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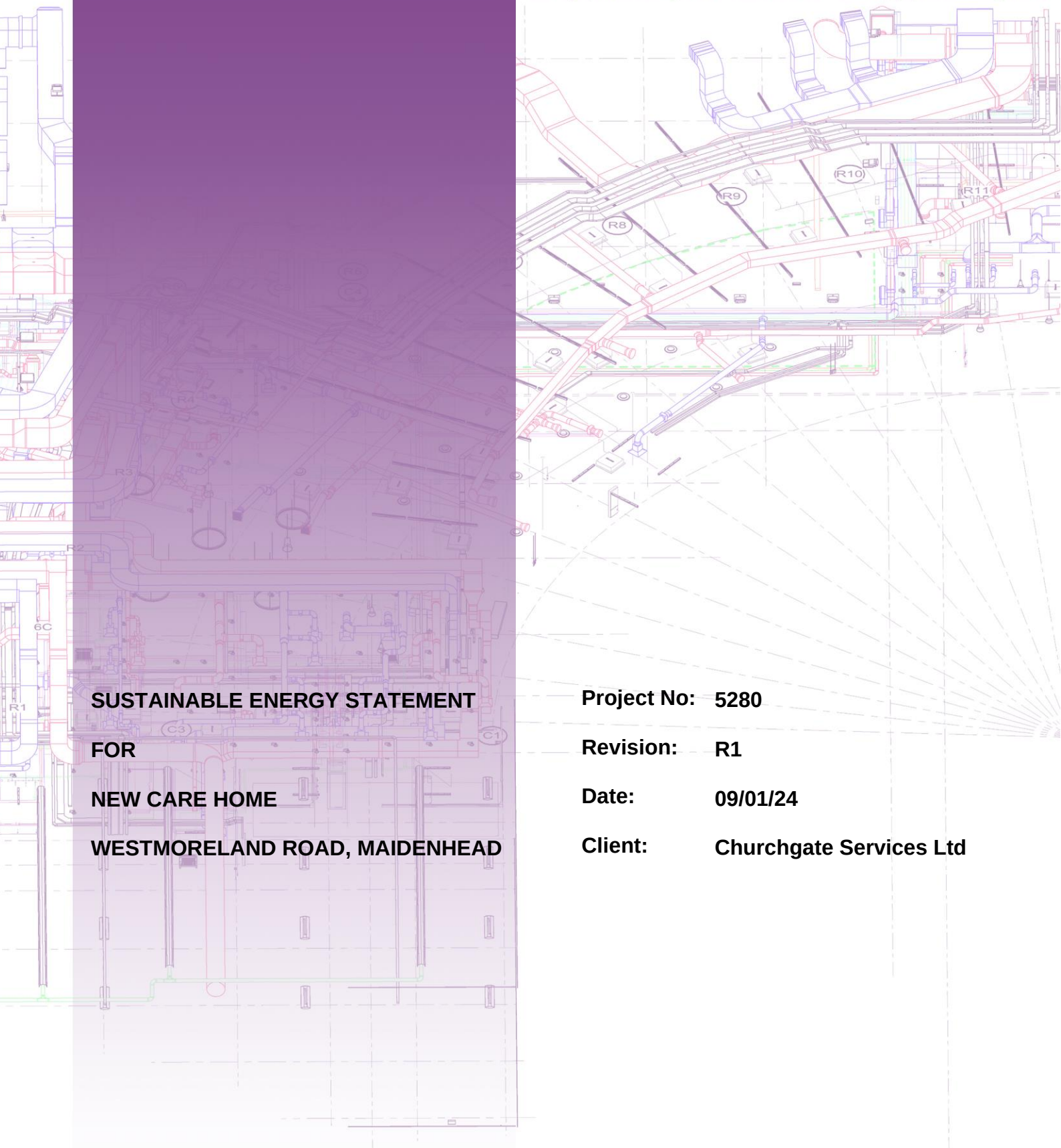

SUSTAINABLE ENERGY STATEMENT

FOR

NEW CARE HOME

WESTMORELAND ROAD, MAIDENHEAD

Project No: 5280

Revision: R1

Date: 09/01/24

Client: Churchgate Services Ltd

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1.0 INTRODUCTION

As part of the planning application for the new build Care Home at Lawnfield House, Westmoreland Road, Maidenhead, this Sustainable Energy Statement has been provided.

