



The PES

Energy & Sustainability Statement

5th May 2026

**Land at Rear of 88 and 90 Westbury Avenue
London
N22 6RT**

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Version Control

V1	05-05-26	

1.0 Executive Summary

The proposed development project at Westbury Avenue involved the development of a new 2 storey, 2 bed dwelling

In accordance with the London Plan and Haringey Local Plan policies, a 'Lean, Clean, Green' has been adopted and the development achieves an improvement in build fabric at over **10.19%** at the "Be Lean" stage and an overall improvement (DER/TER) in regulated emissions at over **63.36%** above Part L 2013 standard, through the adoption of very high standards of insulation and heat pump driven heating and hot water systems and roof mounted PV

2.0 The Site & Proposal

The existing building is located on the north east side of Rusper Road, to the rear of Westbury Avenue.

The proposed redevelopment proposals involve the demolition of single storey lockup garage (B8 use) and erection of single storey (plus basement) detached 2 bedroom dwelling.

2.1 Local Planning Context

The project sits within the London Borough of Haringey.

The project received planning permission in September 2023, under reference HGY/2023/1355, subject to the following condition

A Sustainable Design Statement shall be submitted to and approved in writing by the Local Planning Authority to the first occupation of the development. The statement shall detail how the dwelling hereby permitted achieve best practice sustainability standards with regards to water, materials, energy and adaptation to climate change. The statement must demonstrate how the dwelling will achieve a reduction in Regulated CO2 emissions when compared with a building compliant with Part L of the Building Regulations 2013, and not exceed water use targets of 110L/person/day.

The proposals is subject to Haringey's Local Plan: Strategic Policies 2013 (with alterations 2017) and the Development Management DPD (Adopted July 2017).

Key Strategy Policy SP4: Working towards a Low Carbon Haringey, requires:-

Over the life time of the Local Plan, reducing energy use in buildings and working towards a low carbon borough will be one of the key challenges facing Haringey. The Council will promote the measures outlined below to reduce carbon emissions from new and existing buildings.

1. In line with London Plan policy, the Council will promote and require all new developments to take measures to reduce energy use and carbon emissions during design, construction and occupation, by incorporating the following measures:

a. From 2011 onwards, all new residential development will achieve a minimum 25% reduction in total (regulated) CO2 emissions in line with Code for Sustainable Homes Level 4 energy standards, and should aim to achieve Level 6. All new residential development shall be zero carbon from 2016 onwards; and

b. From 2011 onwards all new non-residential development shall be built to at least BREEAM “very good” standard and should aim to achieve BREEAM “excellent” or the current nationally agreed standard. All new non-residential development shall be zero carbon from 2019.

2. The Council will promote low- and zero-carbon energy generation through the following measures:

- a. Requiring all developments to assess, identify and implement, where viable, site-wide and area-wide decentralised energy facilities including the potential to link into a wider network;
- b. Establishing local networks of decentralised heat and energy facilities by requiring developers to prioritise connection to existing or planned networks where feasible;
- c. Working with neighbouring boroughs and other partners to explore ways of implementing sub-regional decentralised energy networks including the potential in the Upper Lee Valley Opportunity Area; and
- d. All new developments are required, where viable, to achieve a reduction in predicted carbon dioxide emissions of 20% from on site renewable energy regeneration, which can include connections to local sources of decentralised renewable energy

The key DM policy is Policy DM21: Sustainable Design, Layout and Construction

A All new development, including building and landscape works, will be expected to consider and implement sustainable design, layout and construction techniques.

Proposals should:

- a Apply the energy hierarchy to minimise energy use in order to meet, and if possible exceed, minimum carbon dioxide reduction requirements;
- b Apply the cooling hierarchy to reduce the potential for overheating and limit reliance on mechanical air conditioning systems;
- c Maximise opportunities to enhance biodiversity on-site, including through appropriate landscaping, Sustainable Drainage Systems, living roofs and green walls
- d Wherever possible, use building materials with high environmental performance ratings; and
- e Seek opportunities for locally sourced labour.

B The Council will support appropriate measures to sustainably retrofit existing homes and non-residential buildings.

C Proposals that fail to demonstrate adequate consideration for sustainable design, layout and construction techniques will be resisted.

D Consideration will be given to the use of carbon offset payments, to be secured by planning obligations, where it can be demonstrated that proposals are unable to meet carbon dioxide emission reduction targets on-site.

