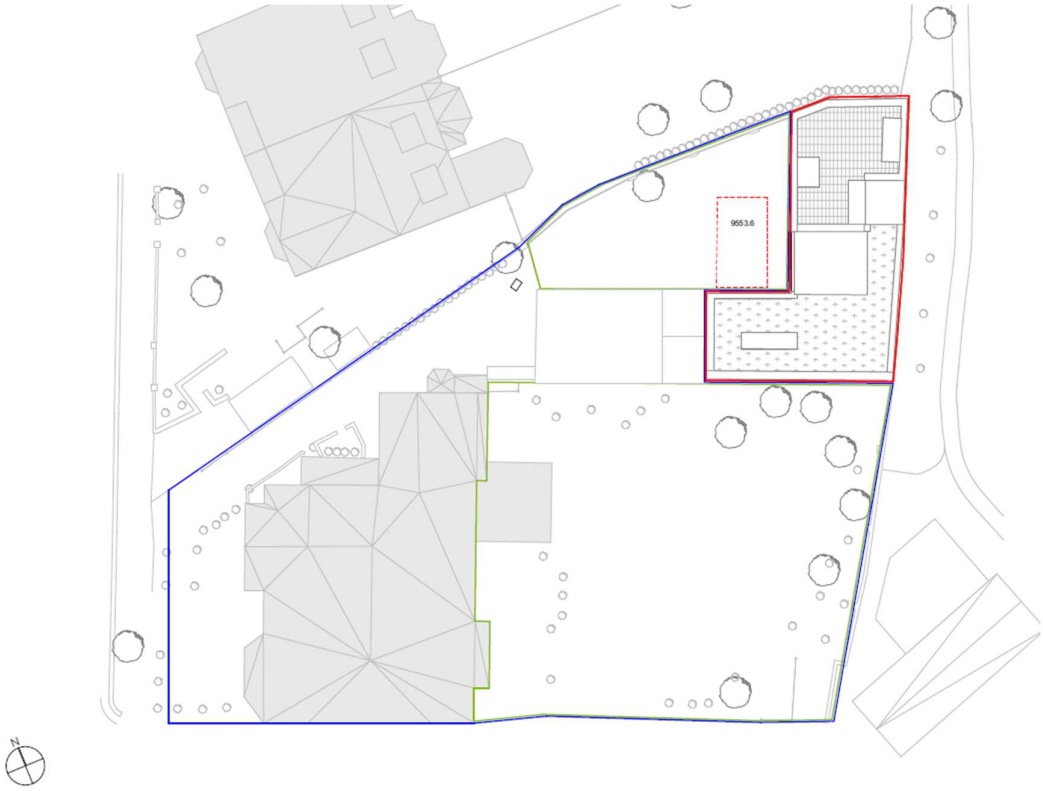


Figure 1.2 – Proposed Site Layout

# 2 SUSTAINABILITY & ENERGY POLICY CONTEXT

2.1 Many definitions of sustainable development exist, although the common objective for all is the integration of economic, social and environmental issues to ensure a better quality of life for people today, without compromising the needs of future generations. A key mechanism for delivering the principles of sustainable development lies within the UK planning system, which is implemented through national guidance and local planning policies. A review of all the relevant policy, regulatory and energy guidance documents was undertaken to gain an understanding of the guiding requirements for sustainability.

## National Planning Policy Framework

2.2 The revised National Planning Policy Framework (NPPF) was released on 20th July 2021. This replaces the previous National Planning Policy Framework published in March 2012, revised in July 2018 and updated in February 2019. It sets out the framework for all planning policy in England and how these policies are expected to be applied. 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. At a similarly high level, members of the United Nations – including the United Kingdom – have agreed to pursue the 17 Global Goals for Sustainable Development in the period to 2030. These address social progress, economic well-being and environmental protection.

2.3 The NPPF sets out a presumption in favour of sustainable development, and the need to support economic growth through the planning system. Achieving sustainable development means that the planning system has three overarching objectives, which are interdependent and need to be pursued in mutually supportive ways (so that opportunities can be taken to secure net gains across each of the different objectives):

a. an economic objective – to help build a strong, responsive and competitive economy, by ensuring that sufficient land of the right types is available in the right places and at the right time to support growth, innovation and improved productivity; and by identifying and coordinating the provision of infrastructure;

b. a social objective – to support strong, vibrant and healthy communities, by ensuring that a sufficient number and range of homes can be provided to meet the needs of present and future generations; and by fostering well-designed, beautiful and safe places, with accessible services and open spaces that reflect current and future needs and support communities' health, social and cultural well-being; and

c. an environmental objective – to protect and enhance our natural, built and historic environment; including making effective use of land, improving biodiversity, using natural resources prudently, minimising waste and pollution, and mitigating and adapting to climate change, including moving to a low carbon economy.

2.4 Planning plays a key role in helping shape places to radical reductions in greenhouse gas emissions, minimising vulnerability and providing resilience to the impacts of climate change, and supporting the delivery of renewable and low carbon energy and associated infrastructure. This

is central to the economic, social and environmental dimensions of sustainable development. The NPPF does not include detailed measures on sustainable design codes and standards to apply, although expects that when setting any local requirement for a building's sustainability, local planning authorities should do so in a way consistent with the national technical standards.