2.0 SITE DESCRIPTION

This image shows the existing site outlined in red and local surrounding area.

This image shows more the current proposed care home building, road access and surrounding area.

3.0 PLANNING POLICY

This section explores some of the relevant policies which set out carbon and energy emission reductions for this project to consider and adopt.

KYOTO PROTOCOL (1997)

The Kyoto Protocol, first signed in 1997, was a landmark international agreement for member states to commit to legally binding emission reduction by set dates.

As the Kyoto Protocol was due to expire 2020, it was replaced by the Conference of Parties (COP21) held in Paris 2015, where commitments were made to limit global temperature rises to 1.5 to 2.0°C compared to pre-industrial levels. This is still the target, with the 2023 COP28 adding additional stocktaking measures to try and ensure these targets are met.

In the United Kingdom, the first commitment was to reduce emission by 12.5% against relative levels in 1990. This later led to the Climate Change Act within the UK that set a commitment to reduce emissions by 34% by 2020 and to achieve Nett Zero by 2050 compared to the relative levels in 1990.

NATIONAL PLANNING POLICY FRAMEWORK (NPPF)

The NPPF sets out planning policies for England and Wales and how these are expected to be applied. In determining planning applications, local planning authorities should expect new developments to:

- Comply with any development plan policies on local requirements for decentralised energy supply unless it can be demonstrated by the applicant, having regard to the type of development involved and its design, that this is not feasible or viable; and
- Take account of landform, layout, building orientation, massing and landscaping to minimise energy consumption.

ROYAL BOROUGH OF WINDSOR AND MAIDENHEAD COUNCIL SUSTAINABLE DESIGN POLICY

The following relevant items have been taken from the Royal Borough of Windsor & Maidenheads, Sustainable Design and Construction Supplementary Planning Document Adopted June 2009 and have been used in the development of this Sustainable Design Statement.

Sustainable Design and Construction

1.8 The concept of sustainable development is at the heart of planning.[3] It is not an alternative name for environmental responsibility but is far broader, encompassing the management of social and economic change within environmental capacity. A widely used definition is:

> *"Development that meets the needs of the present without compromising the ability of future generations to meet their own needs."*[4]

Requirement 3

On-Site Renewable Energy Generation

All developments involving 10 or more dwellings or 1,000m^2 or more gross non-residential floorspace will be expected to secure at least 10% of their expected energy demand[24] from on-site renewable or low carbon sources.

4.0 SUSTAINABILITY PROPOSALS

As the proposed building is over 1000m^2 to comply with the requirements of the above, the proposed care home will need to have at least 10% of its energy requirements met by renewable or low carbon sources.

THE ENERGY HIERARCHY

The Energy Hierarchy has long since been adopted as best practice when designing and reviewing energy efficiency and carbon reduction in both new and existing buildings.

The hierarchy is “be lean, be clean, be green”; in other words, designers should reduce demand by adopting fabric first principles, use energy as efficiently as possible and then after this, where possible integrate renewable technologies:

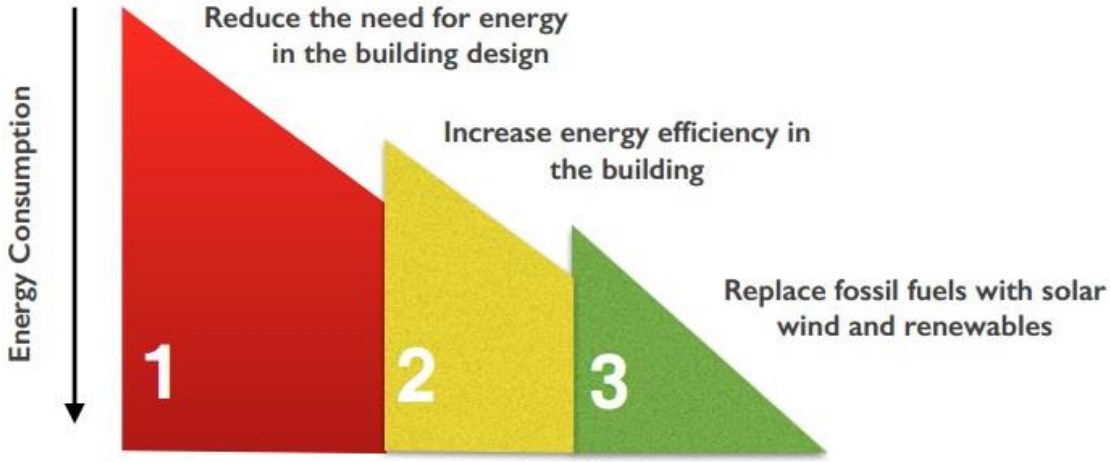


Figure 2.1: The Energy Hierarchy

Each of these steps is explained in more detail below.