Accordingly, this report will be informed by, and be compliant with all of the above policy requirements as well as following the London Plan guideline for the production of Energy Assessments

The project at Westbury Avenue would be considered a non-major scheme and this report is informed accordingly.

The design team at utilising SAP10.2 emissions data and Part L 2013, in line with the required planning condition.

3.0 Baseline energy results

The first stage of the Mayor's Energy Hierarchy is to consider the baseline energy model.

The following section details the baseline energy requirements for the development – the starting point when considering the energy hierarchy.

SAP first creates the notional reference building, based upon the same shape and form as the proposed dwelling and applies the above characteristics as defined in SAP2012

Once all of the baseline emission rates have been calculated in line with the above Government approved methodologies, they are considered as stage 'zero' of the energy hierarchy as described earlier and Target Emission Rate sets the benchmark for the worst performing, but legally permissible, development.

3.2 Unregulated Energy Use

The baseline un-regulated energy use for cooking and appliances in the residential units have been calculated using the SAP Section 16 methodology; the same calculation used for Code for Sustainable Homes (CfSH) Ene 7.

- Appliances = EA = $207.8 \times (\text{TFA} \times \text{N}) \times 0.4714$
- Cooking = $(128 + 24\text{N})/\text{TFA}$
- N= no of occupant SAP table 1B
- TFA – Total Floor Area

The emissions associated with unregulated energy use per sqm is summarised in Table 1 below.

Table 1 – Unregulated Energy Use

Unit	CO ₂ emissions - Unregulated Energy Use SAP2012 Kg/sqm
House	258

The un-regulated emission rates are added to the baseline regulated emission rates (as calculated under 3.1 above) in order to set the total baseline emission rates before then applying the energy hierarchy in line with The London Plan and Haringey policies.

3.4 Baseline Results

The baseline building results have been calculated in line with SAP2012 emission standards and are presented in Table 2 below. The Baseline SAP outputs (which summarise the key data) are attached at **Appendix A**.

Table 2 – Baseline energy consumption and CO2 emissions

Unit	Target Emission Rate (regulated energy use) Kg/annum	Unregulated Energy Use Kg/annum	Total baseline emissions Kg
House	1,501	258	1,759
Development Total	1,501	258	1,759

4.0 Design for energy efficiency

The first step in the Mayor's 'Energy Hierarchy' as laid out in Chapter 9 of The London Plan, requests that buildings be designed to use improved energy efficiency measures – Be Lean. This will reduce demand for heating, cooling, and lighting, and therefore reduce operational costs while also minimizing associated carbon dioxide emissions.

This section sets out the measures included within the design of the development, to reduce the demand for energy, both gas and electricity (not including energy from renewable sources). The table at the end of this section details the amount of energy used and CO₂ produced by the building after the energy efficiency measures have been included. From these figures the overall reduction in CO₂ emissions, as a result of passive design measures, can be calculated. To achieve reductions in energy demand the following measures have been included within the design and specification of the building:

4.1 Passive Design

The National Planning Policy Framework emphasises the need to take account of climate change over the longer term and plan new developments to avoid increased vulnerability to the range of impacts arising from climate change. The UK Climate Impacts Programme 2009 projections suggest that by the 2080's the UK is likely to experience summer temperatures that are up to 4.2°C higher than they are today.

Accordingly, designers are to ensure buildings are designed and constructed to be comfortable in higher temperatures, without resorting to energy intensive air conditioning.

In line with current GLA Guidance, the project at Westbury Avenue has had been designed to ensure the building is not vulnerable to overheating within the limitation of city centre development; to instigate consideration of the risk of overheating with the proposed development, the design team have followed the guidance within the London Plan, which consider the control of overheating using the Cooling Hierarchy:-

1. reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and wall

The development site is within an area of low buildings with a mainly south easterly aspect for the main living areas.

This has been recognised in the design and the livings areas have the benefit of large, glazed areas to the above aspect, introducing natural daylight and attracting useful solar gain, whilst avoiding the peak southern sun.

The bedrooms have glazing mainly to the south west and north west aspects, with reduced areas to reduce excess solar gain and heat losses.

Glazing specification has been a significant consideration as part of the overheating risk mitigation and the high quality glazing has a g-value at circa 0.57 or better which will further assist in reducing overheating risk from excessive solar gain.

2. minimise internal heat generation through energy efficient design

The dwelling has already been constructed to a very high standard of thermal insulation.

Not only does good insulation assist in reducing heat losses in the winter, but it also has a significant impact on preventing heat travelling through the build fabric during the summer.

