Energy Statement

Land to the North and South of Abingdon Road, Clifton Hampden

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Executive Summary

This Energy Statement has been prepared in support of the Neighbourhood Development Order submitted for 17 dwellings and a new doctors surgery building on land to the north and south of Abingdon Road, Clifton Hampden.

This Statement includes an energy demand assessment showing how selected energy efficiency, low carbon and renewable energy measures have been considered and those, which will be incorporated into the scheme.

The planning policy requirement requires a reduction of emissions of 40% compared with the 2013 Building Regulations for dwellings. This statement sets out how this will be achieved and implemented.

The fabric insulation standards and construction specification of the homes will exceed the minimum required by Building Regulations. It is proposed to install an air source heat pump into each of the 17 homes.

Although not required under planning policy the doctor's surgery will be built to net zero carbon standard.

1 Introduction

This report describes the methodology used in assess the development and the initiatives proposed.

The new homes and doctor's surgery will be designed and constructed to reduced energy demand and carbon dioxide emissions.

The objective is to reduce the energy demand to an economic minimum by focusing in the parts of the buildings that have the greatest impact on energy demand and are the most difficult and costly to change in the future , namely the building fabric.

Once cost-effective structures have been designed, low carbon and renewable technologies have been considered to provide heat and or electricity.

The following hierarchy has been followed:

Lean	*Reduce demand and consumption*
Clean	*Increase energy efficiency*
Green	*Provide low carbon renewable energy sources*

2 National Planning Policy

The latest Nation Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. At the heart of the NPPF is a presumption in favour of planning of sustainable development. The NPPF has guidance for developments to ensure they plan for climate change.

The most relevant paragraphs of the NPPF in respect of climate change are;

Paragraph 152 states

'The planning system should support the transition to a low carbon future in a changing climate, taking full account of flood risk and coastal change. It should help to: shape places in ways that contribute to radical reductions in greenhouse gas emissions, minimize vulnerability and improve resilience; encourage the reuse of existing resources, including the conversion of existing buildings; and support renewable and low carbon energy and associated infrastructure.'

Paragraph 158 states

'When determining planning applications for renewable and low carbon development, local planning authorities should; a) not require applicants to demonstrate the overall need for renewable or low carbon energy, and recognize that even small-scale project provide a valuable contribution to cutting greenhouse gas emissions; and b) approve the application if it impacts are (or can be made) acceptable. Once suitable areas for renewable and low carbon energy have been identified in plans, local planning authorities should expect subsequent applications for commercial scale projects outside these areas to demonstrate that the proposed location meets the criteria used in identifying suitable areas.'

3 Local Planning Policy

South Oxfordshire Local Plan 2011-2035, Policy DES10: Carbon Reduction states;

1 'Planning permission will only be granted where development proposals for:

- *i. New build residential dwelling houses; or*
- *ii. Developments including 1,000sqm or more of C2 (including student accommodation); or*
- *iii. Houses in Multiple Occupation (C4 or Sui Generis floorspace)*

Achieve at least a 40% reduction in carbon emissions compared with a code 2013 Building Regulations compliant base case. This reduction is to be secured through renewable energy and other low carbon technologies and/or energy efficiency measures. The requirement will increase from 31st March 2026 to at least 50% reduction in carbon emissions and again from 31st March 2030 to a 100% reduction in carbon emissions (zero carbon). These targets will be reviewed in the light of any future legislation and national guidance.

2 Non-residential development proposals are required:

- *i. To meet the BREEAM excellent standard (or a recognised equivalent assessment methodology)*
- *ii. In addition, development proposals of 1,000sqm or more are required to achieve at least a 40% reduction in the carbon emissions compared with a 2013 Building Regulations compliant base case. This reduction is to be secured through renewable energy and other low carbon technologies and/or energy efficient measures. The requirement will be increased from March 2026 to at least a 50% reduction in carbon emissions.*

3 An Energy Statement will be submitted to demonstrate compliance with this policy for all new build residential developments (other than householder applications) and new-build non-residential schemes over 1,000sqm. The Energy Statement will include details as to how the policy will be complied with and monitored.

4 Assessment Methodology

SAP calculations have been prepared for representative houses and apartments. The specification proposed in this report will exceed the requirements of the new Part L 2021.

5 Build Standards Proposed

Ground Floor (u value 011W/m2K) – 75mm screed finish, 223mm Kay-Cel EPD 70 insulation (thermal conductivity 0.032W/m2K), 150mm concrete bean and block.

External Wall (u value 0.18W/m2K) 150mm cavity fully filled with Knauf Earthwool Dritherm 32 Ultimate, 100mm lightweight block (0.18W/m2K), 12.5mm plasterboard on dabs.

Roof (u value 0.17W/m2K) – tiles/slate on battens, breather membrane, 150mm rafters partially filled with 100mm Celotex GA4000 insulation, 52.5mm Celotex PL4040 insulated plasterboard.