## London Plan Policy

2.5 The London Plan (2021) sets out the Mayor's vision for London. In accordance with the NPPF, it promotes economic development, and endorses the principles of sustainable development. It is the main vehicle for strategic decision-making on London's development, including development decisions. The Plan contains a number of policies directly related to a development's sustainable design and energy reduction, including:

- Policy G1 Green Infrastructure;
- Policy G5 Urban Greening;
- Policy G 6 Biodiversity and Access to Nature;
- Policy SI 1 Improving Air Quality;
- Policy SI 2 Minimising greenhouse gas emissions;
- Policy SI 3 Energy Infrastructure;
- Policy SI 4 Managing heat risk;
- Policy SI 7 Reducing Waste and supporting the circular economy;
- Policy SI 12 Flood Risk Management;
- Policy SI 13 Sustainable Drainage; and
- Policy T 5 Cycling.
- Policy T6.1 Residential Parking.

2.6 Of particular importance to the $CO_2$ and Energy reductions required for a development is *Policy SI-2: Minimising carbon dioxide emissions.*

2.7 Policy SI2 requires that development proposals should make the fullest contribution to minimising carbon dioxide emissions in accordance with the following energy hierarchy:

a. Be Lean: use less energy and manage demand during operation;

b. Be Clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly; and

c. Be Green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.

## London Borough of Camden Planning Policy

2.8 The Council aims to tackle the causes of climate change in the borough by ensuring developments use less energy and assess the feasibility of decentralised energy and renewable energy technologies

2.9 Green Action for Change: Camden's environmental sustainability plan (2011- 2020) commits Camden to a 27% borough wide Carbon Dioxide (CO2) reduction by 2017 and a 40% borough wide CO2 reduction by 2020 (London carbon reduction target). Over 90% of Camden's carbon dioxide emissions are produced by the operation of buildings.

2.10 Any new development in Camden has the potential to increase carbon dioxide emissions in the borough. If we are to achieve local, and support national, carbon dioxide reduction targets, it is crucial that planning policy limits carbon dioxide emissions from new development wherever possible and supports sensitive energy efficiency improvements to existing buildings.

2.11 Policy CC1 Climate Change Mitigation – requires all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation. Camden will:

- Promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;
- Require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met – noting that these standards are not directly required for single householder applications.
- Ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks.
- Support and encourage sensitive energy efficiency improvements to existing buildings;
- Require all proposals that involve substantial demolition to demonstrate that it is not possible to retain and improve the existing building; and
- Expect all developments to optimise resource efficiency.

2.12 The Local Plan details that 'All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L'. This policy will require the development to achieve an overall saving carbon saving of 19% below the new Part L 2021 regulations.

## GLA Guidance on Preparing Energy Assessments

2.13 The GLA guidance on preparing energy assessments (2022) provides a detailed methodology on how to demonstrate a reduction in $CO_2$ emissions for new development. The new guidance explains how London Plan policies apply now that Part L 2021 has taken effect, and the updates made to the GLA's carbon emissions reporting spreadsheet and how to determine the CO2 emissions baseline under Part L 2021.

2.14 This explains the updates made to the GLA's carbon emissions reporting spreadsheet and how to determine the $CO_2$ emissions baseline under Part L 2021. This guidance document explains how to prepare an energy assessment to accompany strategic planning applications referred to the Mayor. Although primarily aimed at strategic planning applications, London boroughs are encouraged to apply the same structure for energy assessments related to non-referable applications and adapt it for relevant scales of development.

2.15 Applicant's in London must continue to meet the London Plan net zero carbon target by following the energy hierarchy (Policy SI 2), the heating hierarchy (Policy SI 3) and by maximising on-site carbon reductions. Planning applicants will be expected to demonstrate that at each stage of the energy hierarchy they have maximised opportunities for carbon reduction to achieve as close to zero as possible. An on-site carbon reduction of at least 35 per cent beyond Part L 2021 of building regulations should be achieved. Once it has been demonstrated that carbon reductions have been maximised, any remaining emissions to zero should be offset by a contribution to the relevant borough's carbon offset fund.

2.16 This sustainability and energy statement draws from this guidance, in particular for the calculation of energy performance against the new building regulations.

# 3 SUSTAINABILITY STATEMENT

3.1 This section includes a review of the scheme against the relevant policies in section 2 and identifies a series of practical measures that would be brought forward in design and construction which contribute to the developments' sustainability.

3.2 The review is structured against the following thematic areas:

- Climate Change Mitigation;
- Climate Change Adaptation;
- Reducing Waste and Supporting a Circular Economy;
- Sustainable Transport;
- Pollution Control; and
- Sustainable Construction

## Climate Change Mitigation

3.3 Climate change mitigation involves a radical reduction in carbon emissions released from the built environment. This relates to both energy use in buildings and energy embodied within the construction process.

3.4 The London Plan sets out an established energy hierarchy in Policy SI2 which is relevant to new build projects. This focuses on how new development can reduce regulated energy demands. The strategy is presented in the next section (section 4).

## Climate Change Adaptation

### Overheating Risks

3.5 The risk of overheating in buildings is anticipated to rise as a result of climate change. Measures including the internal layout and orientation of the development, as well as the specification of low emissivity windows have been specified to reduce the risk of overheating.

3.6 A Part O, TM59 Study has been completed and confirms the development is compliant with the Part O requirements.

### Water Conservation Measures

3.7 Water fittings will be specified with the following or similar flow rates to meet the target water consumption of 105 l/p/day for the development:

- Wash basin taps – 6.5 l/min
- Showers – 7.5 l/min
- Bath – 120l to overflow
- Dishwasher - 1.2 l/place setting

- Washing machine - 9 l/kg load
- WC – 6/4 litre dual flush
- Kitchen taps – 6.5 l/min

Water meters will be installed to encourage residents to limit their consumption.

