ENERGY AND SUSTAINABILITY STATEMENT

GONDAR GARDENS, LONDON, NW2 3SL

CONSULT JA LTD
8 Grove Close
Ickenham, Uxbridge UB10 8QN

ASSESSMENT INFORMATION

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Date:
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DISCLAIMER

CONTENT

The London Plan approach of "Be lean" – "Be clean" – "Be green" is fully adopted by implementing:
- Passive measures (low U-values, air permeability, avoidance of thermal bridging by accredited details)
- High efficiency services, i.e., high efficiency ventilation with heat recovery, high efficiency lighting
- Renewable sources: ASHP water heater, solar photovoltaic

Excluded renewable sources are:
- Solar hot water
- Biomass
- Wind turbines

The proposed development will achieve:

- 104% domestic regulated CO2 reduction against 2021 Part L compliant baseline (zero zarbon)

- 88% domestic regulated CO2 reduction by renewable sources

- 16% domestic regulated CO2 reduction by efficiency measures ("Be Lean" stage of the energy hierarchy)

About the Energy Statement

Consult JA Ltd have been appointed to provide an Energy Statement for the proposed development.

This statement covers possible active and passive measures including renewable energy sources to make this development sustainable and environmentally friendly.

Specific requirements of London Plan on Energy Efficiency and Renewable Energy will be met through a combination of passive design features, energy efficient building services and renewable energy sources. This is to comply fully with the London Plan Policies and ensure they are following the "Energy Hierarchy". This document has been prepared in line with the GLA Energy Team Guidance on Planning Energy Assessments.

Baseline and all estimated energy consumptions have been calculated using a full SAP 10.2 assessment of the proposed development.

The table below shows a summary of energy requirements for baseline scheme and reduction proposed to be achieved by passive measures, efficient services and on-site renewable energy sources.

Table 1: Carbon Dioxide Emissions after each stage of the Energy Hierarchy for residential buildings

	Carbon Dioxide Emissions for residential buildings (Tonnes CO_2 per annum)	
	Regulated	Unregulated
Baseline: Part L 2021 of the Building Regulations Compliant Development	1.0	0.7
After energy demand reduction (be lean)	0.9	0.7
After heat network connection (be clean)	0.9	0.7
After renewable energy (be green)	0.0	0.7

Table 2: Regulated Carbon Dioxide savings from each stage of the Energy Hierarchy for residential buildings

	Regulated residential carbon dioxide savings	
	(Tonnes CO_2 per annum)	(%)
Be lean: savings from energy demand reduction	0.2	16%
Be clean: savings from heat network	0.0	0%
Be green: savings from renewable energy	0.9	88%
Cumulative on site savings	**1.1**	**104%**

SAP results summary of the proposed development

RESIDENTIAL CO_2 ANALYSIS (PART L1)														
		Baseline		'Be Lean'	'Be Green'	Fabric Energy Efficiency		Baseline		'Be Lean'			'Be Green'	
Unit identifier (e.g. plot number, dwelling type etc.)	Model total floor area	TER	Energy saving/generation technologies (-)	DER	DER	Target Fabric Energy Efficiency	Dwelling Fabric Energy Efficiency	Part L 2021 CO_2 emissions	Energy saving/generation technologies	Part L 2021 CO_2 emissions	Part L 2021 CO_2 emissions with Notional PV savings included	'Be Lean' savings	Part L 2021 CO_2 emissions	'Be Green' savings
	(m²)	($kgCO_2$ / m^2)	($kgCO_2$ p.a.)	($kgCO_2$ / m^2)	($kgCO_2$ / m^2)	(kWh/m²)	(kWh/m²)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)	($kgCO_2$ p.a.)
Proposed House	73.3	13.90	-227.09	14.79	-0.51	44.69	41.97	1,019	-227	1,084	857	162	-37	894
Sum		13.9	-227.1	14.8	-0.5	44.7	42.0	1,019	-227	1,084	857	162	-37	894

