JAW

Caxton Road, Wood Green, N22

Energy Strategy Report

10th March 2020

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JAWSustainability

Contents

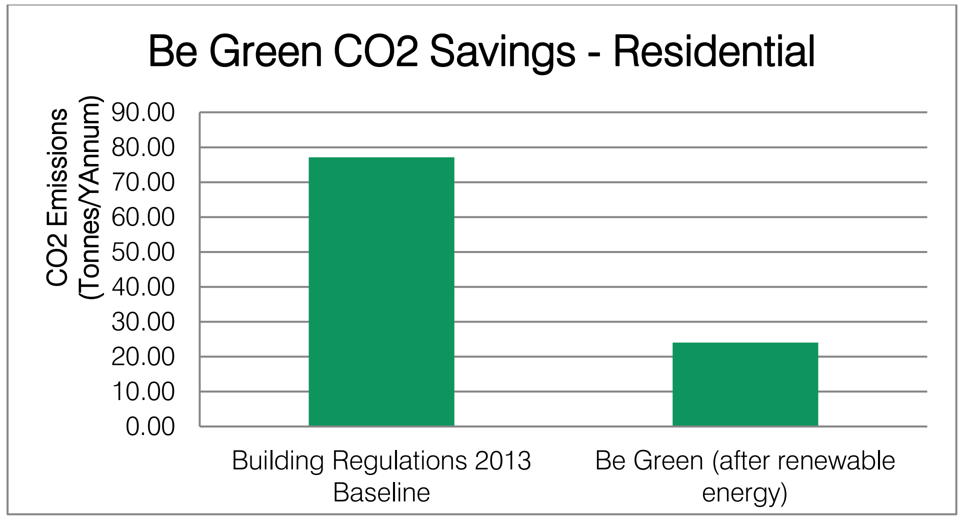
Executive Summary

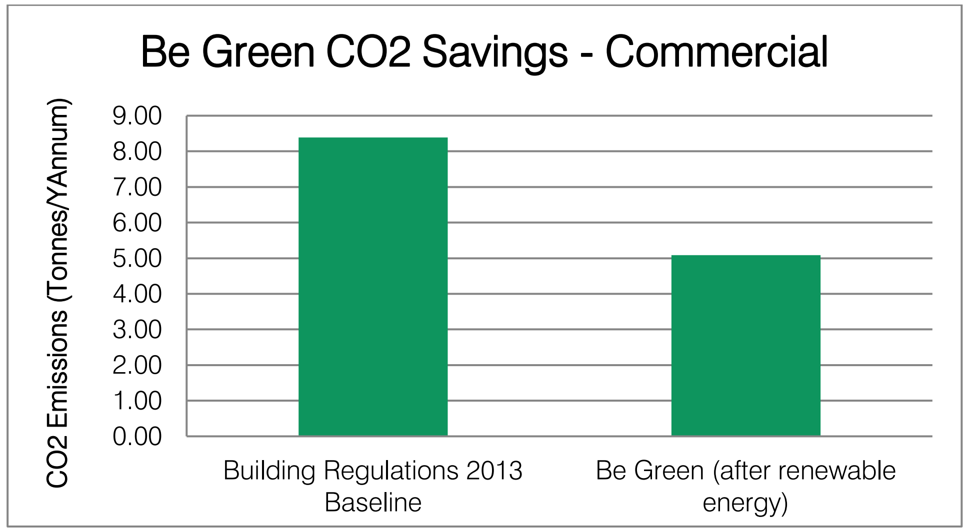
This energy strategy has been prepared for the development at Caxton Road, to support application for full planning permission for mixed use development comprising 75 residential dwellings with 980m^2 of commercial on the ground and first floors.

This report demonstrates how the proposed development addresses local planning policies relating to energy and sustainability.

Following the energy hierarchy, passive design measures, energy efficient equipment have shown an improvement of 69% and 39% over Part L for the residential and commercial parts of the development respectively. The heating and cooling hierarchies have also been followed. An offset payment is proposed to achieve zero carbon overall.

The design team have made all reasonable endeavours to achieve the maximum carbon savings. The fabric performs significantly than building regulations minimum standards, highly efficient systems are specified, and the PV system utilises all available roof space.





1 Introduction

This energy strategy has been prepared for the development at Caxton Road, Wood Green, to support application for full planning permission for mixed use development comprising the construction a total of 980 sqm divided into 7 commercial units on the ground floor, 4 of which span over the ground and first floors. 75 residential dwellings will be constructed on the 1st to 8th floors across two blocks. Associated amenity areas, cycle storage and refuse/recycling stores will also be provided.

Figure 1-01 Caxton Road Road © Google Maps

This statement summarises the sustainable design and construction measures that have been incorporated into the project in order to meet the sustainability requirements of the London Borough of Haringey and the London Plan.

Figure 1-02 Proposed Ground Floor of Caxton Road Site

1.1 Assessment approach

This report summarises the work undertaken to support the development of an energy strategy for the new development, following the energy hierarchy 'Be Lean, Be Clean, Be Green, Be Seen'.

Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) calculations have been carried out for the residential units and thermal model for the commercial element. These are used to assess the impact on energy demand and CO_2 emissions of improvements through the hierarchy and demonstrate the most appropriate solution for the development to meet the relevant planning requirements. The SAP 10 carbon factors have been used to calculate the carbon emissions for the development.

2 Policy

2.1 London Borough of Haringey Development Management Plan (2017)

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.

Policy DM22: Decentralised Energy

A. Subject to other policy requirements, proposals that contribute to the provision and use of Decentralised Energy network infrastructure will be supported. Communal energy systems

B. All development that incorporates site-wide communal energy systems should examine opportunities for extending such systems, irrespective of whether it is connected to a DE network.

C. All development that incorporates site-wide communal energy systems should optimise opportunities for extending such systems beyond the site boundary to supply energy to neighbouring existing and planned future developments. Existing and planned future DE networks

D. All development proposals should prioritise connection to existing or planned future DE networks.

E. All major development located within 500 metres of an existing DE Network, and minor new-build development located within 25 metres, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability.

F. All major development located within 500 metres of a planned future DE Network, which is considered by the Council likely to be operational within 3 years of a grant of planning permission, will be expected to secure connection to that network subject to demonstration of technical feasibility and financial viability. DE network 'connection zones'

G. All major development located within 500 metres of a DE network 'connection zone' should be designed for connection to a DE network.
H. All minor new-build development located within 25 metres of a DE network 'connection zone' should be designed for connection to a DE network.