### Flood Risk and Sustainable Drainage

3.8 The development has been identified to be in Flood Zone 1, which has a low risk of flooding. The development will retain areas of lawn and tree planting to provide permeable surfaces and encourage natural drainage.


**Figure 3.1 – Site Location from Environment Agency Flood Map**

## Reducing Waste and Supporting a Circular Economy

### Sustainable Materials

3.9 Materials will be specified to reduce the embodied carbon of the development, including re-use wherever possible.

3.10 Insulating materials will be specified to maximise thermal performance whilst still paying attention to the environmental impact of the materials used, by specifying mineral wool. If possible, materials with a high recycled content will be specified.

3.11 Responsible sourcing will also be pursued. All timber used on-site during the construction phase and within the building will be from legal sources. All timber will be FSC or equivalent responsibly sourced timber. Sourcing of other materials will include products where the manufacturer employs an environmental management system such as ISO 14001 or BES 6001, inline with the sustainable procurement plan. Where possible, materials will be sourced locally.

3.12 Non-toxic materials will be used wherever possible, including the specification of products with low VOC content in line with European testing standards.

### Construction Waste Management

3.13 Consideration has been given to rationalising material use in the structure of the building, including the structural frame and envelope as part of an ongoing design optimisation exercise.

3.14 A Resource Management Plan will be developed which sets out procedures for managing waste on the site, including setting the total waste and landfill diversion targets which will be monitored throughout the build.

3.15 It is also anticipated that at least 95% by volume of construction waste and non-hazardous demolition waste will be diverted from landfill. This is in accordance with London Plan Policy SI7 of the London Plan.

### Operational Waste

3.16 The buildings will have sufficient space for their own waste storage facilities. Waste will be sorted to provide storage for both general, recyclable and food waste. The bins will be labelled to provide guidance on what can be included in waste stream.

## Sustainable Transport

3.17 Transport for London's (TfL) Web-based Connectivity Assessment Toolkit (WebCAT) recognises that the site has a Public Transport Accessibility Level (PTAL) rating of 5.

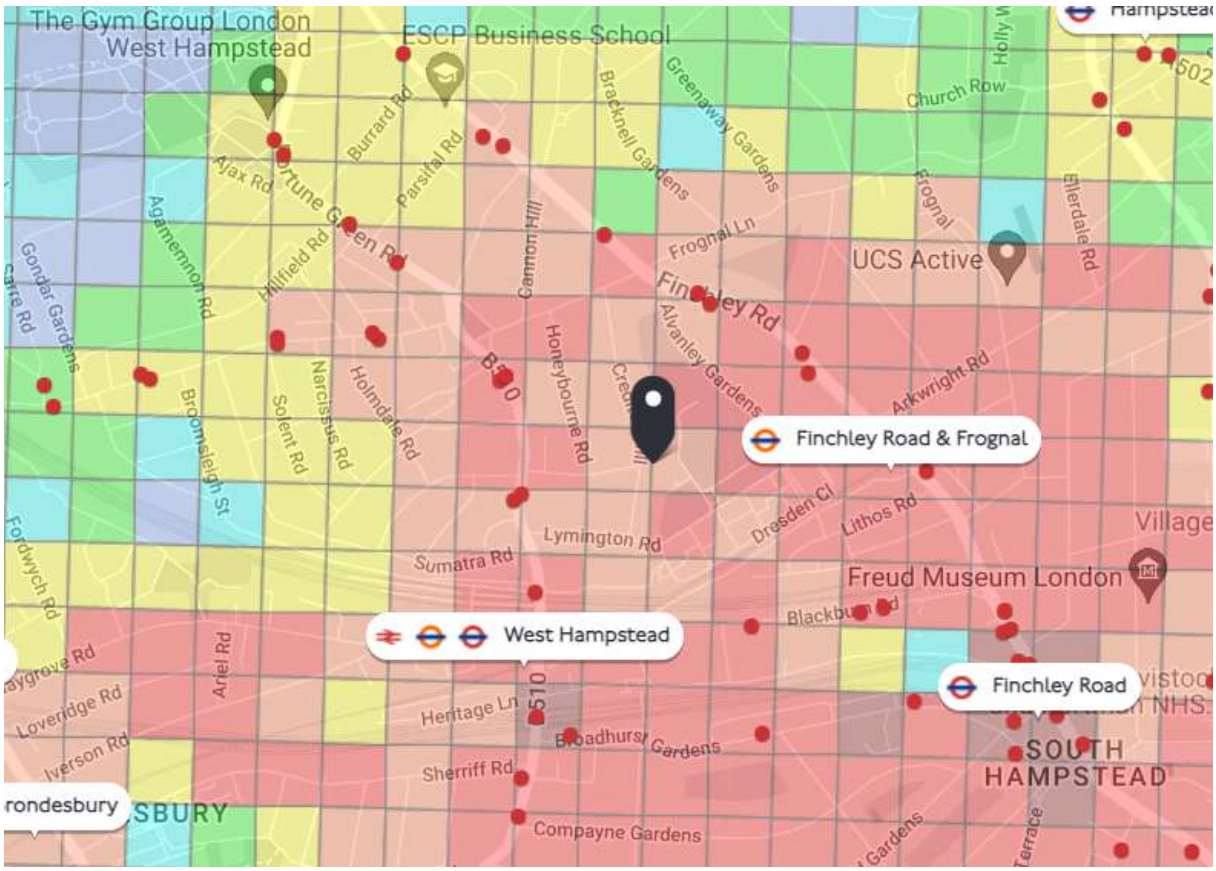



**Figure 3.2 Local Public transport options and walking times**

3.18 The development has a number of transport modes within a 10- minute proximity. This includes over 10 Bus stops, which are located under a 10-minute walk away and West Hamstead train and tube line which is under a 5 minute walk from the development.