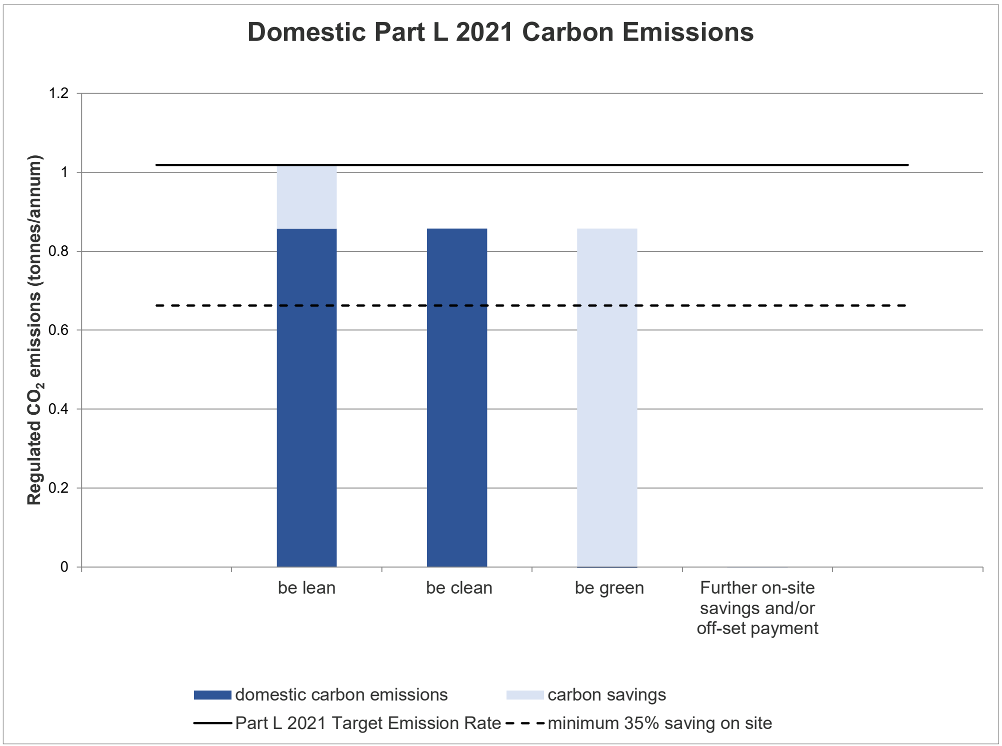


Table 3: SAP calculation specification for each stage of the energy hierarchy

Specification	Notional Baseline	Efficient Baseline (Be Lean)	Proposed Development (Be Green)
Ground floor U-value	0.13	0.13	0.13
External Wall U-value	0.18	0.18	0.18
Roof U-value	0.11	0.11	0.11
Entrance door U-value	1.0	1.0	1.0
Windows U-value	1.2	1.2	1.2
Windows g-value	0.63	0.63	0.63
Air Permeability	5	5	5
Space Heating System	Gas combi boiler, SEDBUK 2009 efficiency 89.5%, radiators, time and temperature zone control	Gas combi boiler, SEDBUK 2009 efficiency 89.5%, radiators, time and temperature zone control	Electric panel heaters with appliance thremostats and programmers
DHW System	Gas combi boiler, SEDBUK 2009 efficiency 89.5%, waste water heat recovery	Gas combi boiler, SEDBUK 2009 efficiency 89.5%, showers flow rate 8 l/min	Air source heat pump water heater Dimplex EDEL 200 L or equivalent; showers flow rate 8 l/min
Ventilation System	Natural with intermittent mechanical extracts	MVHR unit Nuaire MRXBOXAB-Eco3 or equivalent approved by SAP assessor; rigid ducts, Supply and extract duct to and from exterior has to be insulated with 25mm insulation if less than 2m long or 50mm thickness for ducts over 2m long	MVHR unit Nuaire MRXBOXAB-Eco3 or equivalent approved by SAP assessor; rigid ducts, Supply and extract duct to and from exterior has to be insulated with 25mm insulation if less than 2m long or 50mm thickness for ducts over 2m long
Lighting	Lighting power density 2.3 W/m2, lighting luminous efficacy 80 lm/W	Lighting power density 2.3 W/m2, lighting luminous efficacy 80 lm/W	Lighting power density 2.3 W/m2, lighting luminous efficacy 80 lm/W
Renewable energy sources			ASHP as described above + PV system with total peak output of 4 kWp, panels installed on the South facing pitched roof
% Improvement in CO2 over Building regulations compliant baseline	**0.0%**	**16%**	**104%**

BACKGROUND

Consult JA Ltd have been appointed to provide an Energy Statement for the proposed development.
This statement covers possible active and passive measures including renewable energy sources to make this development sustainable and environmentally friendly.

