Energy Statement

Proposed development to take a Fabric First approach to reduce U-Values and Thermal Bridging with the introduction of improved construction details, 100% Low energy lighting

Triple Fixed glazing where to improve acoustics and reduce heat loss, Mechanical Heat Recovery systems to control Ventilation, and reduced Air Leakage Rates of 3.0 m³/hm² @50 Pa

Solar PV to all south facing roofs, PV panels to be sized to achieve a minimum 25% reduction in carbon emmisions (when linked with other renewables)

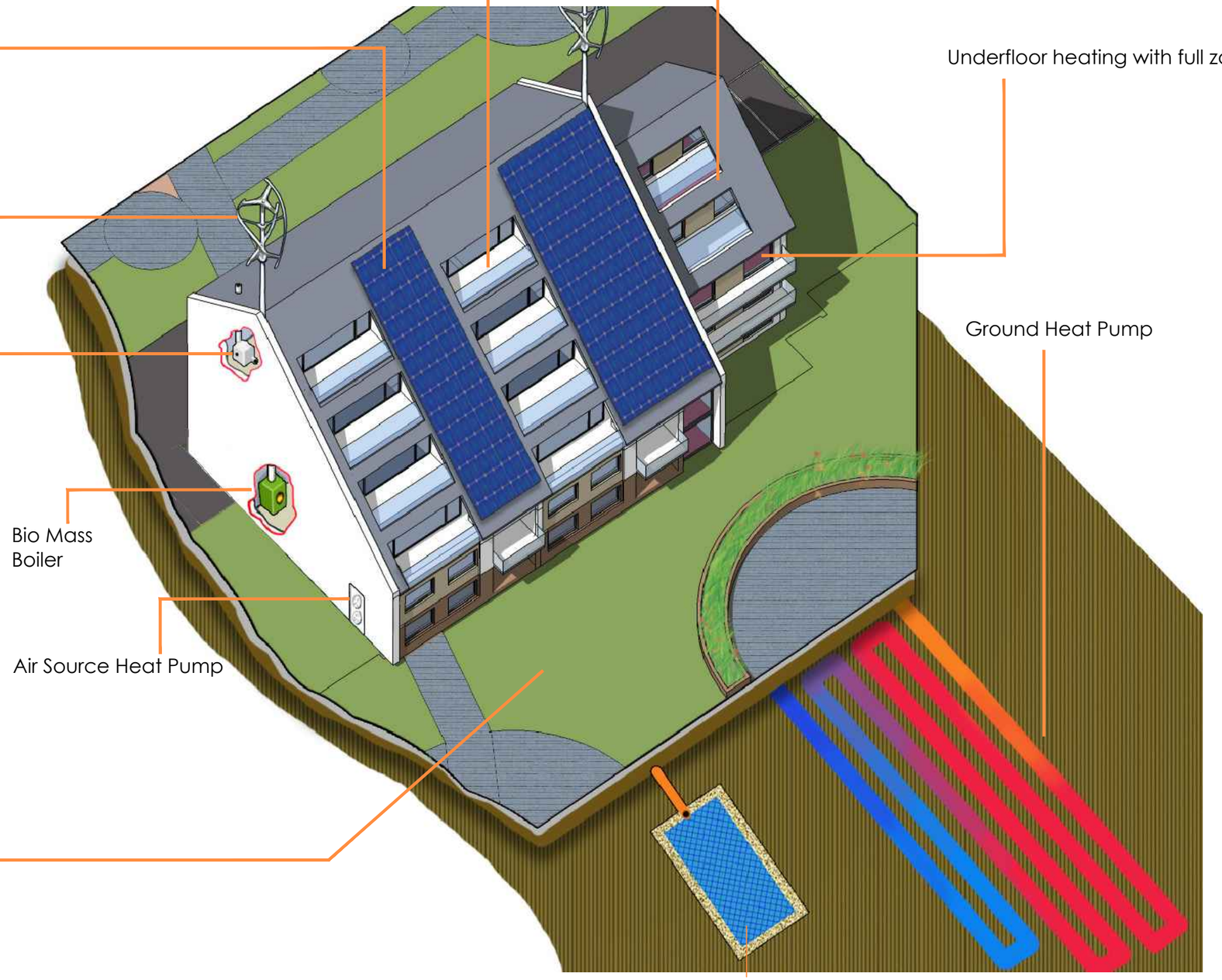
Mini Wind turbines per block, The location adjacent the railway offers large areas of unconstructive air movement. The Line of the railway also coincides with the prevailing wind direction. Due to aesthetic considerations helical wind turbines to be considered.