Insulation at Ceiling Level (u value 0.10W/m2K) 300mm mineral wool (0.038W/m2K) over 100mm mineral wool between joists, 12.5mm plasterboard.

Windows and Glazed Doors (whole u value 1.2W/m2K) Windows are double glazed, low E Argon filled.

Rooflight (whole u value 1.6 W/m2K) Windows are double glazed low Argon filled.

High Performing Solid Entrance Door (u value 1.0W/m2K)

Heating Mistsubishi Electric Ecodan Air Source Heat Pump - COP2.6

Heating Controls Time and temperature zone control by suitable arrangement of plumbing.

Hot Water System Hot Water Cylinder fed from main heating system, with a measured heat loss 2.09 KWh/24h

Ventilation Natural with trickle vents and extract fans to wet rooms and kitchen

Lighting 100% of lighting will be low energy at 80lumen/W or more with 5W power

Thermal Bridging

Knauf Insulation 150mm Dritherm 32 Full-fill insulation - PSI Ψ Values, Concrete Block Association (CBA) PSI Ψ Values & Full Fill Cavity Walls with Aircrete Blocks (0.18W/m2k) PSI Ψ Values to be implemented in the design and construction of the dwellings. Checklists to be completed and signed towards the end of construction.

Thermal junctions complied with as
follows: - E2 Other lintels, hi lintels
E3 CBA Cert 314
Window Sill E4 CBA
Cert 315 Jamb

Knauf E5B Beam and Block Ground Floor
(normal) E6 CBA Cert 303 Intermediate floor
within a dwelling
E7 Party floor between dwellings for flats (Full Fill Cavity Walls with Aircrete Blocks PSI Ψ Value) Knauf E10 Eaves (insulated at ceiling level)
E12 CBA Cert 310 Gable (insulated at ceiling
level) E13 CBA Cert 311 Gable (insulated at
rafter level) E14 Flat roof
Knauf E16 Corner (normal)
E17 CBA Cert 317 Corner (inverted)
E18 CBA Cert 305 Party Wall between
dwellings E20 Exposed floor (normal)
E22 Basement floor
P1 Party wall – ground floor (Full Fill Cavity Walls with Aircrete Blocks PSI Ψ Value)
P4 Party wall – roof insulation at ceiling level (Full Fill Cavity Walls with Aircrete Blocks PSI Ψ Value) P5 Party wall – roof insulation at rafter level (Full Fill Cavity Walls with Aircrete Blocks PSI Ψ Value) R1 – Head of roof window
R2 – Sill of roof window
R3 – Jamb of roof
window R6 – Flat
ceiling
R7 – Flat ceiling
(inverted) R8 – Roof
to wall (rafter)
R9 – Roof to wall (flat ceiling)

Air Permeability

Air test design air permeability for all dwellings – 4m3/hm2

6 Low Carbon and Renewable Technologies (Be Clean and Be Green)

This section assesses the appropriateness of each renewable technology to comply with the planning requirements.

Wind

Roof mounted turbines could be used at the development to generate small amounts of energy. The output is considered small and the wind turbines would not be suitable on account of the proximity of the Conservation Area.

Combined Heat and Power Community Heating

The sites are considered to be too small for a combined heat and power system to be viable.

Ground Source Heat Pumps

The use of ground source heat pumps is considered to be cost prohibitive.

Solar Water Heating

Solar hot water heating panel could be used but the relatively small increase in the total emissions reduction does not justify the cost.

Photovoltaics

Photovoltaics could be accommodated on the roof of a number of buildings and remains an option to achieve the standards.

Air Source Heat Pumps

It is proposed to install air source heat pumps to all houses and install exhaust air heat pumps into the apartments.

7 Doctors Surgery Building

It is proposed to build the doctors surgery to net zero carbon (use) standard. The strategy is as follows:

Mechanical Services

Air source heat pump heating and cooling incorporating heat recovery. Natural (stack effect) ventilation via openable windows.

Air Conditioning System

High level wall mounted units will be provided. (See below).

Electric overdoor heaters
Will be provided within the Lobby to keep conditioned air in and bugs out (see below).

Ventilation
Generally, the building will be naturally ventilated via openable windows, doors and rooflights except toilets, served via MVHR unit located in loft space.