DESCRIPTION OF THE SITE

The proposed development includes Erection of a two storey single family dwelling house in the rear garden fronting Gondar Gardens, with rear garden, bin and bike store.

NATIONAL POLICY

DCLG sets out basis for local policies in section 14 of National Planning Policy Framework. It requires new development to be planned in ways that can help to reduce greenhouse gas emissions, such as through its location, orientation and design. To help increase the use and supply of renewable and low carbon energy and heat, plans are encouraged to:
a) provide a positive strategy for energy from these sources, that maximises the potential for suitable development, while ensuring that adverse impacts are addressed satisfactorily (including cumulative landscape and visual impacts);
b) consider identifying suitable areas for renewable and low carbon energy sources, and supporting infrastructure, where this would help secure their development; and
c) identify opportunities for development to draw its energy supply from decentralised, renewable or low carbon energy supply systems and for co-locating potential heat customers and suppliers.

THE NEW LONDON PLAN

The London Plan is the name given to the Mayor's spatial development strategy. The current version of London Plan was adopted in March 2021. The aim is to develop London as an exemplary sustainable world city, based on three interwoven themes.

- Strong, diverse long term economic growth
- Social inclusivity to give all Londoners the opportunity to share in London's future success
- Fundamental improvements in London's environment and use of resources.

Specific requirements on development sustainability are set out in the following policies:

POLICY SI 2 MINIMISING CO2 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 Regulations 152 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:

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

2) off-site provided that an alternative proposal is identified and delivery is certain.

Although this is not a major development, Policy SI 2 is generally followed. Carbon offset payment is not applicable.

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.

CAMDEN LOCAL PLAN POLICY CC1

Policy CC1 requires all development to reduce carbon dioxide emissions through following the steps in the energy hierarchy, in principle cloying the GLA London Plan policy SI2.

Table 2a of CPG Energy efficiency and adaptation sets out requirements for minor residential refurbishment project as:

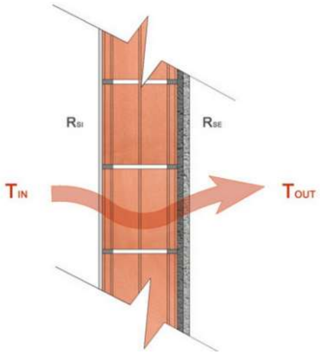
- Overall carbon reduction target: 19% below Part L of 2013 Building Regulations

- Reduction in CO2 from onsite renewables (after all other energy efficiency measures have been incorporated): Incorporate renewables where feasible

Be lean: Passive design measures and efficient services

Number of passive design measures and measures improving energy efficiency of building services have been included in the design to underline the “Passive first” approach in the scheme design. Implemented measures are summarised in Table 3 of this report and include:

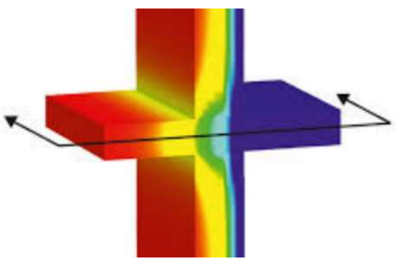
Low U-values of building fabric



Thermal performance of fabric is the most important aspect of passive measures mosaic. Low U-values ensure, that the amount of heat transmitted through building external elements is minimised. This is achieved by using highly insulated building materials with low thermal conductivity.

Notional dwelling U-values as set out in 2021 Part L1 are generally followed with some improvements in the proposed scheme. The current notional building U-values are already challenging in real world and making significant improvements over them is usually not practical from payback and technical point of view.

