1-3 Ferdinand Place
Energy and Sustainability Statement

22nd January 2021

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JAWSustainability

Contents

1 Introduction

The proposed development at Ferdinand Place comprises the Demolition of the existing building and the erection of a four storey building plus roof level accommodation and roof terrace comprised of office use (Class B1(a)) at ground floor level and 9 self-contained residential units (Class C3) on the upper floors with associated plant, cycle parking and refuse storage.

Figure 1-1 Ferdinand Place © Google Maps

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

1.1 Assessment Approach

An energy strategy has been developed following the energy hierarchy detailed in the London Plan. Energy calculations using Building Regulations approved and accredited software have been undertaken at each stage to calculate the savings associated with the measures incorporated.

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). This report has been checked by Jessica James who is an On Construction Domestic Energy Assessor (OCDEA).

2 Policy

2.1 The London Plan Policies on Energy

Policy SI 2: Minimising Green House Gas Emissions

The policies utilised 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.
All policies in Policy SI 2 relate to major developments and are therefore, not relevant to this development. The London Plan Energy Hierarchy is displayed below. As the development at Ferdinand Place is a minor development an energy strategy has been developed following the 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.

2.2 The London Borough of Camden – Camden Local Plan (2017)

Policy CC1: Climate Change Mitigation

The Council will require 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.

We will:

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

For decentralised energy networks, we will promote decentralised energy by:

- working with local organisations and developers to implement decentralised energy networks in the parts of Camden most likely to support them;
- protecting existing decentralised energy networks (e.g. at Gower Street, Bloomsbury, King's Cross, Gospel Oak and Somers Town) and safeguarding potential network routes.

All developments involving five or more dwellings and/or more than 500 sqm of (gross internal) any floorspace will be required to submit an energy statement demonstrating how the energy hierarchy has been applied to make the fullest contribution to CO2 reduction. All new residential development will also be required to demonstrate a 19% CO2 reduction below Part L 2013 Building Regulations (in addition to any requirements for renewable energy). This can be demonstrated through an energy statement or sustainability statement.

The Council will expect developments of five or more dwellings and/or more than 500 sqm of any gross internal floorspace to achieve a 20% reduction in carbon dioxide emissions from on-site renewable energy generation.

The development is not classed as a major development so the remaining requirement of Policy CC1 do not apply.

Policy CC2: Adapting to Climate Change

The Council will require development to be resilient to climate change.

All development should adopt appropriate climate change adaptation measures such as:

- the protection of existing green spaces and promoting new appropriate green infrastructure;
- not increasing, and wherever possible reducing, surface water runoff through increasing permeable surfaces and use of Sustainable Drainage Systems;
- incorporating bio-diverse roofs, combination green and blue roofs and green walls where appropriate; and
- measures to reduce the impact of urban and dwelling overheating, including application of the cooling hierarchy.

Any development involving 5 or more residential units or 500 sqm or more of any additional floorspace is required to demonstrate the above in a Sustainability Statement.

Sustainable design and construction measures

The Council will promote and measure sustainable design and construction by:

- ensuring development schemes demonstrate how adaptation measures and sustainable development principles have been incorporated into the design and proposed implementation;
- encourage new build residential development to use the Home Quality Mark and Passivhaus design standards.

3 Sustainability 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.

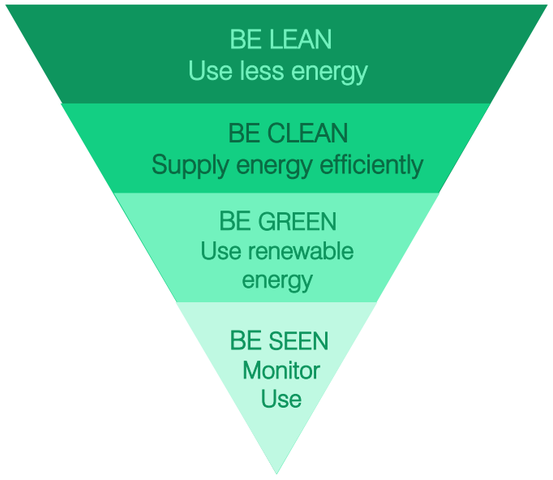

Figure 3-1 The Energy Hierarchy

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, the energy hierarchy has been followed and a saving over the Part L 2013 targets achieved. Table 3-1 below details the energy and carbon breakdown of the Part L target emission rate. The figures in this report are based on the current SAP 2012 carbon factors, as these are still relevant to regulation as the new SAP 10 is only in draft. There are alternative tables in the appendix based on SAP 10 carbon factors for information.