3. manage the heat within the building through exposed internal thermal mass and high ceilings

The structure is of a brick/block walls and slab floors, offering very significant thermal mass able to absorb heat during the summer months, which can then be ventilated during the evening or overnight.

4. passive ventilation

All glazing is designed to have opening areas to introduce high levels of natural levels of "purge" ventilation to further assist in the reduction of overheating risks in appropriate areas.

5. mechanical ventilation

The strategy above would enable a natural ventilation strategy, and this report will assume this as the strategy for the proposed dwellings.

4.2 Heating System

For the "notional" energy efficient model, the primary heating system for the dwellings will consist of high efficiency gas boilers providing hot water and LTHW heating.

- Communal gas condensing boiler – (92.3% + SEDBUK seasonal efficiency)

To increase the efficiency in the use of the heating system, the following controls will be used in a 'boiler interlock' system to eliminate needless firing of the boiler.

- Time and temperature zone control
- Boiler fitted with a weather compensation system

4.3 Fabric heat loss

The existing U-values exceed the Building Regulations minima, with specifics taken from the current EPC data: -

- External wall constructions are off brick and block with a U-Value of 0.20W/m²k
- Floor construction meets a U-Value of 0.18W/m²k.
- The roof structure meets a U-value at 0.15W/m²k.

Glazing

- The glazing for windows and doors have an area weighted average U-Value of 1.4W/m²K or better.

Air Tightness

- The project is to be tested to 4-5m³/hr/m² in line with best practice for new dwellings.

4.4 Ventilation

As noted above, the residential accommodation is to be naturally ventilated via trickle vents, opening windows and wet room extraction

4.5 Lighting and appliances

The development incorporates high efficiency light fittings utilising LED lamps.

The use of LED lighting will also minimise the internal gains commonly associated with tungsten and fluorescent lighting systems and thereby further reduce the potential for the maisonettes to overheat.

External lighting will utilise daylight controls to ensure lights are not active during the day.

4.6 Waste-water heat recovery

In order to further enhance the developments performance at the "be lean" stage, the applicants are to install waste water heat recovery in each residential unit - enabling waste heat from showers to be recovered via the mains water supply to the shower.

4.8 Energy efficiency results

The above data has been used to update the SAP models, the Dwelling Emission Rate outputs of which are attached at **Appendix B**, whilst Table 3 sets out the total emissions using SAP2012 data.

Table 3 – Energy Efficient emission levels

Unit	Target Emission Rate (regulated energy use) Kg/annum	Unregulated Energy Use Kg/annum	Total "be lean" emissions Kg
House	1,348	258	1,606
Development Total	1,348	258	1,606

The results show that the energy efficiency measures introduced have resulted in the reduction in regulated and unregulated CO₂ emissions from the dwelling of **8.7%**.

Regulated emissions have been reduced by **10.2%** via the passive design measures highlighted above.

The total Part L Fabric Energy Efficiency Standard (FEES) for the development – set out in Table 4 below:-

Table 4 – Residential FEES

	Target Fabric Energy Efficiency (MWh/year)	Design Fabric Energy Efficiency (MWh/year)	Improvement (per cent)
Development Total	58.06	46.73	20%

5.0 Supplying Energy Efficiently

5.1 Community Heating/Combined Heat and Power (CHP)

The London Plan, Chapter 9, requires that major developments exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly.

Development in Heat Network Priority Areas should follow the heating hierarchy in Policy SI3 Energy infrastructure.

However, as a non-major project that is already constructed, there is no obligation to be DEN connection ready.

6.0 Renewable Energy Options

The final element of the Mayor's 'Energy Hierarchy' requires development proposals should provide a reduction in expected carbon dioxide emissions through the use of on-site renewable energy generation, where feasible – Be Green.

Renewable energy can be defined as energy taken from naturally occurring or renewable sources, such as sunlight, wind, wave's tides, geothermal etc. Harnessing these energy sources can involve a direct use of natural energy, such as solar water heating panels, or it can be a more indirect process, such as the use of Biofuels produced from plants, which have harnessed and embodied the sun's energy through photosynthesis.

The energy efficiency measures and the sourcing the energy efficiently outlined above have the most significant impact on the heating and hot water energy requirements for the development, and the associated reduction in energy consumption.

This section then sets out the feasibility of implementing different energy technologies in consideration of: -

- Potential for Carbon savings
- Capital costs
- Running costs
- Payback period as a result of energy saved/Government incentives
- Maturity/availability of technology
- Reliability of the technology and need for back up or alternative systems.