3.19 The development incorporates a EV charging station for the provision of an electric car. The provision of the EV charging spot and the available public transport nodes will encourage the residents to adopt sustainable modes of transport.

## Pollution Control

3.20 Any new development can potentially lead to detrimental environmental effects; as is the nature of construction. These potential effects have been considered during the planning stages of this proposal. The development is not of the scale that would require an Environmental Impact Assessment (EIA), however the measures as outlined in this section, and subsequently implemented, will ensure that any potential impacts can be appropriately controlled.

### Air Quality

3.21 The construction site will be managed in such a way that the environmental impact is minimised. This includes following best practice policies for dust pollution by using dust sheets, covering skips and damping down where appropriate.

3.22 An fully electric system has been specified, with heat pumps providing the heating and hot water system. This will result in zero NOx Emissions for the operation of the development.

### Noise

3.23 The development will comply with Building Regulations Part E, providing a good level of sound insulation. All windows are to be specified as high efficiency triple glazing to minimise the transmission of noise between the property and surrounding area.

### Light Pollution

3.24 All lighting will be low energy light fittings specified to have a luminous efficacy greater than 70 lm/W. All external lighting will be appropriately controlled to ensure that spaces not lit during daylight hours, with PIR sensors to provide light when the area is occupied. As the development is residential; there will be no illuminated signage or up lighting incorporated. The proposed dwelling is in an urbanised location, and therefore will not significantly contribute to increasing the effects of light pollution.

## Sustainable Construction

3.25 The construction phase of the development can have a significant effect on the quality of the site and its surroundings, including the local environment, neighbouring residents, surrounding employees and the general public. Sustainable construction involves the prudent use of existing and new resources, the efficient management of the construction process, and consideration of potential adverse environmental impacts on local sensitive receptors.

3.26 It is not considered that the construction phase will yield an adverse level of disturbance, particularly given the surrounding land uses, although various measures adopted by the contractor will ensure that any potential disturbance is minimised. The principal contractor will be required to deliver high standards of sustainable construction, which will be achieved through the following:

- Registering the site against the Considerate Constructors Scheme, and;
- Managing the construction site to reduce environmental effects, this will include adopting best practice measures to protect water and air quality, monitoring water and energy use from construction activities.

# 4 ENERGY STATEMENT

4.1 In line with the London Plan policies this energy statement will follow the following energy hierarchy to make best endeavours to reduce carbon dioxide onsite:

a. Be Lean: use less energy and manage demand during operation;
b. Be Clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly;
c. Be Green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site.

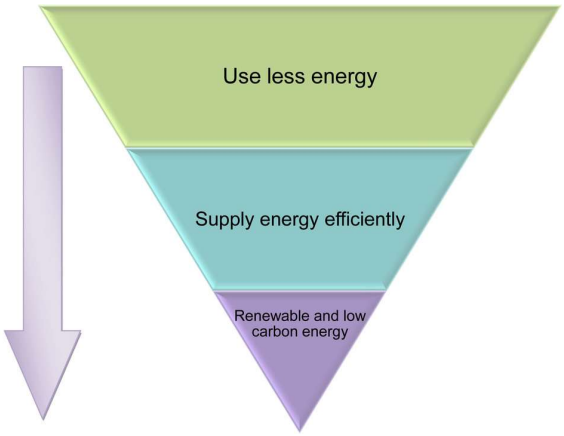



Fig 4.1 - 'Energy Hierarchy'

## Methodology

4.2 The London Borough of Camden hold some of the most stringent sustainability polices within the greater London Area. These extend to single householder applications. Local planning validation requires that applicants should demonstrate how the energy hierarchy has been applied to make the fullest contribution to CO2 reduction in line with Policy CC1.

4.3 The Local Plan details that 'All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L'. This policy will require the development to achieve an overall saving carbon saving of 19% below the new Part L 2021 regulations.

4.4 All new developments are expected to submit a statement demonstrating how the London plans 'cooling hierarchy' has informed the building design. This has been conducted in the form of a dynamic thermal model and a separate Part O assessment has been produced to consider the risks of overheating and how these can be mitigated. This report is to be read in conjunction with this document (ESL23-0304 Part O-Overheating Assessment).

4.5 In accordance with NCM guidance, the appropriate methodology for calculating the energy performance of the domestic portion is "The Government's Standard Assessment Procedure for Energy Rating of Dwellings". This procedure was undertaken using Stroma FSAP 10 version 1.0.78 which is a Department of Communities and Local Government (DCLG) approved methodology and software for undertaking SAP assessments.

## Establishing the Target Emission Rate (TER)

4.6 The total emissions savings calculated in this report for the new-build development is expressed against a Building Regulation Target Emission Rate. This is the Baseline against which the measures implemented must show an improvement.

4.7 The Target Emission Rates for the development have been established using The Standard Assessment Procedure for the Energy Rating of Dwellings (SAP).

4.8 The calculated carbon emissions and total energy demand for the Target Emission Rate are illustrated below. The calculated figures demonstrate a Part L1A Building Regulations 2021 compliant model.