	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)						Electricity CO2 (kg/yr)	Total Energy (kWh/yr)	Total CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	HW	Cooling	Pumps & Fans	Lighting	Total			
Residential	23,103	20,680	**43,783**	**9,457**	0	0	0	675	2,607	**3,282**	**1,703**	**47,065**	**11,160**
Commercial	4,802	646	**5,448**	**1,177**	0	0	846	424	2,710	**3,980**	**2,066**	**9,428**	**3,242**

Table 3-1 Target regulated energy demand and carbon emissions per energy source

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, 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 to maximise daylight while controlling excessive solar gains. Glazing will incorporate low emissivity coatings to limit overheating without compromising light transmittance.

Overheating

The impact of solar gains has been analysed as part of the SAP calculations, taking into account the ventilation strategies and the risk of solar overheating has been concluded to be not significant, when measured against the Part L1A criteria.

The cooling hierarchy

The development has followed the cooling hierarchy as follows:

Requirement	Measures
Minimise internal heat generation through energy efficient design	The building incorporates individual gas boilers, but these will be fully insulated and run at temperatures adequate for operation but not too high. The commercial section will employ Highley efficient lighting to minimise internal heat generation
Reduce the amount of heat entering a building in summer through orientation, shading, albedo, fenestration, insulation and green roofs and walls	The glazing strategy is designed to balance daylight and overheating. Low emissivity coatings will be applied to windows. Overhanging balconies are built into most of the façade for shading.
Manage the heat within the building through exposed internal thermal mass and high ceilings	Floor to ceiling height is maximised within the building constraints
Passive ventilation	All the flats are dual aspect, as well as the commercial units. This will provide opportunity for passive ventilation in summer.
Mechanical ventilation	MVHR is provided in order to maintain air quality and reduce noise levels so adequate ventilation can be provided at all times of day and night
Active cooling systems (ensuring they are the lowest carbon options).	The flats are cooled naturally. The commercial section has Highley efficient VRF cooling proposed

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 3-2 below.

Fabric Component	Residential Proposed Specification	Commercial Proposed Specification
External Walls	0.14 W/m^{2}K	0.20 W/m^{2}K
Walls to communal areas and lift shafts	0.2 W/m^{2}K	0.25 W/m^{2}K
Roof	0.13 W/m^{2}K	-
Residential to Commercial floor/ceiling	0.13 W/m^{2}K	-
Ground Floor	-	0.14 W/m^{2}K*
Party Walls	Fully Filled with Edge Sealing	-
Windows	1.2 W/m^{2}K	1.5 W/m^{2}K, g=0.4
Roof Lights	1.1 W/m^{2}K	-
Air Tightness	4 m3/m2/hr	4 m3/m2/hr
Thermal Bridging	Default	Default
*After correction for ground contact, 0.25 W/m2K before ground contact correction		

Table 3-2 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.

Building Services

Individual systems have been identified as being the most appropriate for the site. These have been specified to maximise efficiency therefore reducing energy used to deliver services.

For the Be Lean case, commercial heat and hot water is supplied by a gas boiler with an efficiency of 91%, in line with the guidance in the London Plan. The proposed specification for the commercial heating and hot water systems is outlined in the Be Green section of this report.

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

Services Component	Residential Proposed Specification	Commercial Proposed Specification
Space Heating & hot water	Gas boilers 91% efficient, UF/H & Rads Delayed start stat, boiler interlock 210l cylinder Time and temperature zone control	*See Be Green Section*
Cooling	-	VRF ASHP, ErP Rating A, SEER 5.1
Ventilation	MVHR 90% efficient SFP 0.5 w/l/s Rigid Duct/ Insulated Approved Installation	MVHR 80% efficient SFP 1.0 w/l/s Demand control based on gas sensors
Lighting & Controls	100% low energy lighting	80 lm/W Photoelectric dimming, occupancy sensing

Table 3-3 Proposed energy efficient design measures

The potential for individual Air Source Heat Pumps have been explored for the residential aspect of the site. The site consists of 9 residential units and is therefore deemed as a minor development in the London Plan. A centralised system was explored; however, it is not feasible or efficient to have a centralised energy system for a development of this size. The potential for individual Air Source Heat Pumps have been explored however, due to the design of the development practical location for individual heat pumps to be located. The flats have associated external amenity space which is too small for a heat pump system, including piping and sound proofing equipment. As a result, the energy strategy for the residential section of the development is individual gas boilers and a PV array.