2.2 The London Plan Policies on Energy

The policies referred to in order to develop this energy strategy, are those in the Intend to Publish New London Plan, which we expect to be published prior to determination of this application.

Policy SI 2 Minimising greenhouse gas emissions

A. Major development should be net zero-carbon. This means reducing greenhouse gas emissions in operation and minimising both annual and peak energy demand in accordance with the following energy hierarchy:

1. be lean: use less energy and manage demand during operation
2. be clean: exploit local energy resources (such as secondary heat) and supply energy efficiently and cleanly
3. be green: maximise opportunities for renewable energy by producing, storing and using renewable energy on-site
4. be seen: monitor, verify and report on energy performance.

B. Major development proposals should include a detailed energy strategy to demonstrate how the zero-carbon target will be met within the framework of the energy hierarchy.

C. A minimum on-site reduction of at least 35 per cent beyond Building Regulations156 is required for major development. Residential development should achieve 10 per cent, and non-residential development should achieve 15 per cent through energy efficiency measures. Where it is clearly demonstrated that the zero-carbon target cannot be fully achieved on-site, any shortfall should be provided, in agreement with the borough, either:

a. through a cash in lieu contribution to the borough's carbon offset fund, or

b. off-site provided that an alternative proposal is identified, and delivery is certain.

D. Boroughs must establish and administer a carbon offset fund. Offset fund payments must be ring-fenced to implement projects that deliver carbon reductions. The operation of offset funds should be monitored and reported on annually.

E. Major development proposals should calculate and minimise carbon emissions from any other part of the development, including plant or equipment, that are not covered by Building Regulations, i.e. unregulated emissions.

F. Development proposals referable to the Mayor should calculate whole life-cycle carbon emissions through a nationally recognised Whole Life-Cycle Carbon Assessment and demonstrate actions taken to reduce life-cycle carbon emissions.

Policy SI 3 Energy infrastructure

A. Boroughs and developers should engage at an early stage with relevant energy companies and bodies to establish the future energy and infrastructure requirements arising from large-scale development proposals such as Opportunity Areas, Town Centres, other growth areas or clusters of significant new development.

B. Energy masterplans should be developed for large-scale development locations (such as those outlined in Part A and other opportunities) which establish the most effective energy supply options. Energy masterplans should identify:

1) major heat loads (including anchor heat loads, with particular reference to sites such as universities, hospitals and social housing)
2) heat loads from existing buildings that can be connected to future phases of a heat network
3) major heat supply plant including opportunities to utilise heat from energy from waste plants
4) secondary heat sources, including both environmental and waste heat
5) opportunities for low and ambient temperature heat networks
6) possible land for energy centres and/or energy storage
7) possible heating and cooling network routes
8) opportunities for futureproofing utility infrastructure networks to minimise the impact from road works
9) infrastructure and land requirements for electricity and gas supplies
10) implementation options for delivering feasible projects, considering issues of procurement, funding and risk, and the role of the public sector
11) opportunities to maximise renewable electricity generation and incorporate demand-side response measures.

C. Development Plans should:

1) identify the need for, and suitable sites for, any necessary energy infrastructure requirements including energy centres, energy storage and upgrades to existing infrastructure
2) identify existing heating and cooling networks, identify proposed locations for future heating and cooling networks and identify opportunities for expanding and inter-connecting existing networks as well as establishing new networks.

D. Major development proposals within Heat Network Priority Areas should have a communal low-temperature heating system:

1) the heat source for the communal heating system should be selected in accordance with the following heating hierarchy:

a) connect to local existing or planned heat networks
b) use zero-emission or local secondary heat sources (in conjunction with heat pump, if required)
c) use low-emission combined heat and power (CHP) (only where there is a case for CHP to enable the delivery of an area-wide heat network, meet the development's electricity demand and provide demand response to the local electricity network)
d) use ultra-low NOx gas boilers

2) CHP and ultra-low NOx gas boiler communal or district heating systems should be designed to ensure that they meet the requirements in Part B of Policy SI 1 Improving air quality
3) where a heat network is planned but not yet in existence the development should be designed to allow for the cost-effective connection at a later date.

E. Heat networks should achieve good practice design and specification standards for primary, secondary and tertiary systems comparable to those set out in the CIBSE/ADE Code of Practice CP1 or equivalent.

Policy SI 4 Managing heat risk

A. Development proposals should minimise adverse impacts on the urban heat island through design, layout, orientation, materials and the incorporation of green infrastructure.

B. Major development proposals should demonstrate through an energy strategy how they will reduce the potential for internal overheating and reliance on air conditioning systems in accordance with the following cooling hierarchy:

1) reduce the amount of heat entering a building through orientation, shading, high albedo materials, fenestration, insulation and the provision of green infrastructure
2) minimise internal heat generation through energy efficient design
3) manage the heat within the building through exposed internal thermal mass and high ceilings
4) provide passive ventilation
5) provide mechanical ventilation
6) provide active cooling systems.

3 Energy Strategy

An energy strategy has been developed following the energy hierarchy ‘Be Lean, Be Clean, Be Green’, ‘Be Seen’. Energy calculations using Building Regulations approved and accredited software have been undertaken at each stage to calculate the savings associated with the measures incorporated.

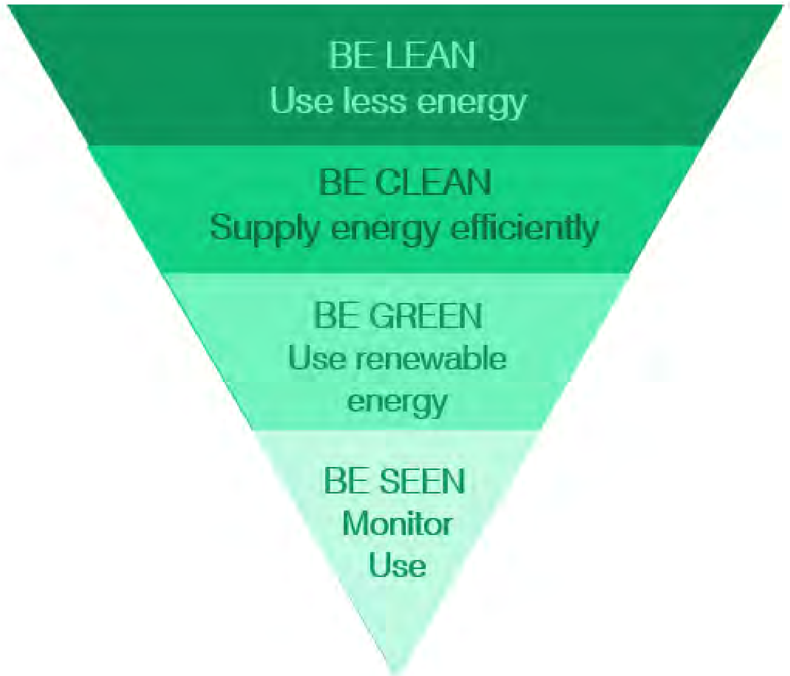


Figure 3-01 The Energy Hierarchy

The energy consumption and carbon emission figures within this report have been calculated using the approved Standard Assessment Procedure for the Energy Rating of Dwellings (SAP) and SBEM.