**Table 4.1 – Target $CO_2$ emissions**

| | Total regulated emissions (Tonnes CO2 / year) | CO2 savings (Tonnes CO2 / year) | Percentage savings (%) |
|---|---|---|---|
| **Part L 2021 baseline** | 2.97 | - | - |

4.9 The figure of 2.97 tn.$CO_2$.yr the targets that must be reached and improved upon by the proposals in this Energy Assessment in order to comply with Part L Building Regulations. This will be achieved through the implementation of fabric efficiency, energy-reduction and carbon-saving measures as outlined in the ensuing sections.

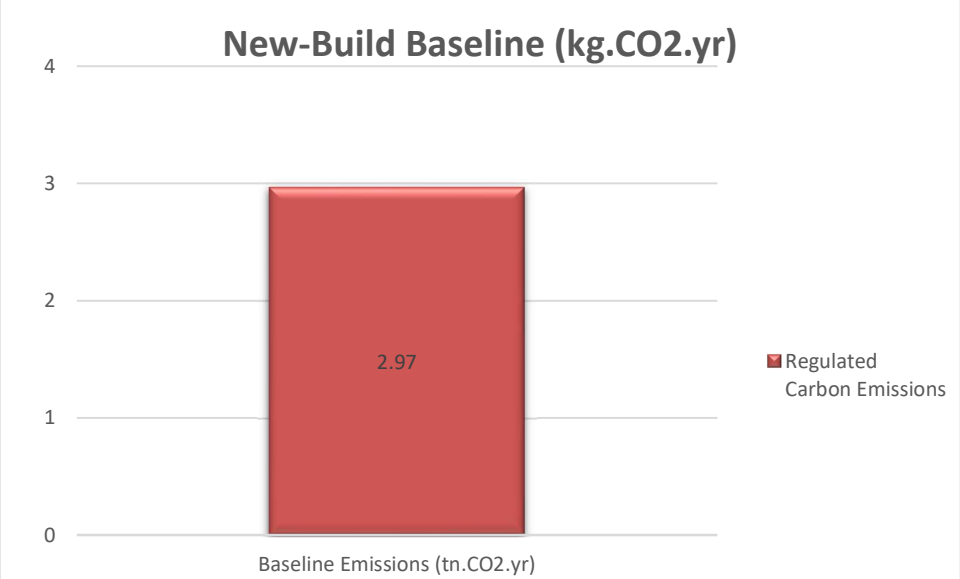



**Fig 4.2 – Target $CO_2$ emissions**

## Applying the London Plan Energy Hierarchy: Stage 1 – Be Lean

4.10 The Greater London Authority seeks a 'fabric first' approach to reducing the carbon footprint of London's built environment. This is achieved through buildings using less energy by improving u-values, air-tightness and lighting efficiency amongst others. This is the first step to consider in reducing a building's carbon emissions before the efficient delivery of power, heat or renewables are considered by a design-team.

### Fabric Efficiency

4.11 U-Values, are used to measure how effective elements of a buildings fabric are as insulators. That is, how effective they are at preventing heat from transmitting between the inside and the outside of a building. Very broadly, the better (i.e. lower) the U-value of a buildings fabric, the less energy is required to maintain comfortable conditions inside the building. The following U-Values are proposed for the development and have been slightly improved from the initial Pre-application note;

**Table 4.2 – Proposed U-Values**

| Elements | New Building Elements: U-Values – $W/m^2 K$ | Comment |
|---|---|---|
| **External Wall** | 0.13 | n/a |
| **Ground Floor** | 0.11 | n/a |
| **Roof** | 0.11 | n/a |
| **External Windows** | Triple Glazed<br><br>U-Values: 1.0 | Frame factor of 0.85.<br><br>G-Values: 0.25 |
| **External Solid Doors** | 1.0 | n/a |
| **Thermal Bridges** | Y= 0.035<br><br>To be calculated at the detailed design stage | |

### Air Permeability

4.12 The designed Air Permeability Rate (APR) has been set at 2 $m^3/h.m^2$ @ 50Pa for the entire development.

### Lighting Strategy

4.13 The Light fittings will be specified as LED, low-energy with local manual switching and if appropriate, occupancy sensing. The light fittings have been specified as to have a 100 lm/W efficiency.

## Ventilation Strategy

4.14 The development will include mechanical ventilation with heat recovery. This has specified as a MRXBOXAB-ECO-4 serving 5 no. wet rooms.

## Space & Water Heating

4.15 In line with the 'GLA guidance on preparing Energy Assessments' methodology, a base case has been generated for the Be Lean Case utilising a gas boiler with a 89.5% efficiency.

## Cooling

4.16 After following the GLAs guidance over heating assessment through a dynamic thermal model was created, to demonstrate how the London plan's 'Cooling Hierarchy' has informed the building design. Following this, the risk of overheating has been mitigated for the majority of zones, with active cooling required within the living room space. The development will include an active cooling system with a minimum efficiency of 330% which covers the open communal space equating to 87.86m$^2$.

## Be Lean Stage $CO_2$ Reductions

4.17 The Part L 2021 GLA carbon emissions reporting spreadsheet has been used to collate the information and offer consistent and transparent process for presenting part L 2021 carbon emission performance. This includes an offset of the energy saving technologies applied to the notional building at Lean stage to highlight the passive design savings.

4.18 The following tables and graphs represent the Be-Lean improvements for the new-build apartments over the Target Fabric Energy Efficiency (TFEE) and the Target Emission Rate (TER) Be-Lean emissions.

