



LZ CARBON PROFILE

Profile: 004
February 2009

Osborne 36b Mid Street

Level 5 Code for Sustainable Homes

CO2 emissions: **At least 100% reduction over Part L2006**

Developer: **Osborne Homes**

Architect: **Harrington Design & Bloomfield Architects**

Completed: **April 2008**

Location: **South Nutfield, Surrey**



This traditional looking house is composed of two 2-bedroom flats. The upper floor unit 36b Mid Street has a floor area of 65 m². The flats are the first dwellings built to Level 5 that have been occupied in the UK. These flats include a minimum of new technologies as it is intended for affordable, easily run, social housing. To minimise costs the local council provided the land free of charge and several grants were obtained. Overall cost was £2,610 per m².

Initially the flats were to be built to Level 3, the mandatory level for new housing association dwellings after May 2008. However, Raven Housing Trust and Osborne chose to upgrade the specifications to Level 5. This allowed the cost and practicalities of new technologies required to meet the higher levels of the Code to be explored on a small rural site before using them in a big development with their greater risks.



Low-carbon approach

Fabric Structurally Insulated Panel Systems (SIPS) combined with additional external insulation is used to form the inner leaf of the building, providing a thermally insulating airtight barrier. Outer leaf is made of bricks and tiles, to provide a traditional appearance. Triple glazed windows minimise heat losses from large windows on South face while increasing daylighting and solar gain.

Heat and power generation A wood pellet biomass boiler shared between the dwellings powers the underfloor heating. Electricity is generated by PV panels on the roof. Mechanical ventilation with heat recovery allows heat energy to be recovered from out-going air while providing warm filtered fresh air to the house.

Outline energy strategy

Minimising heat loss through an airtight, highly insulated fabric with few thermal bridges using SIPS construction. Heating needs were minimised by increasing South and West glazed areas to maximise solar heat gain. A major part of remaining energy needs provided by microgeneration. Overall, significant reduction (>100%) in carbon emissions compared to 2006 Part L levels.

Envelope

Walls U = 0.14 W/m²K
150mm polystyrene SIPS system with additional 50mm external EPS insulation.

Roof U = 0.11 W/m²K
400mm mineral wool insulation between and above joists.

Windows U = 0.8 W/m²K
Triple glazed with low E glass, inert gas filled, aluminium spacers and uPVC frame. Frame has 3 weatherseals and 5 chambers for optimum insulation.

Air tightness
- **Ground floor:** 4.36 m³/m²/hr at 50 Pa
- **First floor:** 5.53 m³/m²/hr at 50 Pa
Air barrier designated as the polythene sheeting within the drywall. Air-leaks limited around windows using tape and around service penetrations using top hats and tape.

Enhanced Construction Details Y= 0.040
Improved construction details reduced thermal bridging and heat losses.

Low carbon heat & power

Biomass Boiler A shared Mescoli biomass boiler using locally sourced wood pellet powers the underfloor heating.

PV Panels 10.5 m² Electricity provided by Sharp PV panels on south facing roof.

MVHR A mechanical ventilation heat recovery system provides fresh clean air.

Building Management System
An ACIS system monitors energy use allowing occupants to change lifestyle to reduce emissions.

Contacts

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Acknowledgement

This LZ Carbon Profile has been prepared for the Zero Carbon Hub by BRE

Low energy alignment with the Code for Sustainable Homes (Post Construction Stage)

Energy Issue	Credits awarded
ENE 1 Dwelling Emission Rate 101.47% reduction in carbon emissions	14 of 15
ENE 2 Building Fabric Heat loss parameter of 1.02	2 of 2
ENE 3 Internal Lighting 100% of fixed fittings are dedicated and energy efficient	2 of 2
ENE 4 Drying Space Rotary drier in garden with provision for over 8 m of line and secured by fence and gate	1 of 1
ENE 5 Energy Labelled White Goods A+ rated fridge freezer, A rated washer/dryer and B rated dishwasher	2 of 2
ENE 6 External Lighting Security and space lighting in car park area and over entrance doors are energy efficient and dedicated.	2 of 2
ENE 7 Low or Zero Carbon Technologies 68% reduction in carbon emissions	2 of 2
ENE 8 Cycle Storage Two bicycles stored in water-proofed building, of adequate size and readily accessible, with fixings set into the ground for security	2 of 2
ENE 9 Home Office Living room provided with desk, operable windows for ventilation and daylighting, power sockets and telephone sockets for internet connectivity	1 of 1

Total 28 credits*

* out of a maximum of 29 credits for the Energy Category

Construction type

Foundation: Piling

Walls: SIPS with extra 50mm of external EPS insulation,

Ground Floor: Beam and block system with 75mm insulation block infills, 75mm insulation above and 75mm screed.

Roof: Trussed rafters

Learning from Osborne Mid-Street

Handover Occupants were trained to use the heating, ventilation and renewable energy systems to increase familiarity and maximise operating efficiencies.

Energy Strategy Several energy scenarios were modelled to establish the optimum technologies for the house.