3.2 Energy Savings

Renewable Energy

In order to further reduce carbon emissions, solar PV as the most appropriate technology for the development. The following system is proposed:

- Peak Power –8.5kWp (approx. 26 panels – 5.5kWp for the residential and 3kWp for the commercial)
- Orientation – SE/SW
- Angle of elevation – 30°

Renewable Energy

In line with guidance from the GLA, the savings from the use of an air source heat pump for heating has been reported within the be green section of the report. The prosed specification for the commercial heating and hot water is shown in Table 3-6.

Services Component	Commercial Proposed Specification
Space Heating & hot water	VRF ASHP, ErP Rating A, SCOP 3.4 Instantaneous Electric hot water

Table 3-6 - Commercial heating and hot water

Energy Use

The breakdown of carbon and energy use has been identified for the site. Table 3-7 shows the breakdown of carbon and energy use once the strategies proposed in this report are incorporated.

	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)							Electricity CO2 (kg/yr)	Total Energy (kWh/yr)	Total CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	HW	Cooling	Pumps & Fans	Lighting	PV	Total			
Resi	18,765	20,945	**39,710**	**8,577**	0	0	0	1,876	2,605	-4,519	**-38**	**-20**	**39,671**	**8,557**
Com	0	0	**0**	**0**	983	620	1,240	801	1,419	-2,697	**2,366**	**1,228**	**2,366**	**1,228**

Table 3-7 Estimated regulated energy demand and carbon emissions per energy source

Energy and Carbon Savings

Table 3-8 and Figure 3-2 demonstrates the percentage improvement over the notional baseline levels for the be green stage.

	Residential			Non-Residential		
	CO_2 Emissions (tonnes /annum)	CO_2 Savings (tonnes /annum)	% Saving	CO_2 Emissions (tonnes /annum)	CO_2 Savings (tonnes /annum)	% Saving
Building Regulations 2013 Baseline	11.16			3.24		
Be Lean	10.90	0.26	2.31%	2.76	0.48	15%
Be Green	7.28	2.35	21.01%	1.23	1.54	47%
Total		2.60	23.32%		2.01	62%

Table 3-8 improvements over Part L

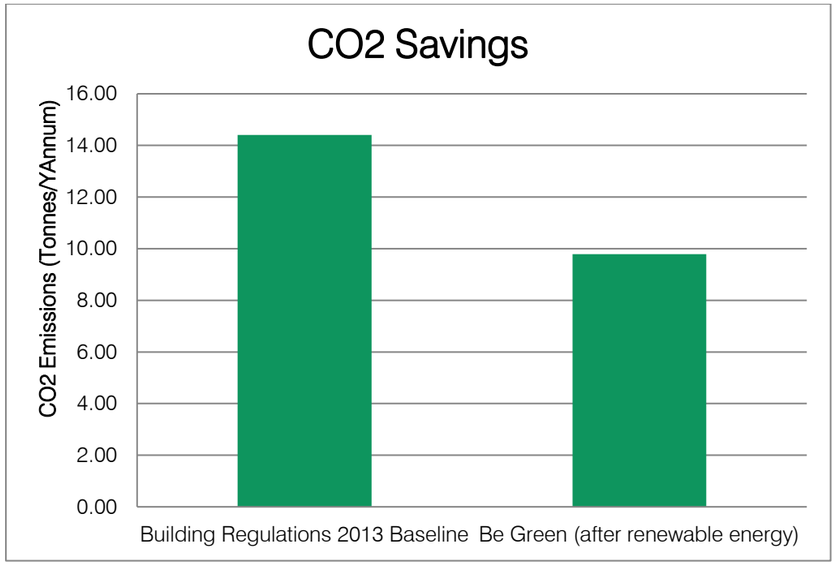

Figure 3-2 Be Lean Improvement over Building Regulations Part L 2013

Overall the residential section of the development has generated a 23.32% savings overall. As the development is 5 or more dwellings a 20% saving must be met onsite inline with the London Borough of Camden's energy policies. A 21.01% Saving has been made from the installation of onsite renewable energy demonstrating the fullest CO2 reduction feasibly possible for the development. The commercial section has made a 47% savings at the Be Green stage through the installation of a PV array and ASHPs. This has generated a 27% saving for the total development.

3.3 Water efficiency

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

- 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.

3.4 Materials

Insulating materials will be specified to maximise thermal performance whilst still paying attention to the environmental impact of the materials used. The use low embodied carbon products will be further investigated.