**Table 4.3 – Be-Lean Fabric Energy Efficiency**

| | Target Fabric Energy Efficiency (kWh/m²) | Dwelling Fabric Energy Efficiency (kWh/m²) | Improvement (%) |
|---|---|---|---|
| **Development total** | 51.1 | 50.6 | 0.98% |

**Table 4.4 – Be-Lean Dwelling Emissions**

| | Total regulated emissions (Tonnes CO2 / year) | CO2 savings (Tonnes CO2 / year) | Percentage savings (%) |
|---|---|---|---|
| **Part L 2021 baseline** | 2.97 | | |
| **Be lean** | 2.63 | 0.3 | 11% |

4.19 As detailed above, the measures as taken at 'Be-Lean' stage enable the dwelling to improve on the TFEE set by the notional building and shows a 0.98% improvement. Further to this, the

dwelling would result in a 11% reduction in regulated $CO_2$ emissions over the Part L Target Emission Rate. This has been achieved by adopting the lowest U-Values feasible, a low air permeability rate and high performance-glazed windows.

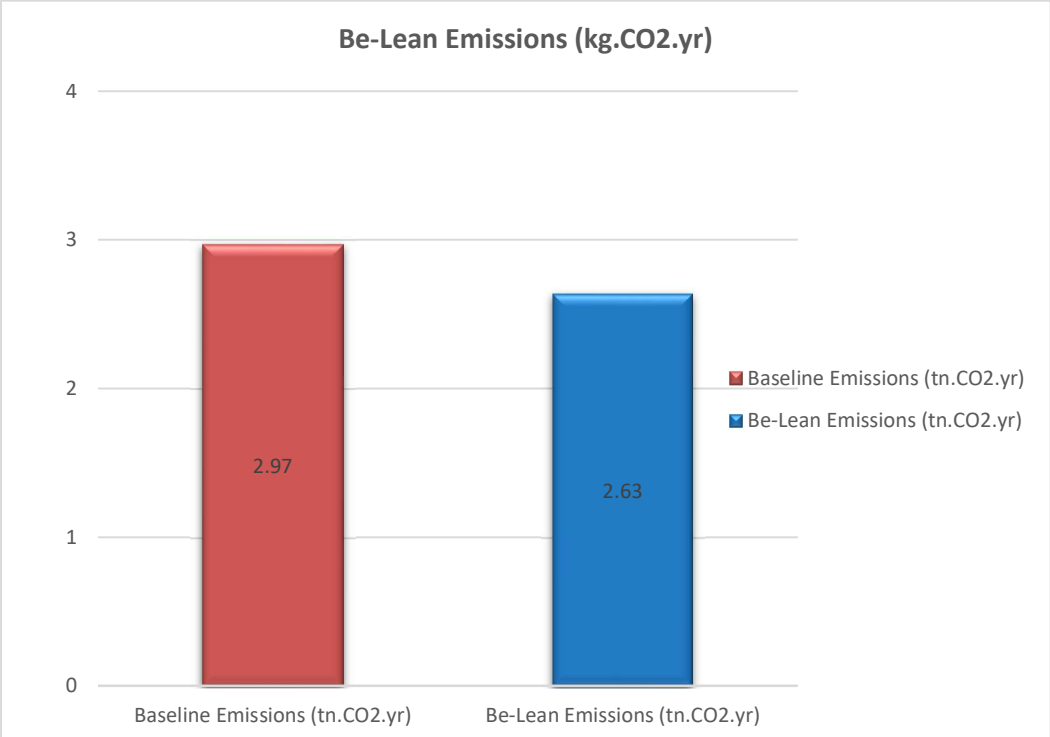



**Fig 4.3 – Be-Lean Stage Reductions**

## Applying the London Plan Energy Hierarchy: Stage 2 – Be Clean

4.20 As part of the Be Clean approach, the use of energy-efficient equipment, heat networks and community heating has been considered. As this development consists of a single residential dwelling, district heating networks and community heating systems are not viable. As a result, no savings are made at the Be Clean stage.

## Applying the London Plan Energy Hierarchy: Stage 3 – Be Green

4.21 An analysis of low carbon/renewable technologies was undertaken to determine which would be suitable for application in a development of this size and nature. This determined that the renewable systems deemed to be the most suitable for the development is the use of an Air-Source Heat Pump providing renewable heating and an Air Source Heat pump tank for hot water.

### Low-Carbon/Renewable Technology

4.22 The low-carbon/renewable energy proposed for development is an air-source heat pump (ASHP) providing space heating. ASHPs with the following specifications have been assumed:

- The modelled ASHP to provide space heating is an ECODAN 14 kW system.
- The ASHP will be selected to operate on R32 or R410a which is an F-Gas compliant refrigerant;
- The ASHP will have a minimum COP of 3.26

4.23 The hot water will be provided by an equivalent unit. The following system has been assumed:

- The modelled cylinder is a megaflop eco 400 system.
- The cylinder will have a volume of 400l and a measured loss of 1.72kw/day.
- The system will have a minimum hot water efficiency of 326%

### Be-Green CO2 Reductions

4.24 The following tables and graphs represent the Be-Green improvements for the development over the Target Emission Rate (TER) baseline emissions:

| | Total regulated emissions (Tonnes CO2 / year) | CO2 savings (Tonnes CO2 / year) | Percentage savings (%) |
|---|---|---|---|
| **Part L 2021 baseline** | 2.97 | | |
| **Be lean** | 2.63 | 0.3 | 11% |
| **Be Clean** | - | - | - |
| **Be Green** | 1.13 | 1.5 | 51% |

**Table 4.5 –Be-Green Improvement over TER**

4.25 As detailed above, the measures as taken at this stage would result in a further 51**%** reduction in the new-build regulated $CO_2$ emissions over the Building Regulations Part L Target Emission Rate.