3.1 Energy Targets

In line with the London Plan, there is a target of a 35% reduction over Part L 2013. Table 3-01 and Table 3-02 details the energy and carbon breakdown of the Part L target emission rate.

	Gas (kWh/yr)				Electricity (kWh/yr)				
Use Type	Space Heating	Hot Water	Total	Gas CO2 (kg/yr)	Cooling	Pumps & Fans	Lighting	Total	Electricity CO2 (kg/yr)
Resi	187,755	148,485	336,241	70,611	0	5,679	22,410	28,089	6,545
Com	7,379	2,273	9,652	2,027	3,326	1,338	22,630	27,293	6,359
Total	195,135	150,758	345,893	72,638	3,326	7,017	45,040	55,382	12,904

Table 3-01 Target regulated energy demand and carbon emissions per energy source

Use Type	Total Energy	Total CO2
Residential	364,330	77,155
Commercial	36,945	8,386
Total	401,275	85,542

Table 3-02 Total target regulated energy demand and carbon emissions

3.2 Be Lean

As part of the Be Lean approach, passive design measures have been considered throughout the pre-planning stage to reduce initial energy demand.

Solar Gain Control and Daylight

Solar gains are a passive form of heating from the sun’s radiation and are beneficial to a building during winter months as they provide an effective source of heat and reduce internal heating requirements. However, during summer months they must be controlled in order to mitigate the risk of overheating. They can be controlled through glazing and shading design in order to allow low level winter sun to enter the building and to limit access to high level summer sun.

The glazing strategy design has carefully considered orientation and window size in order to maximise daylight while controlling excessive solar gains. Glazing will incorporate low emissivity coatings to limit overheating without compromising light transmittance.

Overheating

The building follows the steps in the cooling hierarchy to minimise overheating. Please refer to the overheating report: ‘200309 Caxton Road Overheating Assessment V02’.

Building Fabric

Designing an efficient thermal envelope will greatly reduce the need for space heating and cooling as heat transmittance through the thermal elements is reduced.

Low air permeability rates will also reduce heating and cooling energy demand by reducing the volume of air that can penetrate the building.

As part of a 'fabric first' approach, the building fabric has been carefully considered and specified to meet or exceed current Building Regulations minimum requirements, as detailed in Table 3-03 below.

Fabric Component	Residential Specification	Commercial Specification
External Walls	0.13 W/m²K	0.13 W/m²K
Stairwell/Corridor/Lift Wall	0.15W/m²K	-
Roof	0.11 W/m²K	0.18 W/m²K
Ground floor		0.15 W/m²K
Exposed Floor	0.11 W/m²K	
Party Walls	Fully filled cavity with edge sealing	-
Windows	1.2 W/m²K G-value 0.4	1.5 W/m²K G-value 0.3
External Doors	1 W/m²K	-
Air Tightness	3m³/m²/h	5 m³/m²/h
Thermal Bridging	Y=0.08, requires calculation at detailed design	Default

Table 3-03 Proposed Be Lean passive design measures

With regards to party walls, to reach the required standards, these must be fully filed. Partially filled cavities will not comply.

Thermal bridging

Non-repeating thermal bridges at junctions will be designed carefully in order to ensure that they perform better than typical constructions. It is proposed that an average Y-value of 0.08 is achieved across the project. This will be achieved through a combination of Accredited Construction Details (ACDs) for more standard junctions (e.g. corners, external wall junctions with floors and party walls) and bespoke designed bridges that are then calculated using thermal modelling software. At this stage of design further information is not available but all designs will ensure the 0.08 value is achieved on construction.

Building Services

A communal system has been identified as being the most appropriate for the site. These have been specified to maximise efficiency therefore reducing energy used to deliver services.
As per the recommendations of the London Plan, the commercial sections of the development were modelled was a communal gas boiler of 97% efficiency for heating and hot water, for the baseline be lean stage.

Table 3-04 shows the proposed services strategy and energy efficiency measures for the development.

Services Component	Residential Specification	Commercial Specification
Space Heating & hot water	Communal gas boiler, 97% efficient Charging linked to use off heat, programmer & TRVs U/F Heating	*Gas heating assumed for be lean stage calculations*
Cooling	-	VRF COP 5.1
Heating Controls	Time and temperature zone control	-
Ventilation	MVHR 91% efficient SFP 0.5 w/l/s Rigid Duct/ Insulated Approved Installation	MVHR, 90% Heat recovery efficiency, SFP 1.5 W/l/s Demand control
Lighting & Controls	100% low energy lighting	80 lm/W Daylight Control dimming, Occupancy sensing
Metering	-	
Electrical Power Factor	-	

Table 3-04 Proposed energy efficient design measures

The breakdown of carbon and energy use has been identified for the site. Table 3-05 and Table 3-06 show the breakdown of carbon and energy use once the strategies proposed at the be lean are incorporated.

Use Type	Gas (kWh/yr) Space Heating	Hot Water	Total	Gas CO2 (kg/yr)	Electricity (kWh/yr) Cooling	Pumps & Fans	Lighting	Total	Electricity CO2 (kg/yr)
Resi	109,928	151,127	261,056	54,822	-	13,177	22,308	35,485	8,268
Com	12,781	2,401	15,182	3,188	3,345	3,778	9,199	16,225	3,780
Total	122,709	153,528	276,237	58,010	3,345	16,955	31,507	51,709	12,048

Table 3-05 Estimated regulated energy demand and carbon emissions per energy source

Use Type	Total Energy	Total CO2
Residential	296,540	63,090
Commercial	31,406	6,968
Total	327,946	70,058

Table 3-06 Total estimated regulated energy demand and carbon emissions

Carbon Savings

Table 3-07 demonstrates the percentage improvement over the notional baseline levels for the be lean stage.