6.1 Government incentives

6.1.1 Smart Export Guarantee (SEG)

Introduced in 2020, the SEG will enable solar photovoltaic (PV), wind, hydro and anaerobic digestion (AD) installations up to 5MW and micro-combined heat and power (micro-CHP) up to 50kW will be able to receive an export tariff under the policy.

The SEG is a market-led initiative, requiring electricity supply licensees to offer export tariffs to eligible generators. Suppliers are free to set their own SEG compliant tariff price (provided it is above zero pence at all times) and decide how their tariffs work.

Installation owners are able to shop around and select the Licensee of their choice based upon an offer of the most appropriate tariff.

Payment are made against metered exports only.

6.2 Wind turbines

Wind turbines come in two main types'- horizontal axis and vertical axis. The more traditional horizontal axis systems rotate around the central pivot to face into the wind, whilst vertical axis systems work with wind from all directions.

The potential application of wind energy technologies at a particular site is dependent upon a variety of factors. But mainly these are: -

- Wind speed
- Wind turbulence
- Visual impact
- Noise impact
- Impact upon ecology

The availability and consistency of wind in urban environments is largely dependent upon the proximity, scale and orientation of surrounding obstructions. The site is surrounded by low-rise to mid-rise buildings in all directions. To overcome these obstructions and to receive practical amounts of non-turbulent wind, the blades of a wind turbine would need to be placed significantly above the roof level of the surrounding buildings and the proposed project at Westbury Avenue itself.

It is inconceivable that any wind turbines of this size would be considered acceptable in this location and thus was dismissed as an option.

6.3 Solar Energy

The proposed development has areas of flat roof that could accommodate solar panels.

In general, the roofs will have an unrestricted aspect, so there is scope therefore to site solar photovoltaic (PV) or water heating equipment at roof level.

6.3.1 Solar water heating

Solar water heating panels come in two main types; flat plate collectors and evacuated tubes. Flat plate collectors feed water, or other types of fluid used specifically to carry heat, through a roof mounted collector and into a hot water storage tank. Evacuated tube collectors are slightly more advanced as they employ sealed vacuum tubes, which capture and harness the heat more effectively.

Both collector types can capture heat whether the sky is overcast or clear. Depending on location, approximately 900–1100 kWh of solar energy falls on each m² of unshaded UK roof surface annually. The usable energy output per m² of solar panel as a result of this amount of insolation ranges from between 380 – 550 kWh/yr.

Solar hot water systems are of course, displacing gas or high efficiency heat pumps for DHW provision (as noted above), and due to the low cost of these energies, it would require a very large system to compete with the off-setting of electricity use afforded by PV panels.

Accordingly, the use of solar thermal systems was dismissed.

6.3.2 Photovoltaics (PV)

A 1kWp (1 kilowatt peak) system in the UK could be expected to produce between 790-800kWh of electricity per year based upon a south east orientation according to SAP2005 methodology used by the Microgeneration Certification Scheme (MCS). The figure given in the London Renewables Toolkit is 783 kWh per year for a development in London.

The withdrawal of the Feed in Tariff has now rendered such investments less attractive, however, there is still the benefit and carbon savings derived from the electricity produced – currently some 3.5 x as expensive as mains gas – so returns can still achieve in excess of 8/9%.

Accordingly, the design team have installed an 8 panel PV array, a total 3.68kWp array generating some 3,000kWh/annum.

6.4 Biomass heating

Biomass is a term given to fuel derived directly from biological sources for example rapeseed oil, wood chip/pellets or gas from anaerobic digestion. It can only be considered as a renewable energy source if the carbon dioxide emitted from burning the fuel is later recaptured in reproducing the fuel source (i.e. trees that are grown to become wood fuel, capture carbon as they grow).

Biomass heating systems require space to site a boiler and fuel hopper along with a supply of fuel – which can be very bulky items. There also needs to be a local source of biomass fuel that can be delivered on a regular basis. There are also issues with fuel storage and delivery which mitigate against this technology.

Additionally, a boiler of this type would replace the need for a conventional gas boiler and therefore offset all the gas energy typically used for space and water heating. However, biomass releases high levels of NO_x emissions and particulate matters, as well as other pollutants and would therefore have to be considered carefully against the high standard of air quality requirements within Haringey's Borough wide AQMA. Accordingly, the use of biomass was not considered appropriate for this project.