Full House Heat recovery (MVHR) system works in conjunction with fixed glazing and controlled ventilation

Communal Heating Systems. A combination of Air Source heat pumps, Ground source heat pumps and Biomass boilers can all feed into a communal heating system that provides heating and hot water throughout the whole development. This may also be on a per block basis to reduce inefficiencies of heat transfer. Ample areas for plant rooms, delivery and storage are available at the undercroft / ground floor levels.

Sustainable Urban Drainage systems to control all surface water run offs to adjacent watercources

Hard & soft landscaping to incorporate Permeable paving, Rain Gardens, Tree Pits, Detention basins



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Advanced practice energy efficiency standards for new dwellings that will help to deliver, alongside renewable and low carbon technologies, a 25% reduction in carbon emissions compared to Building Regulations Part L 2010.

'**Fabric first**' approach - By using a fabric first approach, the demand for fossil fuels is reduced and therefore the residents are hedged against potential increases in fuel costs. The savings from energy bills and carbon emissions are also locked in for the life of the property.

Future proofing By concentrating on the difficult fabric elements to reduce carbon, the residents are enabled to upgrade their homes further with simple 'bolt-on' measures such as solar water heating or photovoltaic panels. The proposed strategy also allows residents to change their heating systems to newer emerging technologies in the knowledge that they already have a robust fabric. These measures would further reduce fuel bills and the CO2 emissions. The purpose of this report is to set out the developer's commitment to reduce carbon emissions from the development by improved thermal performance and the use of renewable technologies with the objective of achieving at least a 25% reduction in CO2 emissions.

Definitions

Renewable Energy Source - Renewable energy is the term used to describe energy flows that occur naturally and continuously in the environment, such as energy from the wind or sun. These sources are inexhaustible.

Low Emission Energy Source Those which have low emissions of greenhouse gases. For the purpose of this assessment this includes biomass and MVHR, which can be considered to be carbon neutral over its life cycle. Ground source heat pumps also fall within this definition, as a fossil fuel powered heat pump is required.

Energy Efficiency Domestic consumption of energy accounts for almost 25% of the carbon dioxide emissions in the UK with most energy being produced by the burning of fossil fuels such as coal, oil and gas. Carbon dioxide contributes to the problem of global warming as it traps energy from the sun inside the earth's atmosphere. The trapped heat acts like a blanket - or greenhouse - and is believed to be a cause of changes in our climate.

Electricity, gas, oil and coal are being consumed at an ever-increasing rate. If the use of non-renewable fuels for energy continues at the current rate, then supplies could run out during the lifetime of children born in the 1990s.

Currently, renewable forms of energy such as wind, sun and water only supply a small percentage of our requirements. So it makes sense to:

use as little energy as is necessary,

get the maximum amount of energy out of every type of fuel that is used and

ensure a minimum of energy is wasted

Proposed Fabric The growing focus on improved energy efficiency has resulted in a wider range of advanced performance building materials and products being available in the market

IMPROVED BUILDING FABRIC Heat loss floors: 0.13 W/m2K (130mm Kingspan)

External walls (including walls to common areas): 0.22 W/m2K (120mm Full fill)

Roofs:0.08 W/m2K to plane areas

Roofs:0.14 W/m2K to sloped areas

Windows:1.10 W/m2K triple glazed

Air leakage :up to 3.0 m3/hm2 @ 50 Pa

MVHR Ventilation Extract fans

Low energy lighting 100%

Initial Renewable/ Low Emission Energy Assessment

The proposed apartments at the development will employ improved specification together with renewable energy to meet the 25% improvement in CO2 emissions. Alternative ways achieving the 25% improvement have also been identified in this section. These are summarised in the renewable energy checklist below and further details are provided in the subsequent sections of this report.