Energy Hierarchy stage	Residential			Commercial		
	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving
Building Regulations 2013 Baseline	77.16			8.39		
Be Lean	63.09	14.07	18.2%	6.97	1.42	17%

Table 3-07 improvements over Part L

3.3 Be Clean

As part of the Be Clean approach, the use of energy efficient equipment, heat networks and community heating have been considered.

District Energy Systems

The development is located in an area highlighted as a Decentralized Enegy Conective Zone within the Haringey Development Mangement Document, shown in in Figure 3-02.

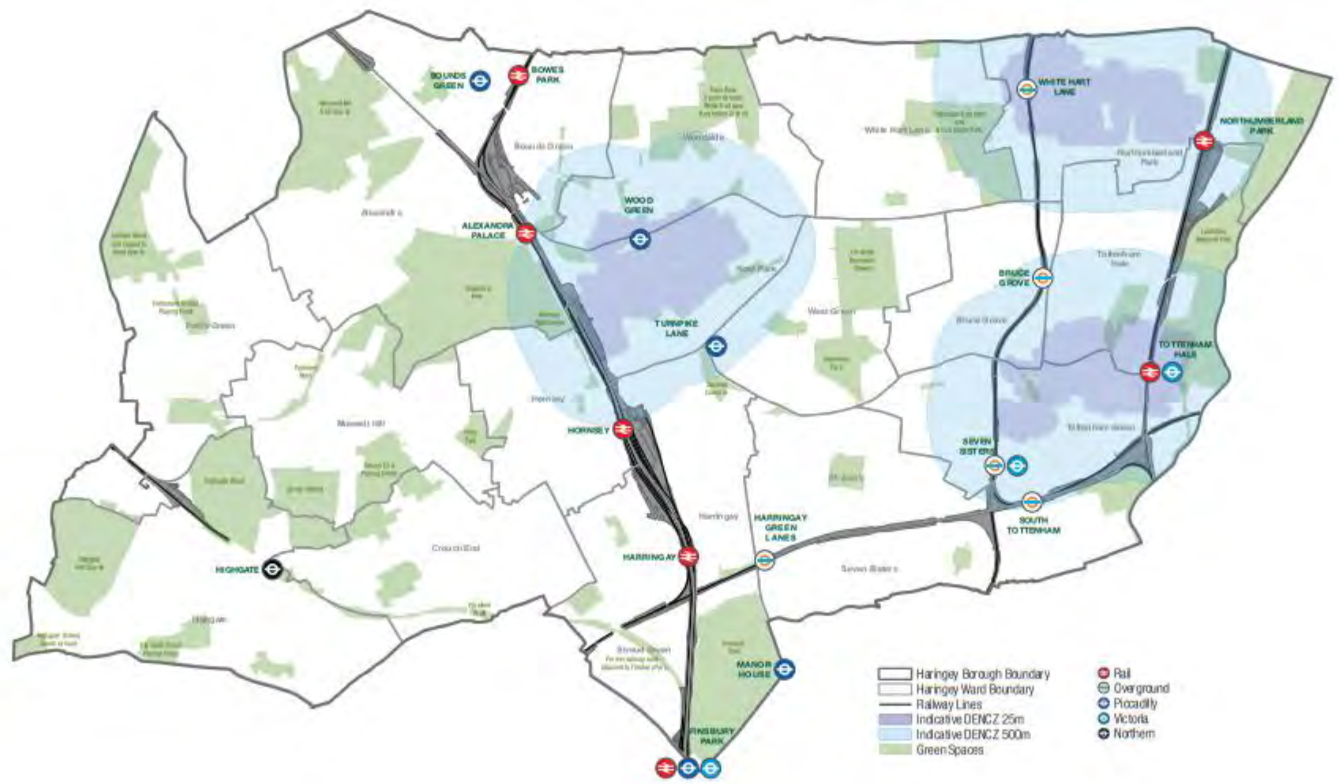


Figure 3-02 Hanringay Decentralized Enegy Conective Zone

A new heat network is proposed within the vacinity of the development. Upon construction, the Wood Green FES network, shown in Figure 3-03, will provide a connection for the develop to a district heating system.

The energy strategy for the development, is to connect to the proposed district heating network at Wood Green, following the advice given during the pre-application consultation. It is currently unsure when this district heating system will become available. In order to provide heating for the site, in the interim stage, communal gas boilers will be provided. This communal system will be future proofed in order to connect to the Wood Green Network when it is completed. The energy savings and carbon offset payment for the development have been presented for the district heating strategy. The interim communal gas strategy is presented within Appendix 1.

therefore the energy strategy for this proposal has been developed to incorporate this. At present it is not available for the development to connect to this heat network as construction of it has not yet begun. The development will be designed with communal gas heating systems in order to ensure there is a heat source on completion, but will be futureproofed for connection to the network.