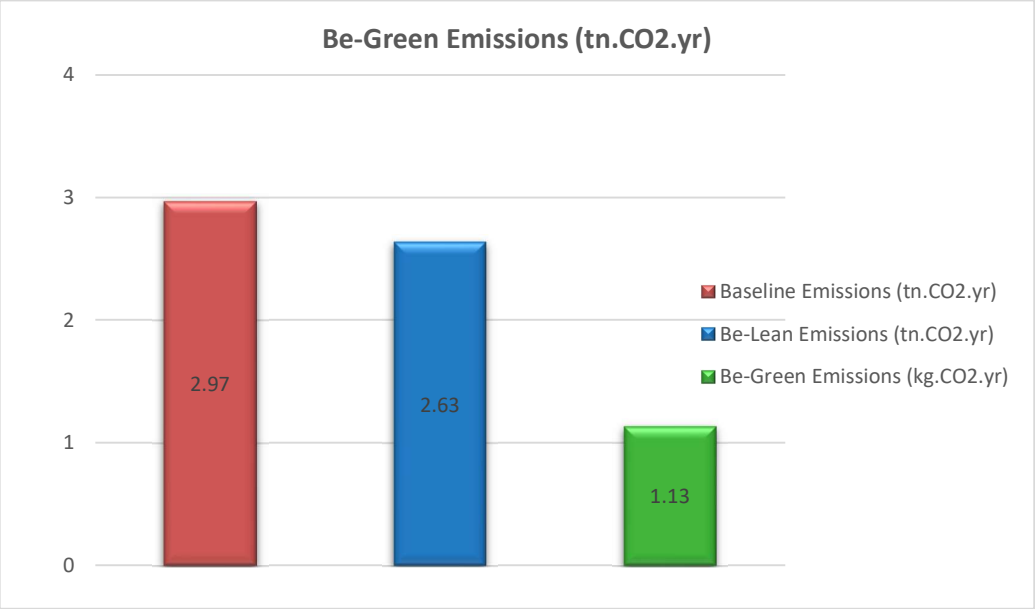



**Fig 4.4 –Be-Green Reductions**

**Table 4.6 –Be-Green Primary Energy Efficiency**

| | Target Primary Energy Efficiency (kWh/m²) | Dwelling Primary Energy Efficiency (kWh/m²) | Improvement (%) |
|---|---|---|---|
| **Development total** | 51.1 | 28.15 | 47.67% |

## Final $CO_2$ Reduction Charts

4.26 In accordance with the 'GLA guidance on preparing energy assessments', the final carbon emissions and predicted savings are presented below for the development.

**Table 4.6 – Final $CO_2$ reductions**

| | Regulated residential carbon dioxide savings (Tonnes CO2 per annum) | (%) |
|---|---|---|
| **Be lean: savings from energy demand reduction** | 0.3 | 11% |
| **Be clean: savings from heat network** | - | - |
| **Be green: savings from renewable energy** | 1.5 | 51% |
| **Cumulative on site savings** | 1.8 | 62% |
| **Annual savings from off-set payment** | 1.1 | - |

4.27 The Development has achieved a 62% saving overall.

## Applying the London Plan Energy Hierarchy: Stage 4 – Be Seen

4.28 As part of the Be Seen requirement to monitor, verify and report on energy performance through the Mayor's post construction monitoring platform. The buildings design stage Energy Use Intensity (EUI) and space heating have been measure at the final stage and highlighted below.

| Building type | EUI (kWh/m2/year) (excluding renewable energy) | Space heating demand (kWh/m2/year) (excluding renewable energy) |
|---|---|---|
| **Residential** | 6.035325066 | 14.24191179 |

| EUI value from Table 4 of the guidance (kWh/m2/year) (excluding renewable energy) | Space heating demand from Table 4 of the guidance(kWh/m2/year) (excluding renewable energy) | Methodology used (e.g. 'be seen' methodology or an alternative predictive energy modelling methodology) |
|---|---|---|
| **35** | 15 | Part L1 - SAP 10.2 & none dwellings / & Landlord Circulation |

# 5 CONCLUSION

5.1 This Sustainability and Energy Statement, has been prepared by Envision on Scenario Architecture's behalf and is submitted in support of a full planning application for the demolition of an existing residential dwelling to construct a 3 storey, 4 bedroom house.

*5.2* The most relevant policy when considering the sustainability of the application of Policy CC1 of the adopted Core Strategy. This requires all development to minimise the effects of climate change and encourage all developments to meet the highest feasible environmental standards that are financially viable during construction and occupation. Camden will:

i. Promote zero carbon development and require all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy;

ii. Require all major development to demonstrate how London Plan targets for carbon dioxide emissions have been met – noting that these standards are not directly required for single householder applications.

iii. Ensure that the location of development and mix of land uses minimise the need to travel by car and help to support decentralised energy networks.

iv. Expect all developments to optimise resource efficiency.

5.3 The Local Plan details that 'All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L'. This policy will require the development to achieve an overall saving carbon saving of 19% below the new Part L 2021 regulations.

5.4 The Energy Statement presented in Section 4 of this report explains the approach which has been taken to minimise carbon emissions. A reduction in emissions has been achieved through adopting efficient building fabric, including new insulation and highly efficient glazing. Measures are also incorporated to minimise pollution, footprint of the development and reduce water use.