6.5 Ground source heat pump

All heat pump technologies utilise electricity as the primary fuel source – in this case displacing gas, as such, the overall reduction in emissions when using this technology can be less effective when opposed to a technology that is actually displacing electricity.

Ground source heating or cooling requires a source of consistent ground temperature, which could be a vertical borehole or a spread of pipework loops and a 'heat pump'. The system uses a loop of fluid to collect the more constant temperature in the ground and transport it to a heat pump. In a cooling system this principle works in reverse and the heat is distributed into the ground.

The heat pump then generates increased temperatures by 'condensing' the heat taken from the ground, producing hot water temperatures in the region of 45°C. This water can then be used as pre-heated water for a conventional boiler or to provide space heating with an under-floor heating system.

The use of a ground source heating/cooling system will therefore require:

- Vertical borehole or ground loop
- Use of under floor heating
- Space for heat pump unit

Clearly, in the case of the proposed development, there was no scope for the locating of the ground collector devices and as such, ground source heating was dismissed as an option.

6.6 Air source heat pump

Air source heating or cooling also employs the principle of a heat pump. This time either, upgrading the ambient external air temperature to provide higher temperatures for water and space heating, or taking warmth from within the building and dissipating it to the outdoor air.

It must be remembered that heat pumps utilise grid based electricity, so calculations base the benefits on SAP10.2 emissions data

Assuming a seasonal system efficiency of 320% (Coefficient of Performance of 3.2) and that the air source heat pump will replace 100% of the space heating/hot water demand, then the system would reduce the overall CO₂ emissions by approximately 70%. The table below demonstrates, on the assumption of a demand of 10,000Kwh/year for heating and hot water.

Table 5 – Air Source Heat Pump Performance

Type of Array	Energy Consumption (kWh/yr.)	Emission factor (kgCO ₂ /h)	Total CO ₂ emissions (kg/annum)
90% efficient gas boiler	11111	0.210	2333
320% efficient ASHP	2813	0.136	383
100% efficient immersion (back-up)	1000	0.136	136

A theoretical carbon saving of 77%

With the above data in mind, clearly an ASHP was an option and the "be green" "as built" proposals include the installation of an air source heat pump to deliver the heating and hot water as well as an 8 panel PV array.

6.7 Final Emissions Calculation

Given the outcome of the feasibility study above, the developer has used the above noted heat pump system to deliver the heating and hot water demands to the dwelling, as well as benefiting from the 3.68kWp PV installation.

The final table – Table 6 – summarises the final outputs from the SAP models; attached at **Appendix C**.

Table 6 – “Be Green” emission levels

Unit	Target Emission Rate (regulated energy use) Kg/annum	Unregulated Energy Use Kg/annum	Total “be green” emissions Kg
House	550	258	808
Development Total	550	258	808

The data at Table 6 confirms that overall emissions – including unregulated energy use - have been reduced by **54.05%** over and above the baseline model, with a **45.36%** reduction in emissions directly from the use of energy generating and renewable technologies, i.e. over and above the energy efficient model.

Excluding the un-regulated use, i.e. considering emissions controlled under AD Part L, then the final reduction in DER/TER equates to **63.36%**.

7.0 Sustainable Design & Construction

The Sustainability credentials of the new residential development at Westbury Avenue are set out below; based on the environmental assessment criteria developed by the Building Research Establishment.

The key sustainability credentials for the proposals are set out below:-

Materials & the Circular Economy

The principal issue when considering the environmental impact of new construction materials is the embodied carbon – i.e. the carbon cost extraction of raw material, transport to factory, manufacturing, transport to site and erection on site.

Demolition/enabling works were limited to the demolition of the small single brick, but the development sought to re-use these materials on site as a priority, prior to removal and recycling as the secondary option.

The new internal partitions will be of a LSF material enabling ready dismantling and relocation to enable future flexibility in use.

Additional carbon costs are occurred through maintenance and repairs as well as end of life (deconstruction/demolition). The new dwelling include highly robust finishes and quality materials to reduce the refurbishment/replacement schedules.

The design team also sought out new construction techniques with a lower embodied carbon contents; with the extensive use of sustainably sourced timber for partitions, stairs, new floors etc.

All materials were selected to have an end-of-life strategy of being at least recyclable, and preferably re-usable – with a target of 99% of new materials being returned to the circular economy.

Overall, the project will sought to source at least 10% of new materials with a recycled content.