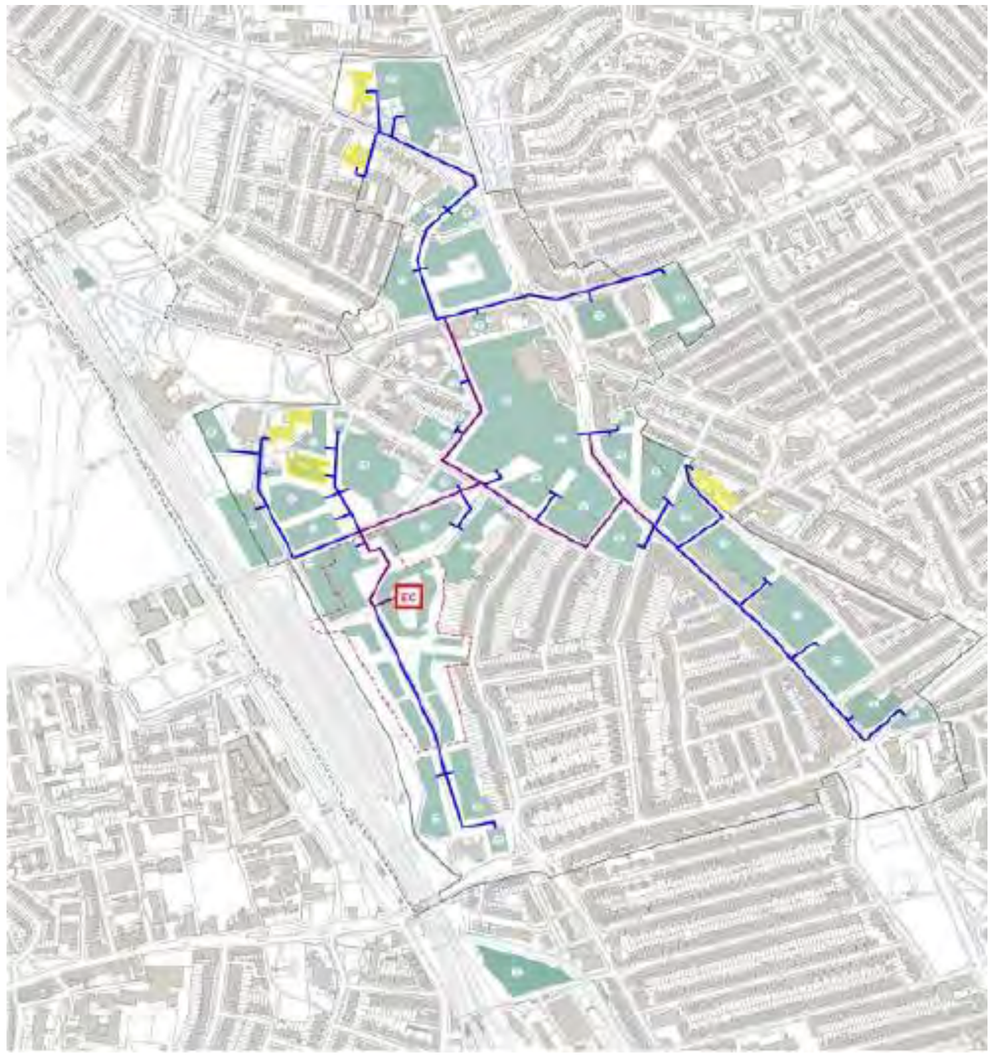


Figure 3-03 Hanringay Decentralized Enegy Conective Zone

Heating Hierarchy

Following the heating hierarchy, the energy strategy for the development is to connect to the proposed heat network at Wood Green. The heating hierarchy has been followed to determine the most technically feasible option for the residential heating, during the interim stage, is communal gas boilers. As it is anticipated that the development will be able to make a future connection to the district heating network, this technology is considered the most appropriate in order to ensure streamlined decommissioning in the future.

Efficient systems for energy delivery have also been investigated. At this scale, Combined Heat and Power (CHP) systems are not viable. CHP requires a high base energy demand load in order to operate efficiently. It is usually more suited to hotel or hospital schemes which have a high hot water demand, or very large residential or mixed use schemes incorporating several hundred units.

The commercial sections are likely to require cooling and as such a completely separate system is proposed, not connected to the communal heating system. This is outlined in the Be Green section of this report and, therefore, no further savings are made at the Be Clean stage for the commercial section of the development.

Energy Use

The breakdown of carbon and energy use has been identified for the Be Clean stage. Table 3-08 and Table 3-09 shows the breakdown of carbon and energy use after the implementation of the district heating strategy.

District Heating Strategy											
Use Type	Heat (kWh/yr)			Heat CO2 (kg/yr)	Electricity (kWh/yr)						Electricity CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heat	HW	Cooling	Pumps & Fans	Lighting	Total	
Resi	109,928	151,127	261,056	21,146	-	-	-	13,177	22,308	35,485	8,268
Com	-	-	-	-	3,424	2,184	3,247	3,778	9,199	21,833	5,087
Total	109,928	151,127	261,056	21,146	3,424	2,184	3,247	16,955	31,507	51,709	12,048

Table 3-08 Estimated regulated energy demand and carbon emissions per energy source

Use Type	Total Energy	Total CO2
Resi	296,540	29,413
Commercial	31,406	6,968
Total	327,946	36,382

Table 3-09 Total regulated energy demand and carbon emissions

Carbon Savings

Table 3-10 and Figure 3-04 demonstrate the percentage improvement over the notional baseline levels for the development for the district heating case. The SAP 10 Carbon Factors have been used to calculate the percentage savings for the development and a carbon factor of 0.081kgCO2/kWh for that generate by the district heating network.

District Heating Strategy	Residential			Commercial		
Energy Hierarchy stage	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving
Building Regulations 2013 Baseline	77.16			8.39		
Be Lean	63.09	14.07	18%	6.97	1.42	17%
Be Clean	29.41	33.68	43.6%	6.97	0.00	0.0%
Total Cumulative Savings		47.74	62%		1.42	17%

Table 3-10 improvements over Part L

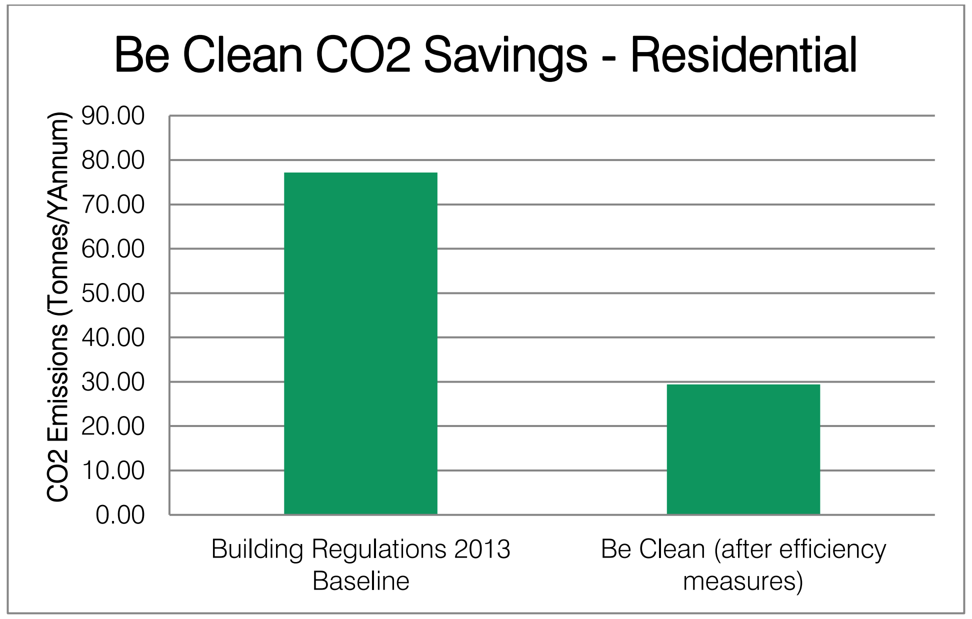


Figure 3-04 Residential improvement over Building Regulations Part L 2013 for the district heating case

3.4 Be Green

At the Be Green stage, renewable technologies are investigated. Table 3-11 considers the feasibility of renewable energy technologies for the scheme.