Lighting
New LED Lighting to be installed throughout the site

Fabric Elements

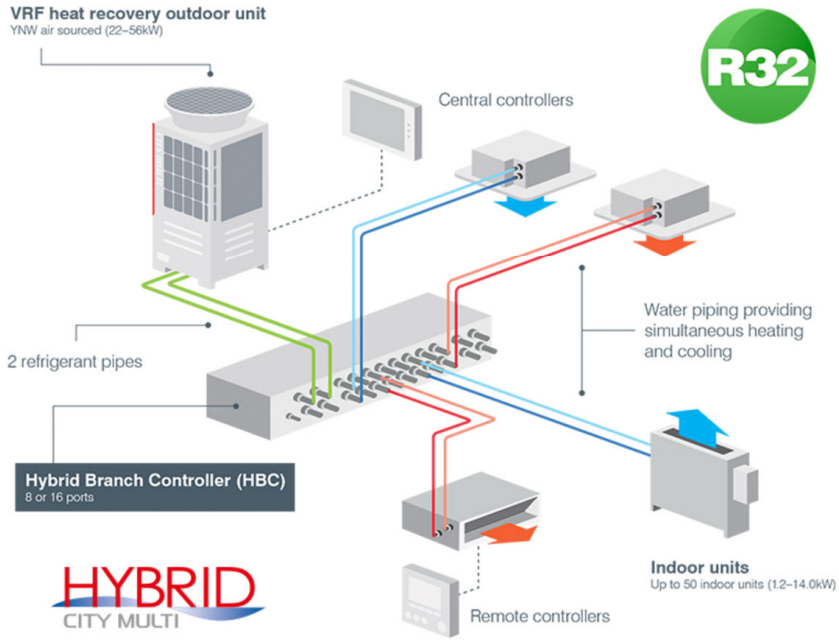
Fabric element	$U_{a\text{-}Limit}$	$U_{a\text{-}Calc}$	$U_{i\text{-}Calc}$	First surface with maximum value
Walls*	0.26	0.18	0.18	External Wall
Floors	0.18	0.15	0.15	Ground Floor
Pitched roofs	0.16	0.15	0.15	Roof
Flat roofs	0.18	-	-	No flat roofs in project
Windows** and roof windows	1.6	1.22	1.28	Window 1
Rooflights***	2.2	1.83	1.83	Rooflight
Personnel doors^	1.6	-	-	No personnel doors in project
Vehicle access & similar large doors	1.3	-	-	No vehicle access or similar large doors in project
High usage entrance doors	3	-	-	No high usage entrance doors in project

$U_{a\text{-}Limit}$ = Limiting area-weighted average U-values [W/(m²K)] $U_{i\text{-}Calc}$ = Calculated maximum individual element U-values [W/(m²K)]
$U_{a\text{-}Calc}$ = Calculated area-weighted average U-values [W/(m²K)]
* Automatic U-value check by the tool does not apply to curtain walls whose limiting standard is similar to that for windows.
** Display windows and similar glazing are excluded from the U-value check. *** Values for rooflights refer to the horizontal position.
^ For fire doors, limiting U-value is 1.8 W/m²K
N.B.: Neither roof ventilators (inc. smoke vents) nor swimming pool basins are modelled or checked against the limiting standards by the tool.

Air permeability	Limiting standard	This building
m³/(h.m²) at 50 Pa	8	3

ASHP/VRF Heat Recovery System

Yes, the systems utilise the same ASHP technology (seasonal efficiencies etc) so the net zero target is not affected. Generally, the refrigerant circuit is extended to serve indoor units as opposed to being contained within the outdoor unit requiring a heat exchanger serving the LTHW heating plant. The VRF system is simpler and more familiar, R-32 is a next generation refrigerant that has a low environmental impact and Hybrid systems are available with water serving indoor units which reduce the need for leak detection (F-Gas Regulations) in occupied spaces. See illustration below, secondary pipework will be refrigerant (not water) for non-hybrid systems and require leak detection and pump down facility.



Photovoltaic Panels

In summary, the Part L assessment include PV installations that displace 100% of the electricity required for heating, hot water, lighting and associated auxiliary power for pumps, fans etc. However, electricity for domestic appliances is not considered and actual performance (as opposed to design) will be affected by occupant usage, and incremental weather. Consequently, a new grid connected electricity supply will be necessary for unregulated energy including any car charging points and since PV will be less effective in winter, for example and it is important to clarify the difference between 'zero carbon' vs 'off-grid' developments.

8 Summary

This Energy Statement has demonstrated the strategies required for the houses to meet the requirements of DES10 and the doctor's surgery to exceed the standard and reach net zero.

Policy DES10 also requires the Energy Statement to include details as to how the policy will be complied with and monitored. On completion of the development As Built SAPs will be provided to the planning authority demonstrating that the policy has been complied with.

The planning authority may wish to consider imposing the following or similar Planning Condition?

'The development hereby permitted shall not be occupied until written documentary evidence has been submitted to, and approved in writing by, the local planning authority demonstrating that the dwellings and doctors surgery building hereby permitted, as built, have achieve a minimum 40% reduction in carbon emissions compared with a code 2013 Building Regulation compliant base case. Such evidence shall be in the form of an As Built Standard Assessment Procedure, produced by an accredited energy assessor.

Reason: To ensure that the development is carried out in accordance with sustainable building standards in accordance with Policy DES10.'