Photovoltaic panels convert energy from sunlight into electricity. They work in daylight, so do not require direct sunlight and are suitable for the cloudy climate of the UK. However, more energy will be produced in direct sunlight and in very shady positions the photovoltaic panel will not function efficiently.

The level of efficiency achieved when using PV depends on the orientation of properties, roof pitch and the weather. The biggest barrier is currently cost but to offset this, the Government are offering small grants to assist with the purchasing cost of the PV system. Careful consideration must be given to the type of buildings the PV cells are put onto in view of the high initial cost and to optimise on the efficiency of the PV array. The PV systems are most efficient during the day, all year. Domestic properties do not fully benefit from this as the demand in the early morning and evening when the PV Cells are least efficient. W i th

commercial properties, the general design on large areas of available roof space offers good opportunity to maximise the efficiency of the PV system.

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Air Source Heat Pumps Air source heat pumps absorb heat from the outside air. This heat can then be used to warm water for radiators or underfloor heating systems, or to warm the air inside dwellings. An air source heat pump extracts heat from the outside air / Ground 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.
There are two main types:
A n ai -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.
A n air-to-air system produces warm air which is circulated by fans to heat homes.
The efficiency of air source heat pump systems is measured by a coefficient of performance (CoP) - the amount of heat they produce compared to the amount of electricity needed to run them. A typical CoP for an air source heat pump is around 2.5.

Ground Source Heat pumps (GSHPs) are electrically powered systems that tap the stored energy of the greatest solar collector in existence: the earth. These systems use the earth's relatively constant temperature to provide **heating**, cooling, and hot water for homes and commercial buildings.
Working in a similar principal to air source heat pumps, however not being dependent on the outside air temperature. The site will require extensive ground works and remediation due to contamination there will be ample opportunity to excavate and install the necessary ground pipes.

Biomass Boiler Heating system. Biomass is a solar energy store, as the fuel (wood) is created through process called photosynthesis. Biomass heating is a robust, efficient, and cheap renewable technology that lends itself to community heating making use of a central fuel storage area and communal heat distribution. There are important implications for building layout, management, and also sourcing of fuel.
However, individual biomass boilers such as the Baxi Bioflo represents the next generation of biomass boilers. This is ideal for smaller properties where mains gas is not available, the boiler is simple to install, low maintenance and easy to operate. A full gas back-up is normally designed in for security of supply and for servicing peak demand where peak outstrips the installed biomass provision. The biomass boiler is controlled to operate during scheduled hours. In the summer profile, the heat demand peaks in the morning and evening. During the middle of the day when the heat demand is low, the biomass boiler generates excess heat which is stored in the thermal accumulator. In the evening when the heat is required, this heat is drawn from the thermal store. Pairing the biomass boiler with a thermal store allows a smaller size of boiler to be recommended than would otherwise be the case.

Biomass Heating Design Implications

Elevations - Biomass boiler flues (incl. back-up gas system) (nb. separate flues are

often required);

Roof plan - Flues Risers Space for internal flues (if required);

Location - The energy centre will t y p i c a l l y be in the basement of the development,

and an area will be left for a lorry to stop and off-load the biomass fuel;

Floor plans - Space for plant room and fuel store at undercroft level;

Services - Community heating (CH) distribution;

Management - Metering, billing and maintenance of CH, removal of annual gascheck cost, both of which are the same as for gas fired community heating, except maintenance will be more expensive.
A bio powered boiler will require an adjacent fuel store, regular deliveries of a suitable fuel and space to locate the biomass system. A Biomass boiler would need to be a standalone boiler which would fire as lead and through a series of pumps and header pipes connect to the main heating system. For larger apartment blocks, Biomass can provide heat through a communal heating system.

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