LZC Technologies	Description	Noise	Visual impact	Internal Space	External Space	Capital Cost	Maintenance	Feasibility	
Solar Thermal Collectors 	Solar thermal collectors can be used to provide hot water using the irradiation from the sun. They can generally provide approx. 50% of the hot water demand	●	●	●	●	●	●	There are areas of flat roof that can incorporate solar technologies. However, carbon savings are quite low and it is quite a high cost technology.	×
Solar Photovoltaic Panels 	Solar PV panels generate electricity from the sun's energy. They should be installed within 90° of due south ideally at a 30° angle. The electricity can be used to supply the landlords load.	●	●	●	●	●	●	There are areas of flat roof that can incorporate solar technologies. Solar PV is ideal for making carbon savings while being a simple technology.	✓
Biomass Heating 	Solid, liquid or gaseous fuels derived from plant material can provide boiler heat for space and water heating A biomass boiler would supplement a standard gas heating system so some of the cost may be offset through money saved on using smaller traditional boilers reliability of fuel access/supply can be a problem	●	●	●	●	●	●	Biomass is not considered feasible for this development due to issues with fuel storage, access for delivery vehicles and local NO_x emissions	×

Wind Turbines 	Vertical and horizontal axis wind turbines enable electricity to be generated using the power within the wind Not suitable for urban environments due to low wind conditions and obstructions	🔴	🔴	🟢	🔴	🔴	🟡	This development is in an urban environment and so a wind turbine will not generate much energy	×
Ground Source Heat Pumps (GSHP) 	Utilising horizontal loops or vertical boreholes, GSHP make use of the grounds almost constant temperature to provide heating and/or cooling using a heat exchanger connected to a space/water heating delivery system Optimum efficiency with underfloor heating systems	🟡	🟢	🟡	🟡	🔴	🟡	GSHP are not a feasible technology for the site since there is a limited external space available for installation of boreholes	×
Air Source Heat Pumps (ASHP) 	Air Source Heat Pumps extract latent energy from the external air in a manner similar to ground source heat pumps Optimum efficiency with underfloor heating systems	🟡	🟡	🟡	🟡	🟡	🟡	Air source heat pumps are a feasible option for the commercial element of the project, to provide both heating and cooling.	✓

Table 3-11 Feasibility of LZC technologies for the development

The feasibility study has identified solar PV as the most appropriate technology for the residential part of the development, and air source heat pumps for the commercial.

Renewable systems

For the commercial sections of the development, VRF heating is proposed. Although this does not deliver any saving using the current carbon factors, using the proposed SAP 10 carbon factors, this delivers a significant saving over gas boilers.

Services Component	Residential Specification	Commercial Specification
Space Heating & hot water	-	VRF CoP 3.4 Instantaneous electric DHW
Photovoltaic panels	Peak Power – 28kWp Orientation – SE/SW Angle of elevation – 30˚ Panel specification – Min 20% efficiency Approx. no of panels – 86	

Table 3-12 Proposed Be Green systems

3.5 Energy and Carbon Savings

The energy strategy for the development, is to connect to the proposed district heating network at Wood Green, following the advice given during the pre-application consultation. It is currently unclear when this district heating system will become available. In order to provide heating for the site, in the interim stage, communal gas boilers will be provided. This communal system will be future proofed in order to connect to the Wood Green Network when it is completed. The energy savings and carbon offset payment for the development have been presented for the district heating strategy. The interim communal gas strategy is presented within Appendix 1.

Energy Use

The breakdown of carbon and energy use has been identified for the site. Table 3-13 and Table 3-14 demonstrate the breakdown of carbon and energy use once the district heating strategies proposed in this report are incorporated.

District Heating Strategy													
Use Type	Heat (kWh/yr)			Heat CO2 (kg/yr)	Electricity (kWh/yr)							Electricity CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heat	HW	Cooling	Pumps & Fans	Lighting	PV	Total	
Resi	109,928	151,127	261,056	21,146	-	-	-	13,177	22,308	-23,005	12,480	2,908
Com	-	-	-	-	3,424	2,184	3,247	3,778	9,199	-	21,833	5,087
Total	109,928	151,127	261,056	21,146	3,424	2,184	3,247	16,955	31,507	-23,005	34,312	7,995

Table 3-13 Estimated regulated energy demand and carbon emissions per energy source

Use Type	Total Energy	Total CO2
Residential	273,536	24,053
Commercial	21,833	5,087
Total	295,368	29,140

Table 3-14 Total estimated regulated energy demand and carbon emissions

Carbon Savings

Table 3-15, Figure 3-05 and Figure 3-06 demonstrate the percentage improvement over the notional baseline levels for the development for the district heating case, with renewable measures incorporated.

District Heating Strategy	Residential			Commercial		
Energy Hierarchy stage	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving
Building Regulations 2013 Baseline	77.16			8.39		
Be Lean	63.09	14.07	18.23%	6.97	1.42	17%
Be Clean	29.41	33.68	43.6%	6.97	0.00	0.0%
Be Green	24.05	5.36	6.95%	5.09	1.88	22%
Total Cumulative Savings		53.10	68.82%		3.30	39%