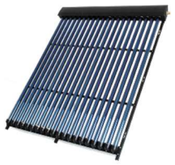
5.5 To maximise carbon emissions onsite, a highly efficient heat pump have been specified to provide space heating and hot water.

5.6 The scheme will incorporate a range of energy-saving measures and is to achieve a 62% reduction in carbon emissions compared to a notional existing building baseline.

5.7 The development is considered to comply with London Borough of Camden Energy and Sustainability policies, along with those found within the London Plan (2021).

# APPENDIX I – SAP CALCULATIONS

# APPENDIX II – LZC ANALYSIS

| | | Typical Lifetime | Maintenance | Land & Space Requirements | Operational Impacts | Adopted in Development? |
|---|---|---|---|---|---|---|
| Solar Photovoltaic (PV) Panels |  | 25 | Low | PV is typically installed on available roof-space so little to no impact on land use. | Proportionately large arrays may need electrical infrastructure upgrade (0.5 MW+)<br><br>PV arrays are typically maintenance free and panels are self-cleaning at angles in excess of 10 degrees.<br>Provision for access to solar panels installed on flat roofs needs to be incorporated into the design of PV arrays layout as well as inclusion of spaces for inverters within the development.<br>Quality of PV panels varies dramatically. | **Not Adopted**<br>The developed has a flat roof with average to high shading from the surrounding environment.<br><br>As there are no further policy requirements for a single unit, the use of photovoltaic panels is not considered necessary. The opportunity does exist however to mount these at roof level to further enhance the sustainability of the scheme and offset some of the buildings running costs. Due to high electricity prices, the payback of a PV array would be relatively fast < 7 years. |
| Solar Thermal |  | 25 | Low | Solar thermal panels are typically installed on available roof-space so little to no impact on land use.<br><br>Requires hot water cylinders that link to system and requires additional energy.<br><br>Due to amount of roof space required and distance from tank to panels, less suitable for dense developments or high-rise buildings. | Note above with regards to maintenance of solar thermal panels.<br>Biggest reductions achieved by people who operate their hot water system with consideration of the panels. | **Not Adopted**<br>The proposed DHW system (ASHP) will already generate hot water – given the hot water demand on site the use of a solar thermal system although technically feasible would not offer significant carbon emission savings relative to the cost and complexity of installation. |
| Air-Source Heat Pumps |  | 20 | Medium | No need for external ground works, only a heat pump unit for the air to pass through, typically installed on the roof.<br><br>Minimal external visual evidence if located in plant enclosure. | Vital that ASHP model selected has been proven to maintain performance at the low temperature and high humidity conditions of the British winter.<br><br>May need immersion backup for hot water.<br><br>Highly reliable and require virtually no maintenance. | **Adopted**<br>ASHPs are viable for the development and are capable of providing a significant portion of the building's energy from effectively a renewable source, as for each kW of electricity in excess of 3kW of heating will be extracted. This makes ASHPs the preferred renewable technology for the provision of heating and hot water to each dwelling.<br><br>Two ASHPs have been specified for this development. There is external space at ground level which will provide space for the condensers. |
| Ground Source Heat Pumps |  | 20 | Low | Require extensive ground works to bury the boreholes that extract the low-grade heat from the earth.<br><br>They therefore require a large area for horizontal burial (40-100m long trench) or a vertical bore (50-240m) which is considerably more expensive but can be used where space is limited. | May need immersion backup for hot water.<br><br>Maintenance issues if components of ground bore hole fail. | **Not Adopted**<br>GSHP are not a feasible technology for the site since there is a limited external space available for installation of boreholes. |
| Wind Turbines |  | 25 | Medium | Smaller models (<6kW) can be roof mounted.<br>Must be higher than surrounding structures/trees.<br>Planning permission required. | Annual services required.<br>Turbines rated in excess of 5kW may require the network to be strengthened and arrangements to be made with the local Distribution Network Operator and electricity supplier. | **Not Adopted**<br>This development is in an urban environment and so a wind turbine will not generate a significant amount of energy. |
| Combined Heat & Power (CHP) |  | 25 | High | CHP systems require a plant room and possibly separate energy centre for large developments.<br>Require a flue to effectively disperse pollutants. This is best to rise to a minimum of 2m above the roofline of the tallest building. | Require operational support and maintenance.<br>Can produce proportion of electricity which can help in lowering energy demand.<br>Emissions of oxides of nitrogen – ~80-100mg/kWh. | **Not Adopted**<br>As the grid continues to decarbonise, the carbon offset offered by CHP will reduce, resulting in the system actually emitting far more carbon than other systems as the heat efficiency is typically around 50%, i.e., an inefficient gas-fired boiler. |

| | | | | | | |
|---|---|---|---|---|---|---|
| Biomass |  | 20 | High | Biomass boilers require a plant room and possibly separate energy centre for large developments.<br>Require a flue to effectively disperse pollutants. This is best to rise to a minimum of 2m above the roofline of the tallest building.<br>Fuel store/delivery vehicle space will be required. This should be maximised to reduce fuel delivery frequency. | Normally run-on biomass but can also work with biogas.<br>Require some operational support and maintenance.<br>Fuel deliveries required.<br>Boiler and fuel store must be sited in proximity to space for delivery vehicle to park.<br>Issues with rights to dig up roads, etc (for heat networks).<br>Emissions of oxides of nitrogen – ~80-100mg/kWh. | **Not Adopted**<br>Burning of wood pellets releases high NOx emissions and there are limitations for their storage and delivery within a development if this nature. |