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

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

All the building elements will achieve high ratings on the BRE Green Guide to Specification. Materials will be specified to have a low embodied energy, taking into account whole life cycle analysis.

3.5 Waste Management and Construction

Construction site waste will be managed in such a way to reduce the amount of waste produced as much as possible, and the waste hierarchy will be followed. In addition, a target of 90% of waste that does arise will be recycled using an external waste contractor and the Civil Engineer's Demolition Protocol. This will encourage materials to be re-used on site or where this is not possible, salvage appropriate materials to enable use off-site. A target of ≤26.52m3 or 16.9 Tonnes (per £110k project value), for Non-Hazardous Waste has been set. Waste arising will be monitored during construction and recorded in the Site Waste Management Plan.

Household waste will be recycled through the local authority collection scheme. A dedicated space for waste will be required with a minimum recycling capacity of 30L. Internal recycling bins in a kitchen cupboard will be provided to facilitate this.

3.6 Nature Conservation and Biodiversity

The site is occupied by existing buildings and minimal vegetation and is considered to be of low suitability for nesting birds and bats. Measures will be taken during construction to minimise impact on ecology by timing works appropriately and following best practice guidance. The workforce will be trained on protecting ecological features and will report any ecological features found during development. An Ecology report has been prepared by Ecosa and should be referred to for all ecological recommendations regarding the site.

3.7 Climate Change Adaptation

Tackling Increased Temperature and Drought

The impact of solar gain has been incorporated into the SAP analysis for compliance with Part L and the risk of solar overheating has been concluded to be low for the development.

Windows will incorporate low emissivity coatings to reduce solar gain, and overhangs are built to some of the windows. Other than mandatory ventilation to meet AD Part F, the development utilises openable windows.

Flooding

Surface water drainage strategies will ensure that the peak and volume of surface water run-off rates will not be increased due to the development, as the site is already fully occupied by buildings. The site is in flood zone 1 so the building is not at risk of flooding.

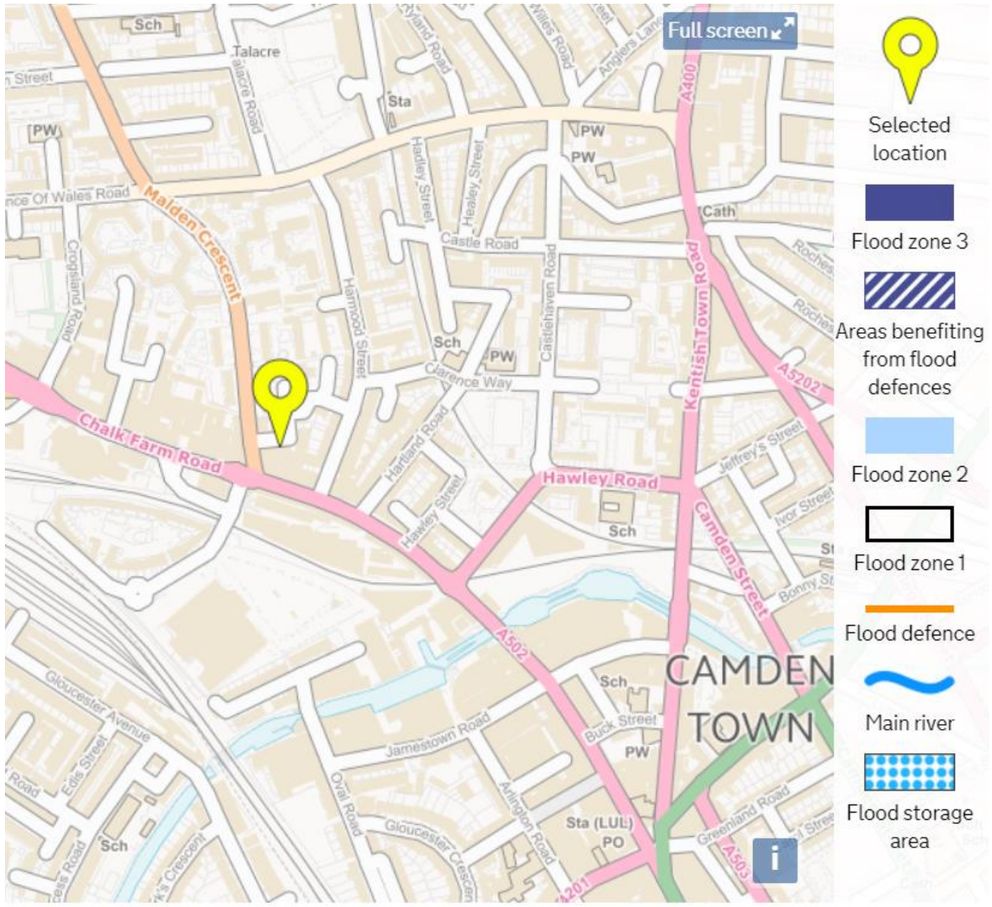

Figure 3-1 Ferdinand Place Flood Risk Map

3.8 Pollution Management

Air Quality

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.