Table 3-15 improvements over Part L

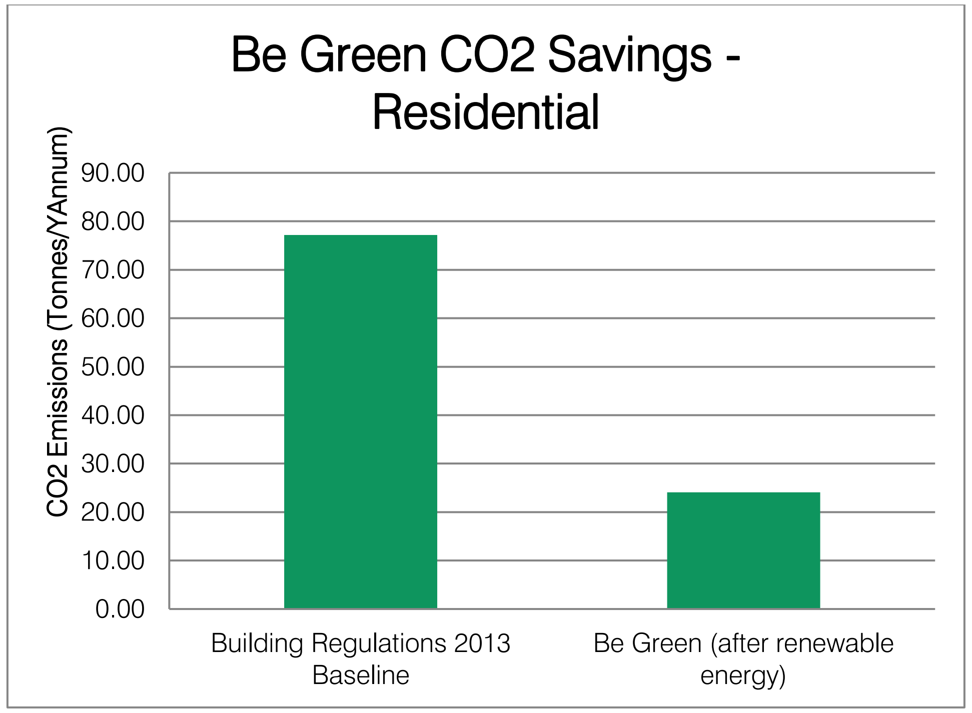


Figure 3-05 Residential improvement over Building Regulations Part L 2013 for the district heating case

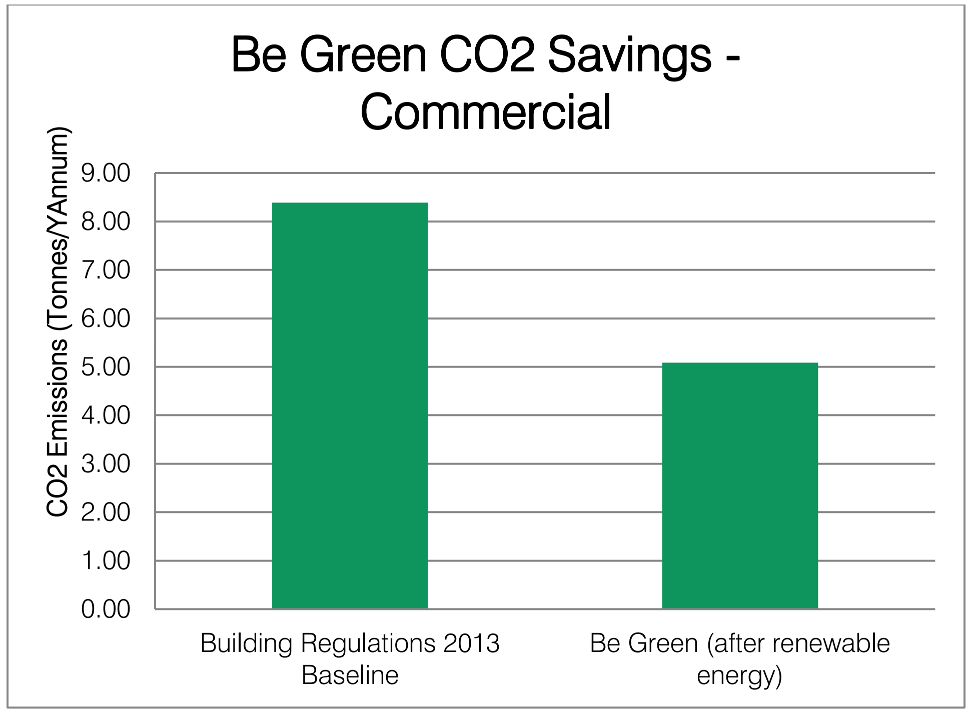


Figure 3-06 Commercial Improvement over Building Regulations Part L 2013

Carbon Offset Payment

The development has achieved a 69% and 39% improvement over Part L for the residential and commercial parts of the development respectively. In line with the London Plan carbon reduction requirements, there is a target of zero carbon, which can be achieved through an offset payment when there is a shortfall on site. The pre-application consultation stated that two carbon offset payments were to be completed for both the interim communal gas scenario and the district heating scenario. The difference between these two payments will be delayed for a period of ten years, providing a time period to connect to the proposed district heating system. If the development connects to the district system within this time the difference in carbon offset payment will not be required but the scheme will be required to pay up to this amount as a connection charge. This calculation is detailed below for the district heating and communal gas cases in Table

	Shortfall on zero carbon – District Heating		
	Carbon emissions (tonnes / annum)	30 year carbon emissions	Offset payment (£95/tonne)
Residential	24.05	722	£ 68,552
Commercial	5.09	153	£ 14,498

	Shortfall on zero carbon – Communal Gas		
	Carbon emissions (tonnes / annum)	30 year carbon emissions	Offset payment (£95/tonne)
Residential	57.73	1732	£ 164,529
Commercial	5.09	153	£ 14,498

3.6 Be Seen

All major plant will be fitted with meters to allow remote monitoring of energy used by the communal heating systems and electrical distribution boards and commercial heat pumps. A contract will be put in place to monitor the readings so that they can be compared with the predicted energy performance, and this information will be reported.

4 Conclusion

The development incorporates 75 residential dwellings with 980m^2 commercial below.

As required by the London Plan, the development follows the energy hierarchy, incorporating passive design measures, energy efficient equipment and renewable energy.

The development employs an efficient building fabric, including well insulated walls and highly efficient glazing, efficient systems, air source heat pumps and PV Panels are specified to maximise carbon savings for the site.

At the be lean stage, this results in a 18% and 17% over Part L for the residential and commercial parts of the development respectively. This exceeds the minimum requirement of 10% for the residential and 15% requirement for commercial.

The development has been advised during the pre-application consultation that the long term strategy is to connect to the proposed network at Wood Green. Construction on this proposed system has not yet begun, so an interim strategy, as presented in Appendix 1, of communal gas boilers will be adopted to providing heating whilst the Wood Green Network is developed. At the be green stage the overall results are a 69% and 39% improvement over Part L for the residential and commercial parts of the development respectively. The development follows the energy hierarchy, heating hierarchy and cooling hierarchy. The systems specified represent the best available for the development to save carbon while future proofing to allow connection to the proposed heat network, ad detailed by the London Borough of Haringey, should this become possible in the future. The PV system is the largest that the roof can accommodate. The proposals therefore represent the best on site savings. The development will further achieve 'zero carbon' through an offset payment in line with the London Plan guidance.

The figures within this report are based on preliminary analysis only and further detailed studies will be required at the detailed design stage before specifying any of the proposed systems.

5 Appendix 1 – Interim Communal Gas Strategy

As it is currently unknown when the Wood Green district heating network will become available an interim communal gas strategy has been proposed to ensure heating is provided on site in the meantime. The targets and savings for the communal gas strategy are detailed below.