4.1 BE LEAN: USE LESS ENERGY

It is proposed that the building be built with area weighted U-values improving upon the limiting values stated within the Building Regulations Part L2A (2013) for the building fabric and glazing elements.

New buildings are required to be pressure tested upon completion. The standard air leakage used by the Building Regulations target model is 5 m^3/(h.m^2) @ 50 Pa. Therefore it is proposed that the construction is built to improve upon this air leakage performance and achieve at least 3 m^3/(h.m^2) @ 50 Pa. This will further improve the energy efficiency of the building.

The following values would therefore be targeted for the new building.

U Values	Baseline – 2013 L2A Limiting Values	Proposed Values
Wall	0.35	0.15
Floor	0.25	0.22
Roof	0.25	0.18
Windows	2.20	1.29
Air Permeability	5.00	3.00

These fabric values will inform the build-up and material selection for the element of the building. By improving upon the limiting values, the building will minimize its energy requirements, in particular, the heating and cooling needs, as the U Values will aid in limiting heat transfer across building elements.

VENTILATION

Mechanical ventilation with heat recovery, (MVHR) can provide a more energy efficient solution, this provides supply and extract ventilation to spaces and heat recovered from the extract is transferred into the supply reducing energy losses associated with standard extract only ventilation. The significant ventilation requirements of the buildings numerous ensuite bathrooms would require a major ventilation system if heat recovery were to be incorporated, beyond the typical requirements for a building of this type, therefore simple extract will be used.

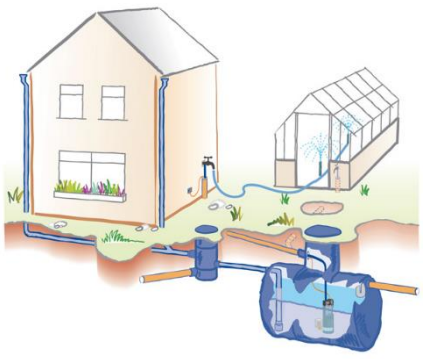
LIGHTING

Significant advances have been made with LED lighting technology recently and typically LED's will use only 15% of the energy compared to incandescent or halogen fittings.

Therefore, low energy LED lighting will be used throughout the building.

WATER USAGE

Reducing water usage, particularly hot water, can have significant energy savings; therefore, when selecting sanitaryware especially in this instance the shower unit's consideration should be given to low flow alternatives, for example the Delabie Sporting 2 Shower panel uses 6 litres/minute of water as opposed to the traditional 9 litres/minute. Low flow spray taps for basins can provide significant savings and WCs should be low volume dual flush.



Rainwater harvesting could be considered for garden irrigation. This utilises either an above ground or below ground tank that collects and stores rainfall from the roofs. An integral pump allows the water to be connected to hose outlets for hand or automatic irrigation. Due to the installation costs for below ground tanks, the financial

payback period is extensive and carbon savings are minimal. Above ground tanks / butts can offer a low energy cost effective solution, however due to the vulnerable nature of the residents, untreated water storage and usage could provide risks. Rainwater harvesting is therefore not recommended for Westmoreland Road.

We would not recommend rainwater harvesting for toilet flushing as this would requires a secondary pumped water system within the property which would never achieve a financial payback and provide minimal carbon savings. Also, although filtered the harvested water is not as clean as mains water leading to dirt build up within WC pans and possible maintenance issues with connected equipment.

Heat reclaim systems are now available for shower drains, these extract the heat from the shower wastewater and transfer it to the cold main feeding the shower / water heater. These systems can provide some energy savings, however within a property of this type with multiple shower areas fed from a central location they would be very difficult to incorporate and unlikely to provide any significant energy or cost or carbon savings with payback periods typically of between 30 to 40 years.

