

LZ CARBON PROFILE

Profile: 005
February 2009



DFM House: Oxley Woods Block B

Ecohomes Very Good

Developer: **Taylor Wimpey**
Architect: **Rogers Stirk Harbour & Partners**
Completed: **August 2007**
Location: **Milton Keynes, Buckinghamshire**



The Oxley Woods site is part of the Design for Manufacture (DfM) programme, which is a government led challenge to build high quality, well designed and sustainable houses for a construction cost of £60,000. The site comprises 140 houses, 42 of which are for social housing. Several house designs have been used: houses are between 2 to 5 bedrooms with floor areas between 61.7 and 136 m².

Homes were erected without scaffolding, using cherry pickers, scissors lifts and a mobile crane. The external cladding was also erected without use of scaffolding to reduce construction costs and improve site safety.

Low carbon approach

Fabric The dwelling structure is made of timber frame panels, up to three storeys high, which provide airtight thermally efficient structure to minimise heat losses. A balloon timber frame system allows the timber studs to continue through the three stories thereby minimising heat losses by thermal bridging and air leaks at floor-to-wall junctions.



Each panel has organic insulation made from non-hazardous recycled newspapers. This low embodied energy insulation does not require cutting to fit as it is sprayed or injected into place. It also allows irregular panels and voids to be completely filled in order to provide a continuous layer of thermal insulation to walls.

Heat and power generation The houses incorporate a steel lantern structure (Ecohat) on the roof. This novel feature assists with natural ventilation, solar warming of hot water and allows solar heat to penetrate into the home. Together these features help reduce energy consumption.

Outline energy strategy

The use of a UK factory made timber frame system allows a reduction of waste and energy used in the transportation of materials to site. A good fabric, allows CO₂ emissions from heating to be reduced by 20%, compared with a conventional new-build house. This reduction rises to 38% with the inclusion of the roof mounted lantern passive heating and ventilation system.

Envelope

Walls U = 0.12 W/m²K

Several storeys high timber frame panels with 145mm cavity fully filled with Warmcel insulation made from recycled newspaper.

Roof U = 0.17 W/m²K

Roof panel covered with 100mm rigid polyurethane board. Having timber underneath the insulation allows ventilation to limit the risks of timber rot.

Windows U = 1.7 W/m²K

Double glazed with low e glass.

Airtightness 2.5 m³/m²/hr at 50 Pa

The houses are built using a balloon timber frame system where the timber stud framing is extended through several storeys with the upper floor fixed to the studs at an intermediate level. This structure minimises potential for breaks in the continuity of external

Low carbon heat and power

Gas boiler Central heating and hot water is provided by an ISAR condensing combination natural gas boiler.

Ecohat Situated on top of the service zones of each house to provide natural ventilation, pre-heating of incoming air from hot air circulating up through the stack and passive solar heating of air and water. Moisture laden air is removed to improve air quality and help maintain timber building fabric. Ecohat enables a reduction of 18% in carbon emissions.

Contacts

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Construction: ANSER Project Managers
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Acknowledgement

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

Low energy alignment with Ecohomes (design)

Energy Issue	Credits awarded
ENE 1 CO₂ Emissions (SAP 2001) 33.31 kg/m ² /yr (Note: In SAP 2005 8 out of 10 credits are obtained)	4 of 10
ENE 2 Building Fabric (SAP 2001) 9.5% improvement in average U-value	3 of 5
ENE 3 Drying Space Rotary drier in garden and secured by fence and gate	1 of 1
ENE 4 Eco-labelled Goods A+ rated fridge freezer, A rated dishwasher and A rated washer	1 of 2
ENE 5 External Lighting Space light fittings are dedicated and energy efficient	2 of 2

Total 11 credits* (SAP 2001)

Total 15 credits* (SAP 2005)

* out of a maximum of 20 credits for the Energy Category



Construction type

Foundation: Concrete strip

Walls: Timber frame panel with Warmcel insulation

Ground Floor: Floating floor over concrete topping

Roof: Timber cassettes, rigid polyurethane insulation

Learning from the DFM House

Affordability This scheme has shown that sustainable houses can be built on a large scale (145 homes) at a low cost, using flexible yet modern design, through the use of factory manufactured panels.

Recycled materials Using recycled low-embodied energy materials can produce an attractive modern-looking home.