Energy Use

Communal Gas Strategy												
	Gas (kWh/yr)				Electricity (kWh/yr)							
Use Type	Space Heating	Hot Water	Total	Gas CO2 (kg/yr)	Space Heat	HW	Cooling	Pumps & Fans	Lighting	PV	Total	Electricity CO2 (kg/yr)
Resi	109,928	151,127	261,056	54,822	-	-	-	13,177	22,308	-23,005	12,480	2,908
Com	-	-	-	-	3,424	2,184	3,247	3,778	9,199	-	21,833	5,087
Total	109,928	151,127	261,056	54,822	3,424	2,184	3,247	16,955	31,507	-23,005	34,312	7,995

Table 5-01 Estimated regulated energy demand and carbon emissions per energy source for the communal gas case

Use Type	Total Energy	Total CO2
Residential	273,536	57,729
Commercial	21,833	5,087
Total	295,368	62,817

Table 5-02 Total regulated energy demand and carbon emissions per energy source for the communal gas case

Carbon Savings

Table 5-03, Figure 5-01 and Figure 5-02 demonstrate the percentage improvement over the notional baseline levels for the development for the communal gas case.

Communal Gas Stratgey	Residential			Commercial		
Energy Hierarchy stage	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving	CO_2 Emissions (T/yr)	CO_2 Savings (T/yr)	% Saving
Building Regulations 2013 Baseline	77.16			8.39		
Be Lean	63.09	14.07	18.2%	6.97	1.42	17%
Be Clean	63.09	0.00	0.0%	0.00	0.0%	0.00
Be Green	57.73	5.36	6.95%	5.09	1.84	22%
Total Cumulative Savings		19.43	25.18%		3.30	39%

Table 5-03 Improvements over Part L

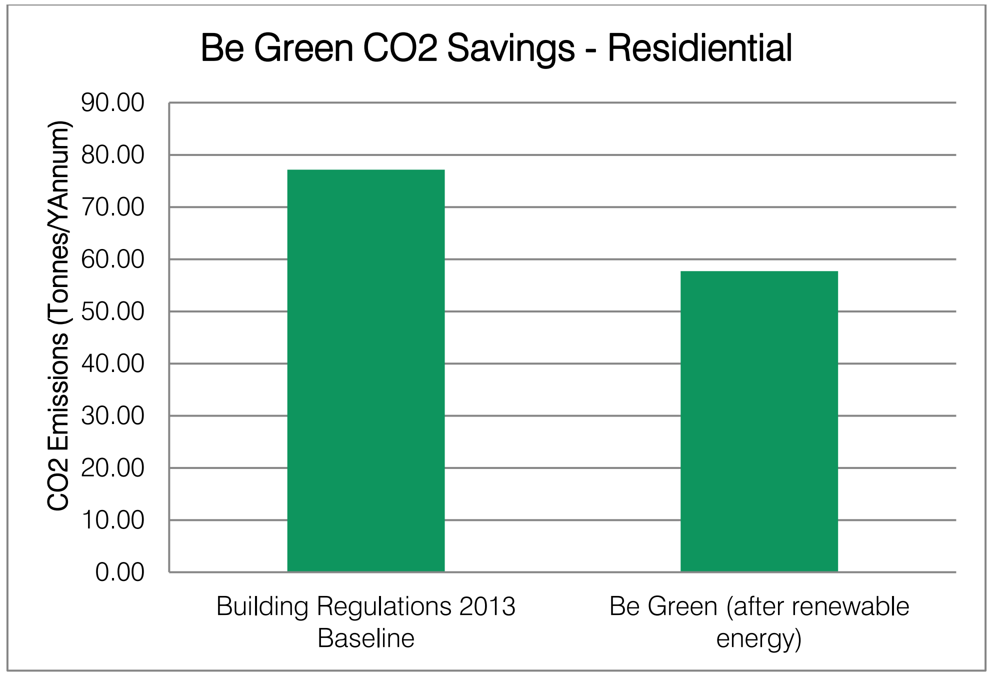


Figure 5-01 Residential improvement over Building Regulations Part L 2013 for the communal gas case

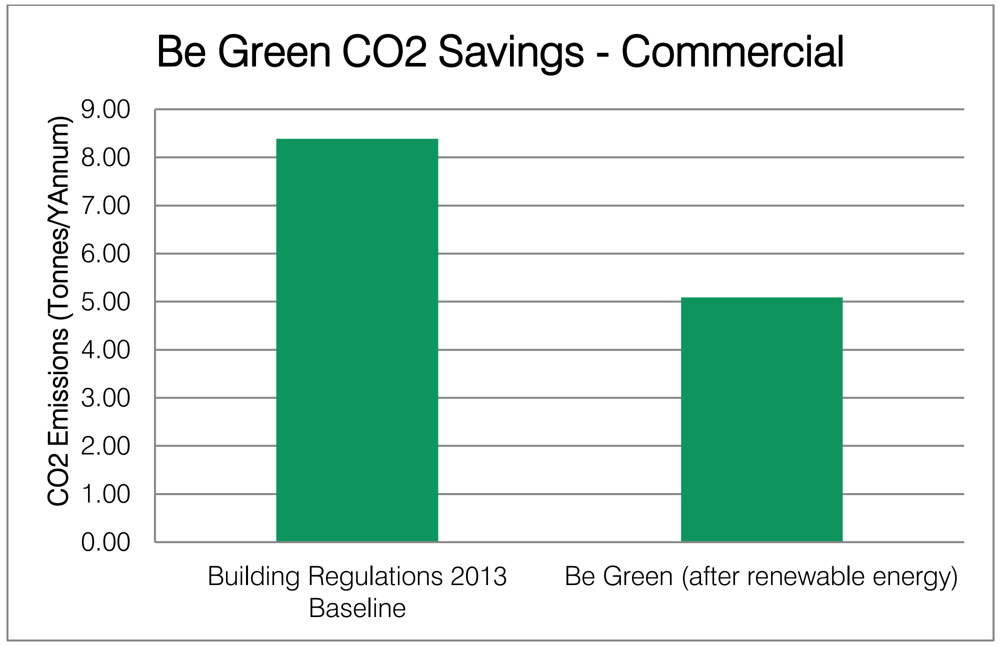


Figure 5-02 Commercial improvement over Building Regulations Part L 2013 for the communal gas case

Carbon Offset Payment

	Shortfall on zero carbon – Communal Gas		
	Carbon emissions (tonnes / annum)	30 year carbon emissions	Offset payment (£95/tonne)
Residential	57.73	1732	£ 164,529
Commercial	5.09	153	£ 14,498