4.2 BE CLEAN: SUPPLY ENERGY EFFICIENTLY

Once energy consumption has been minimised, the priority is to use local low carbon or decentralised energy sources. The premise of this is to supply energy more efficiently before looking to decarbonise the ultimate source. As such, this part of the energy hierarchy tends to focus on assessing the feasibility of district or development scale solutions.

However, as we are only considering a single property and there is no local heat network within the area, this step is not available for this building.

4.3 BE GREEN: USE RENEWABLE ENERGY

Following application of the lean and clean principles, the next stage is to review options to further reduce the use of grid supplied electricity and gas with their associated carbon emissions. Therefore, options for suitable low and zero carbon technologies can be reviewed.

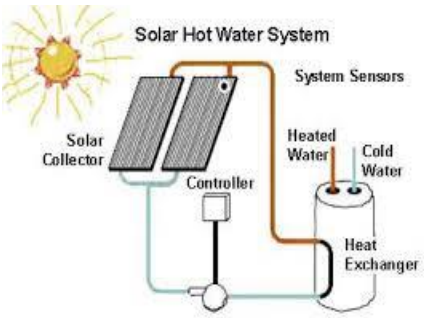
PHOTOVOLTAIC POWER GENERATION

The installation of Photovoltaic Panels (PV's) would allow the property to utilise the sun's energy to generate clean, on-site renewable energy. Westmoreland Road has significant flat roofs that could incorporate PV panels. PV's will therefore be provided at Westmoreland Road.

BATTERY STORAGE

PV panels generate electricity during daylight hours and the property will have a daylight load of electricity, there could be occasions when more electricity is generated than used internally. This over capacity can be sold back to the grid, however the payment from this is minimal; an alternative is to install a battery system which can store unused electricity that would normally be fed back to the grid for use by the building when required, typically lighting. The PV installation will probably be large enough to have spare capacity and battery storage could provide a financial payback. Battery storage is therefore proposed for Westmoreland Road.

SOLAR HOT WATER GENERATION

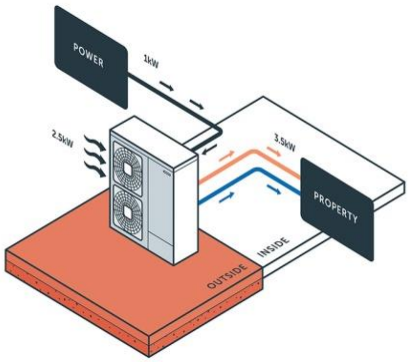


Solar Water Heating uses the suns energy to produce typically 50% of a properties hot water demand. The flat roof area could provide the facility to include solar thermal, however this would have to be balanced with the option to include PV's. Solar hot water systems can have issues with overheating if the hot water is not used especially during the summer months, we therefore believe that solar thermal should not be used at Westmoreland Road.

COMBINED HEATING AND POWER

Combined heating and power [CHP] units use a gas engine to generate both heat and electricity. This on-site generated electricity does not have the system losses inherent with grid supplied electricity and by using the heat creates a carbon efficient but not carbon neutral heat and electricity generation system. To be efficient both the electrical and heat energy generated by the CHP must be used. As Westmoreland Road does not have a sufficient base load and the technology is now sufficiently low carbon the integration of CHP is not suitable.

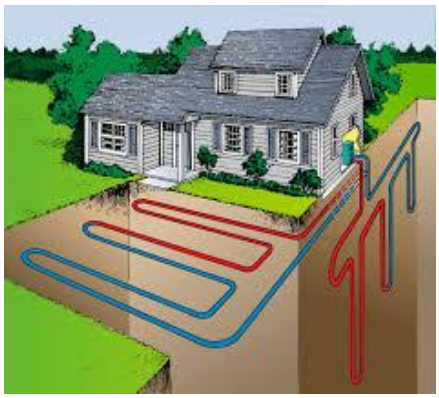
AIR SOURCE HEAT PUMPS



Air Sources Heat Pumps (ASHP's) efficiently extract energy from the air via an external unit and transfer it into water for heating and hot water generation. To operate efficiently, ASHP's deliver water at 55°C, which is ideal for underfloor heating, and preheating domestic hot water as proposed at Westmoreland Road.