Avoidance of Thermal Bridging



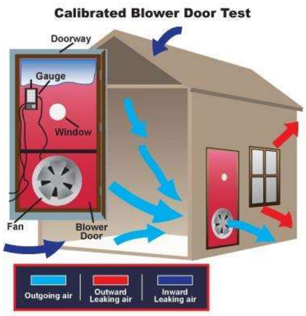
Thermal bridges occur at all junctions between building thermal elements, typically at junctions between wall/floor, wall/roof etc. Recent changes in the building regulations have emphasized the significance of thermal bridging in building design.

Continuity of insulation has to be maximised in order to minimise thermal bridging. Calculations presented in this energy statement and current proposal are based on thermal bridging y-value of 0.05 W/m2K – same as 2021 Part L1 notional dwelling. Psi-values of all applicable junctions will be assessed by a suitably qualified assessor at the detailed design stage by either:

- Custom Psi-value calculation by 2D thermal modelling
- Psi value from database of approved details

BE LEAN: PASSIVE DESIGN MEASURES AND EFFICIENT SERVICES

AIR TIGHTNESS



Air tight buildings minimise their heat loss through infiltration of cold air through gaps and cracks in building envelope. Air tightness of buildings is expressed as air permeability rate. Air permeability rate of 5.0 m3/h.m2 is set out as a reference value for the current building regulations notional dwelling. The proposed development air permeability is set to 4 m3/h.m2.

MECHANICAL VENTILATION WITH HEAT RECOVERY

Building regulations Part F recommends mechanical ventilation for dwellings with design air permeability of 5 or less. The most efficient form of mechanical ventilation is the heat recovery ventilation, where warm air extracted from bathrooms and kitchen passes the heat on to the supply air in heat exchanger. Supply air is then distributed to habitable rooms (bedrooms, living rooms).

To meet a good practice for MVHR efficiency, the installed units have to have hight heat recovery efficiency and low specific fan power. Such performance can be verified by choosing units from SAP Product Characteristics Database. Ductwork between the unit and exterior (supply and extract) has to be insulated to “Level 1” standard, i.e. 25mm insulation if less than 2m long or 50mm thickness for ducts over 2m long.

HIGH EFFICIENCY LIGHTING

While previous versions of Part L1 recognised low energy lighting to certain degree, the impact of low energy lighting is more accurate and more significant in the new 2021 Part L. All installed light fittings need to be included in detail in the assessment. To meet the efficiency level of notional reference dwelling, the installed power density shouldn’t exceed 2.3 W/m2 and all light fittings should achieve a luminaire efficacy of at least 80 lm/W

BE LEAN: PASSIVE DESIGN MEASURES AND EFFICIENT SERVICES

WATER EFFICIENCY

Reducing general water consumption in dwellings also reduces amount of energy needed to provide hot water. New Part L1 notional building therefore allows for overall water consumption of 125 l/person.day and more specifically, showers with flow rate of 8 l/min.

BE CLEAN: DISTRICT HEATING AND CHP

COMBINED HEAT AND POWER

Although gas CHP's used to help to reduce CO_2 emissions by delivering heat and electricity locally and reducing the losses that normally occur by conventional power plants. This is no longer true, after significant grid electricity de-carbonisation in recent years. Any local electricity generation using fossil fuels (e.g. mains gas) will deliver electricity with higher carbon footprint than grid electricity. Combined heat and power is therefore no longer considered a low carbon technology.