In addition to the above low carbon strategy, the development sourced all materials from suppliers that can demonstrate that materials are sourced responsibly in line with recognised Environmental Management Systems (FCS, BES6001 etc.), this included a local sourcing strategy where possible.

The project sought to target a figure in excess of 97% of construction waste diverted from landfill.

Operational waste and recycling – appropriate internal and external storage space has been provided to ensure that residents can sort, store and dispose of waste and recyclable materials in line with Haringey's collection policies.

Pollution

The completed development uses zero emission heat pump systems for heating and hot water.

To avoid the issue of noise pollution, the development complies with Building Regulations Part E, providing a good level of sound insulation between the dwelling and surrounding buildings.

Energy

The development incorporates renewables technologies as noted in the main report above - air source heat pumps and the benefit of roof mounted PV.

The new home has been supplied with a Home User Guide offering practical advice on how to use the home economically and efficiently, including specific advice on how to reduce unregulated energy uses.

This will be further enhanced by the installation of smart energy metering, enabling occupants to accurately assess their energy usage and thereby, manage it.

Water

The development minimises water use as far as practicable by incorporating appropriate water efficiency and water recycling measures. The dwellings meet the required level of 110 litres maximum daily allowable usage per person.

A Part G water use calculation is included at **Appendix D**.

Sustainable Urban Drainage (SuDs)

The project has put in place the sustainable urban drainage strategy in accordance with Condition 12 of the planning consent issued September 2023.

8.0 Conclusions

This report has detailed the baseline energy requirements for the newly constructed residential development, the reduction in energy demand as a result of energy efficiency measures and the further CO₂ reductions using renewable energy technologies.

The baseline results have shown that if the development had been built to a standard to meet only the minimum requirements of Part L 2012, the total amount of CO₂ emissions would be **1,759Kg/year**.

Following the introduction of passive energy efficiency measures into the development, as detailed in section 4, the total amount of CO₂ emissions would be reduced to **1,606Kg/year**

There is also a requirement to reduce CO₂ emissions across the development using renewable or low-carbon energy sources. Therefore, the report has considered the feasibility of the following technologies:

- Wind turbines
- Solar hot water
- Photovoltaic systems
- Biomass heating
- CHP (Combined heat and power)
- Ground & Air source heating

The results of the assessment of suitable technologies relative to the nature, locations and type of development confirmed that the most suitable solution to meeting reduction in CO₂ emissions would be via the use of heat pump driven heating and hot water systems and the benefit from generation of electricity on site via an on site PV array.

This has been used in the SAP models (reproduced at **Appendix C**) for the development which have also been detailed above in Table 6, which show a final gross emission level of **808Kg/year**, representing a total reduction in emission over the baseline model, taking into account unregulated energy, of **54.05%**.

In addition, the final SAP outputs at Appendix C demonstrate that the building achieves an overall improvement in regulated emissions over the Building Regulations Part L 2012 standards for regulated emissions of minimum of 63.36%.

Tables 8 & 9 Demonstrate how the Westbury Avenue project complies with the London Plan requirements and the GLA guidance relating to zero carbon development based up SAP2012 emissions data.

Table 8 – Carbon Emission Reductions – Domestic Buildings

Key	Tonnes/annum
Baseline CO ₂ emissions (Part L 2013 of the Building Regulations Compliant Development)	1.5
CO ₂ emissions after energy demand reduction (be lean)	1.3
CO ₂ emissions after energy demand reduction (be lean) AND heat network (be clean)	1.3
CO ₂ emissions after energy demand reduction (be lean) AND heat network (be clean) AND renewable energy (be green)	0.5

Table 9 – Regulated Emissions Savings – Domestic Buildings

	Regulated Carbon Dioxide Savings	
	(Tonnes CO ₂ per annum)	%
Savings from energy demand reduction	0.2	10%
Savings from heat network	0.0	0%
Savings from renewable energy	0.8	53%
Total Cumulative Savings	1.0	63%
	(Tonnes CO ₂)	
Carbon Shortfall	0.5	
Cumulative savings for off-set payment	16	
Cash-in-lieu Contribution	N/A	

Appendix A

Baseline/Un-regulated Energy Use:-

SAP Outputs & Dwelling Emission Rates

Appendix B

Energy Efficient Design:-

SAP Outputs & Dwelling Emission Rates

Appendix C

Generating energy on-site:-

SAP Outputs & Dwelling Emission Rates

Appendix D

Part G internal water use calculations