ASHP's do generate noise, however this can be mitigated and should not cause a problem in the relatively built up location. We do however believe that ASHP's are suitable for Westmoreland Road and provide the best low carbon option for heat generation.

GROUND SOURCE HEAT PUMPS



Ground Source Heat Pumps (GSHP's) efficiently extract energy from the ground and transfer it into water for heating and hot water generation. The ground arrays for GSHP's can be either horizontal or vertical. Horizontal arrays are typically buried 1.5m to 2.0m and require significant areas of open ground, vertical arrays are set within 100-130m deep boreholes typically spaced 6-7m apart and require significantly less area of open ground. Westmoreland Road does have some open areas including car park and gardens; however these may not be large enough to incorporate the ground array required.

Due to the higher cost and minimum carbon savings offered by GSHP over ASHP we do not believe they provide a good heat source option for Westmoreland Road.

WIND TURBINES

Wind turbines use wind energy to generate electricity. They are best suited to rural open areas as they require a steady wind, and they generate noise. The site is in a built up residential area which will reduce wind speeds and coupled with the noise and visual impact would make planning permission for a wind turbine very

unlikely. We therefore do not consider that wind turbines are suitable for Westmoreland Road.

BIOMASS BOILERS

A biomass boiler plant can provide very low carbon energy using wood chip or wood pellet as a fuel. However, they are relatively large scale and therefore really only suitable for large developments or district heating schemes. Additionally, biomass boilers require daily maintenance to operate efficiently and reliably. We therefore do not consider that biomass boilers are suitable for Westmoreland Road.

5.0 RECOMMENDATIONS

By using the Be Lean, Be Clean, Be Green it has been identified that the following sustainable approaches should be incorporated at Westmoreland Road Care Home.

Energy Reduction Measures:

- Improved U Values below standard building regulation requirements
- Improved Airtightness below standard building regulation requirements
- LED Lighting Throughout
- Low Flow Sanitaryware

Low / Zero Carbon Technologies:

- Photovoltaic Panels
- Possible Inclusion of Battery Storage
- Air Source Heat Pumps for Heating and Hot Water Generation

5.0 ENERGY USE IN CARE HOMES

The utilities for health care, care home energy guide 2017 advises the following typical breakdown of energy use within care homes to be as follows.

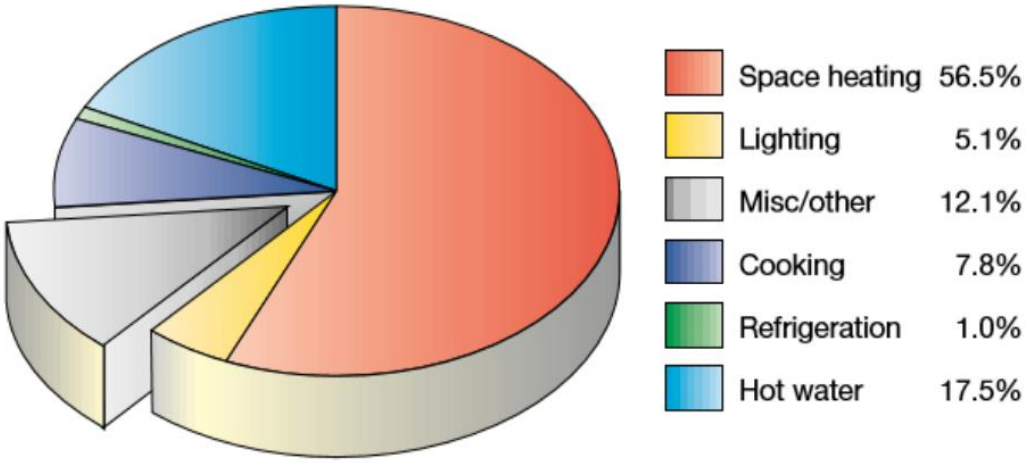


Figure 3 Energy use (kWh) breakdown

5.0 CONCLUSION

By incorporating the use of air source heat pumps to provide the heating and hot water at the Westmoreland Road Care Home, 74.1% of the building's energy demand will be from renewable technologies, the addition of PV's will further increase the percentage of energy delivered from renewable technologies.

The Royal Borough of Windsor and Maidenheads requirement of 10% of energy to be provided by renewable technologies will therefore be achieved.