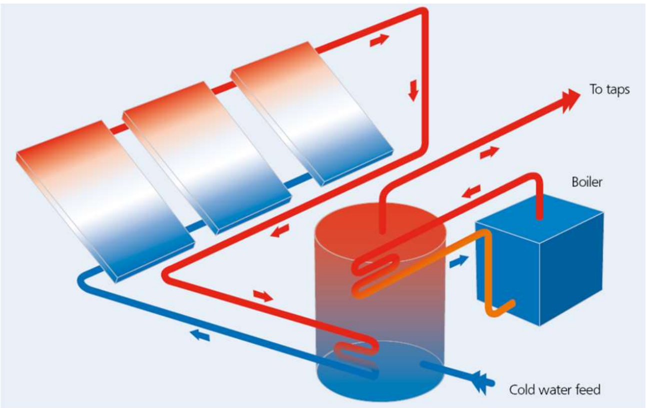
DISTRICT HEATING CONNECTION

District heating connection is not feasible due to the size and nature of this development.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCES – SOLAR HOT WATER

GENERAL INFORMATION

Solar hot water systems for dwellings use collector which provides a separate heating circuit for hot water cylinder. This is usually backed up by electric immersion heater or other source of heat.
Two types of collectors are available:
- Flat Plate – less expensive, less efficient
- Evacuated Tube – more expensive and more efficient



RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

Solar hot water system has been ruled out as a less suitable system compared to the proposed solar PV. Solar photovoltaic is preferred due to longer life span and higher CO2 savings.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - AIR SOURCE HEAT PUMPS

GENERAL INFORMATION

An air source heat pump extracts heat from the outside air in the same way that a fridge extracts heat from its inside. It can extract heat from the air even when the outside temperature is as low as minus 15° C.

On 17 December 2008, the European Parliament adopted the EU Directive on promoting the use of energy from renewable sources. For the first time however, in addition to geothermal energy, aerothermal and hydrothermal energy are also recognised as renewable energy sources.

There are two main types of ASHP:

AIR-TO-WATER SYSTEM

Air-to-water system uses the heat to warm water. Heat pumps heat water to a lower temperature than a standard boiler system would, so they are more suitable for underfloor heating systems than radiator systems. Although some ASHP systems are capable of heating the water to the higher temperature, the efficiency is higher when using low temperature underfloor heating or low temperature fan convectors.

AIR-TO-AIR SYSTEM

Air-to-air system uses the heat to warm the indoor air. The air is heated through individual fan-coils or centrally and then distributed to rooms via ductwork.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

It is proposed to install an Air Source Heat Pump water heater Dimplex EDEL 200 or equivalent ASHP water heater. The unit will provide hot water from integrated heat pump with storage without external unit requirement.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCES

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - SOLAR PHOTOVOLTAICS

GENERAL INFORMATION

This system uses semi-conductor cells to convert solar energy into electricity. Two main types of PV panels are available:
- Monocrystalline – More expensive and more efficient
- Polycrystalline – Less expensive and less efficient

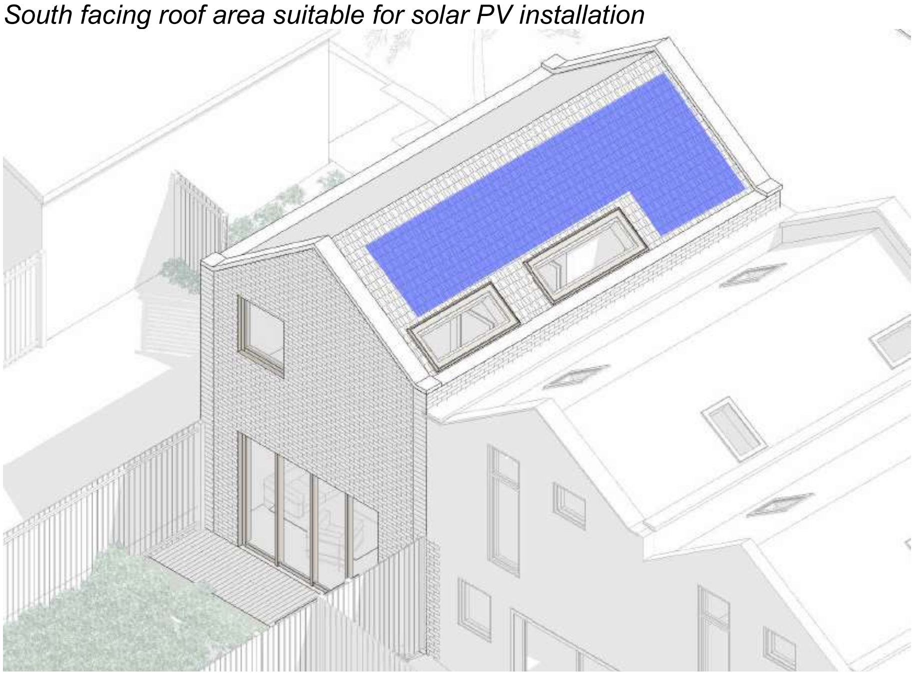
Depending on type, the output of 1 kWp (kilowatt peak) can be achieved by panels with area between 5 and 9 m2.