Plant and machinery

All plant and equipment installed in the development will be appropriately sized and selected for efficiency in order to reduce greenhouse gas emissions.

New high efficiency gas boilers will be installed, which will be specified to have a low NO_x emission value. A target of dry NOx emissions of space heating and hot water systems of <40 mg/kWh has been set. All equipment will be frequently maintained to ensure it continues to run efficiently and cleanly. Insulating materials and heating systems will be specified to keep pollutants to a minimum. Insulation will have a low Global Warming Potential (GWP).

Noise

The dwellings will comply with Building Regulations Part E, providing a good level of sound insulation. All windows are to be specified as high efficiency double glazing to minimise the transmission of noise between the property and surrounding area. Acoustic testing will be completed post construction to ensure noise from Chalk Farm Road is not impeding on the development.

Light Pollution

100% of the proposed lighting will be provided by low energy light fittings specified to have a luminous efficacy greater than 40 lm/W. All external lighting will be adequately controlled with a PIR system and an automated time switch to ensure that spaces are not lit during daylight hours and only when the area is occupied. As the proposed building use is residential; there will be no illuminated signage or up lighting incorporated. The proposed dwelling is in a highly urbanised location, and therefore will not significantly contribute to increasing the effects of light pollution.

4 Conclusion

The proposed development consists of a four storey building plus roof level accommodation and roof terrace comprised of office use (Class B1(a)) at ground floor level and 9 self-contained residential units (Class C3) on the upper floors with associated plant, cycle parking and refuse storage. With regards to energy requirements for each use type, these do not meet the threshold for major development standards, with respect to the London Plan. The requirement is to follow the energy hierarchy and incorporate sustainable design and construction measures.

The development follows the energy hierarchy, incorporating passive design measures and energy efficient equipment. The development employs an efficient building fabric, including new insulation, highly efficient glazing, efficient gas heating, a commercial heat pump and a PV array to maximise carbon savings for the site, resulting in 23.32% residential savings over the Target Emissions Rate and a 62% saving for the commercial sections. Measures are also incorporated to minimise pollution and reduce water use. The development complies with sustainability policy of the London Borough of Camden and the London Plan, for minor developments.

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 – SAP 10 Factors

The following tables show the energy and carbon results when using the SAP 10 carbon factors.

5.1 Energy Targets

	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)						Electricity CO2 (kg/yr)	Total Energy (kWh/yr)	Total CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	HW	Cooling	Pumps & Fans	Lighting	Total			
Residential	23,103	20,680	**43,783**	**9,194**	0	0	0	675	2,607	**3,282**	**765**	**47,065**	**9,959**
Commercial	4,802	646	**5,448**	**1,144**	0	0	846	424	2,710	**3,980**	**927**	**9,428**	**2,071**

5.2 Energy savings

	Gas (kWh/yr)			Gas CO2 (kg/yr)	Electricity (kWh/yr)							Electricity CO2 (kg/yr)	Total Energy (kWh/yr)	Total CO2 (kg/yr)
	Space Heating	Hot Water	Total		Space Heating	HW	Cooling	Pumps & Fans	Lighting	PV	Total			
Resi	18,765	20,945	**39,710**	**8,577**	0	0	0	1,876	2,605	-4,519	**-38**	**-9**	**39,671**	**8,330**
Com	0	0	**0**	**0**	983	620	1,240	801	1,419	-2,697	**2,366**	**551**	**2,366**	**551**

	Residential			Non-Residential		
	CO_2 Emissions (tonnes /annum)	CO_2 Savings (tonnes /annum)	% Saving	CO_2 Emissions (tonnes /annum)	CO_2 Savings (tonnes /annum)	% Saving
Building Regulations 2013 Baseline	9.96			2.07		
Be Lean	9.38	0.58	5.78%	1.75	0.32	16%
Be Green	8.33	1.05	10.57%	0.55	1.20	58%
Total		1.63	16.36%		1.52	73%