ENERGY STATEMENT

Rev P1

Great Oaks
Newtown Common
Newbury

waterfox
consulting engineers

first floor, rafts court, brocas street, eton, berkshire. sl4 6rf
tel. 01753 290 590, www.waterfox.co

CONTENTS

1. Introduction.

This Energy Statement has been prepared by Waterfox Consultancy Ltd as a supporting document for a planning application for a replacement dwelling at Great Oaks, Newtown Common, Newbury. This statement confirms an holistic approach to energy and CO_2 emissions reduction and energy management comprising both passive and active systems.

The primary aim is to reduce the regulated CO_2 emissions beyond Building Regulation requirements following the energy hierarchy:

- **Be lean**; use less energy
- **Be clean**; supply energy efficiently
- **Be green**; use renewable energy

The development will utilise high performance materials, insulation and glazing along with low energy fixed services systems, equipment and appliances. Heat producing equipment will be highly efficient and will utilise renewable sources where technically feasible to reduce reliance on fossil fuels.

2. Baseline Energy Predictions

An assessment will be made together with calculations to determine the baseline CO_2 emissions for the building; this will form the baseline notional building rating giveing annual energy consumption and annual CO_{2e} emissions figures.

The efficiencies and improvements indicated below will be considered from project conception to inform the final design of the building leading to a significant reduction in energy use and CO_2 emission from the notional building.

3. Be Lean Energy Efficiency.

The first steps in the energy hierarchy are to improve the design of the building fabric to minimise the energy requirement and also maximise the energy efficiency of the installed services. The following items will be considered.

3.1. Insulation

Insulation is a key component to increase energy efficiency as a major form of heat loss is through the building fabric. Creating a highly insulated building envelope (floors, walls, roofs and windows) using significantly lower U-values than required by Building Regulations will create a reduced space heating demand resulting in reduced energy use.

3.2. Air Tightness

Unwanted infiltration and air leakages cause a huge amount of heat loss in a building, accounting for up to 20% of a dwelling's heat loss. By creating a tighter thermal envelope through a reduction in air permeability rates the space heating requirement will be reduced resulting in less energy use.

3.3. Windows

The use of windows with U-Values exceeding current Building Regulations benchmarks will further reduce space heating demand in the development.

3.4. Ventilation

The installation of Mechanical Ventilation Heat Recovery units will allow heat to be extracted from exhaust air and recirculated around the dwellings via the incoming fresh air. This will reduce space heating demands further.

3.5. Hot Water

Installing super insulated hot water vessels, separately controlled and timed will allow the heating of the hot water to become far more efficient and thus reduce energy demand for this critical aspect of the dwelling energy use.

3.6. Lighting and Appliances

The use of a higher percentage of energy efficient lighting over and above that required by Building Regulations will provide a reduction in energy demand. The use of 'A' and 'A+' rated appliances throughout will reduce the electricity demand further still from the baseline calculations.

4. Be Clean Energy Efficiency.

The second step in the energy hierarchy is to supply energy efficiently. The following systems would typically be considered but are not by the nature and location of the property viable options.

- District Heating Systems.
- Communal Heating System.
- Combined Heat & Power System

5. Be Green Energy Efficiency

The third step in the energy hierarchy is to use renewable energy sources. The following systems have been considered

5.1. Wind Turbine

Wind Turbines use natural energy to turn a turbine, creating mechanical energy; this is then converted into usable electricity via a generator. Despite the UK being classed as the most productive European country for the generation of wind power, it is very site specific. Due to the nature of this site and the locational average wind speed the provision of a wind turbine is considered unfeasible.

5.2. Photovoltaic Panels

This form of renewable energy generation uses photovoltaic (PV) semiconductor materials that produce electricity when exposed to irradiation from the sun. There are many varying types of PV panel with the most common being monocrystalline and polycrystalline. These can then be arranged into rigid panels and attached to a building's roof or walls to generate electricity either for use in the building or fed into the national grid.

The site and building design lend themselves to the use of PV arrays and with use providing a significant reduction in CO_2 emissions.

5.3. Solar Hot Water

This form of solar technology uses the power of the sun to heat water, which is then used within a building. As with solar PV panels in order that the panel generates its maximum energy output it must receive maximum exposure to the sun.

There needs to be reasonable demand for hot water in the building to ensure that the hot water generated is used, ideally this demand will be during times when the sun is present. The use of SWH is not proposed as greater efficiency can be obtained by the use of PV arrays.

5.4. Biomass

Biomass is biological material derived from living or recently living organisms. In terms of energy use biomass generally refers to timber and crops grown specifically to be burnt to generate heat and power. Biomass is renewable and a low carbon fuel. The use of biomass is not considered viable for this project due limiting design & operation constraints: plant space, fuel storage, regular deliveries, local availability, operating control.

5.5. Heat Pumps

There are three main types of heat pump: ground source, air source and water source.

Ground Source Heat Pumps and Water Source Heat Pumps work by absorbing the heat from the sun which is stored in the earth or water. This heat goes through a heat exchange to 'upgrade' it. Significant land area is required to utilise ground source heat pumps and a suitable water source is required for WSHP, for these reasons they are not considered viable for this project.

Air Source Heat Pumps extract heat from the outside air with the help of an air handling system. This heat is then passed through a heat exchange to 'upgrade' it. Air source heat pumps will be considered for space heating and domestic hot water generation. All secondary systems will be engineered to make full use of low grade hot water most suited to that produced by heat pumps at higher '*coefficient of performance*' ratings.

6. Conclusion

By adopting improvements associated with the building fabric and construction techniques along with the introduction of heat pump technologies the new dwelling will provide a significant reduction in energy use and CO_2 emissions than the notional building.

7. Post Completion Monitoring

Smart meters will be provided to allow monitoring of energy usage.