The use of PV panels generally requires relatively large unshaded roof area where they can be mounted facing south, ideally having between 15° and 40° inclination.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

It is proposed to install a mono-crystalline PV system on the South facing pitched roof, with total peak output of 4 kWp (e.g. 10 panels @ 0.4 kWp each). This is considered a maximum PV system that can fit on the South facing roof.

South facing roof area suitable for solar PV installation

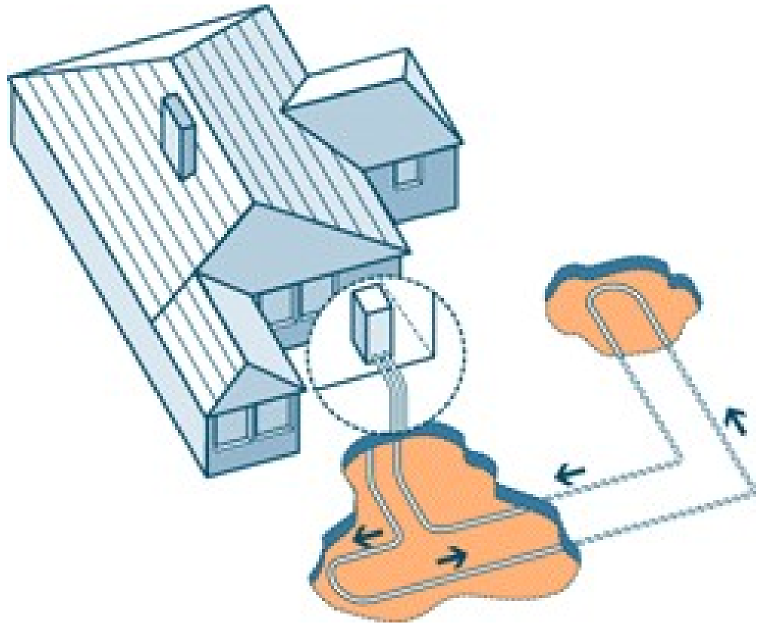


BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - GROUND SOURCE HEAT PUMP

GENERAL INFORMATION

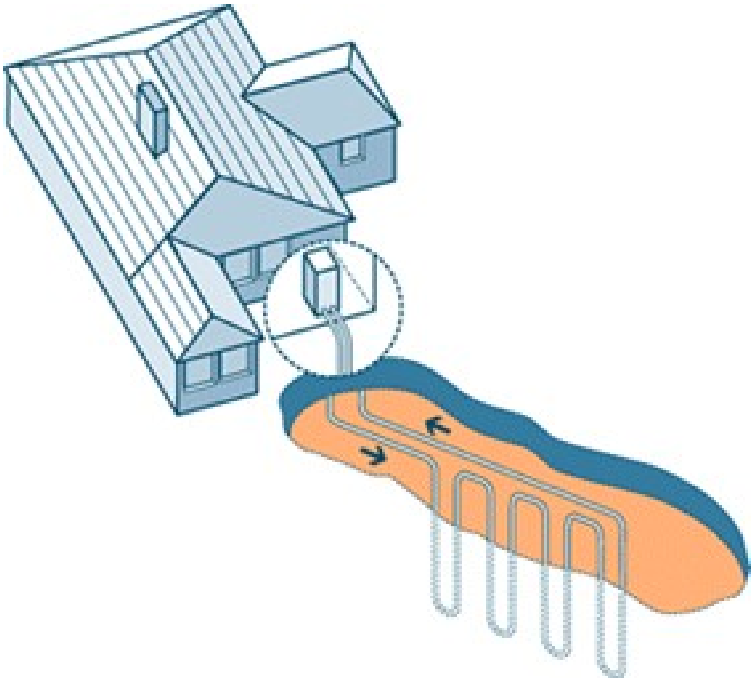
Ground source heat pumps use a buried ground loop which transfers heat from the ground into the building through heating distribution system. GSHP technology can be used both for heating and cooling. Two main types of GSHP are available:

- Horizontal loop is suitable for applications where sufficient area is available to accommodate horizontally buried pipes



BE GREEN: ON-SITE RENEWABLE ENERGY SOURCES

- Vertical loop system can be used where ground space is limited, but will require boreholes typically 15-150m deep, and is consequently more expensive to install than horizontal systems.



RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

Ground source heat pumps have been ruled out due to higher installation cost compared to the proposed systems.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - BIOMASS / BIOFUELS

GENERAL INFORMATION

Producing energy from biomass has both environmental and economic advantages. It is a carbon neutral process as the CO2 released when energy is generated from biomass is balanced by that absorbed during the fuel's production.
There are two main ways of using biomass to heat a domestic property:

- Standalone stoves providing space heating for a room. These can be fuelled by logs or pellets but only pellets are suitable for automatic feed. Generally they are 6-12 kW in output, and some models can be fitted with a back boiler to provide water heating.

- Boilers connected to central heating and hot water systems. These are suitable for pellets, logs or chips, and are generally larger than 15 kW.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

Biofuels are ruled out due to negative impact on air quality and environmental issues surrounding liquid biofuels as currently there are no established standards relating to the sustainability of biofuels.

BE GREEN: ON-SITE RENEWABLE ENERGY SOURCE - WIND ENERGY

GENERAL INFORMATION

Wind power is a clean, renewable source of energy which produces no carbon dioxide emissions or waste products. The turbines can have horizontal or vertical axis (Darrieus type). Wind turbines use the wind's lift forces to rotate aerodynamic blades that turn a rotor which creates electricity. Most small wind turbines generate direct current (DC) electricity and are not connected to the national grid. A special inverter and controller is required to convert DC electricity to AC at a quality and standard acceptable to the grid if the turbine is to be connected to national grid.

RECOMMENDATIONS SPECIFIC TO THIS DEVELOPMENT

Wind energy systems will not be considered due to negative visual effects, interference, flicker and noise risk. Exposure to wind would be limited by surrounding buildings.

Water

Internal water consumption will be reduced to 105 litres/person/day by specification of water efficient fittings:

Dual flush WC's with 4/6 l flush volume
Kitchen taps: 8 litres/min
Other taps: 6 litres/min
Showers: 8 litres/min
Bath capacity to overflow: 140 litres
Washing machines: 6 litres/kg dry load
Dishwashers: 1.3 litres pre place setting

Materials

Environmental impact of construction materials will be taken into account. Where possible, construction materials will be sourced from local producers and suppliers with environmental impact certification. All timber will be FSC (or equivalent) certified.

Energy

Besides the energy efficiency measures relating to regulated energy, which are described in the energy statement, there will be additional energy saving measures implemented in the development:

- Energy efficient white goods will be used

- Low energy external and communal lighting

Waste

Adequate internal and external storage of recycled and non-recycled waste will be ensured. The external storage will be sized according to the frequency of collection, based on guidance from the recycling scheme operator.

Construction waste will be minimised by implementing a site waste management plan containing procedures to minimise and divert waste from landfill

The London Plan approach of "Be lean" – "Be clean" – "Be green" is fully adopted by implementing:

- Passive measures (low U-values, air permeability, avoidance of thermal bridging by accredited details)
- High efficiency services, i.e., high efficiency ventilation with heat recovery, high efficiency lighting
- Renewable sources: ASHP water heater, solar photovoltaic

Excluded renewable sources are:

- Solar hot water
- Biomass
- Wind turbines

The proposed development will achieve:

- 104% domestic regulated CO2 reduction against 2021 Part L compliant baseline (zero zarbon)

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