

# LZ CARBON PROFILE

Profile: 008  
February 2009



## Miller Homes Miller Zero Housing Project

Level 4 Code for Sustainable Homes

CO2 emissions: **At least 44% reduction over Part L2006**

Developer: **Miller Homes Ltd**

Architect: **Fraser Brown MacKenna Architects**

Completion: **Expected May/June 2009**

Location: **Basingstoke, Hampshire**



The Miller Homes Miller Zero housing project comprises homes complying with Code levels 3, 4, 5 and 6. The development is an R&D project aimed at showcasing how these various code levels dwellings can be produced and the implications for the supply chain.

The level 4 house is a two-storey 4-bedroom house with a floor area of 105m<sup>2</sup>. It uses products that are available on the market and aims to put them into a functional use while demonstrating that low carbon housing can be achieved today.

### Low carbon approach

**Fabric** The walls are fabricated from thin-joint aircrete concrete blocks, a system that minimises air leakage across the mortar joints and creates a more airtight envelope. Another advantage is their high thermal mass, which provides passive heating and cooling throughout the seasons. Cavity insulation minimises heat losses through the building envelope.

**Heat and power generation** Heat and hot water is provided by a ground source heat pump (GSHP), which utilises the latent heat from the ground to power an underfloor heating system.

**Ventilation** Due to the relatively high airtightness of the building envelope this necessitates the use of a mechanical ventilation heat recovery system with summer by-pass option to provide fresh, clean air to the house.

## Outline energy strategy

The design involves improving building fabric performance and shows how, with power and heating microgeneration equipment, a reduction in CO<sub>2</sub> emissions of at least 44% can be achieved compared to 2006 Part L.

## Envelope

### Walls

Cavity wall U = 0.30 W/m<sup>2</sup>K  
90mm cavity fully filled with water repellent blown glass wool insulation.

Timber rainscreen U = 0.25 W/m<sup>2</sup>K  
110mm SIPS with rigid polyurethane insulation.

### Roof

Mono-pitch roof U = 0.18 W/m<sup>2</sup>K  
160mm of rigid polyurethane insulation.

Utility flat roof U = 0.21 W/m<sup>2</sup>K  
105mm of rigid polyurethane insulation.

Small GRP kitchen bay U = 0.22 W/m<sup>2</sup>K  
Filled with polyurethane insulation.

3<sup>rd</sup> bedroom U = 0.16 W/m<sup>2</sup>K  
165mm of rigid polyurethane insulation.

**Windows** U = 1.7 W/m<sup>2</sup>K  
Double glazed with uPVC frame.

**Airtightness** (Design) 6.0 m<sup>3</sup>/m<sup>2</sup>/hr at 50 Pa.  
Internal wall plaster and aircrete concrete blocks with thin-joint mortar minimise air-leaks.

## Low carbon heat and power

**Ground Source Heat Pump 6kW**  
An ICE Energy GSHP is used to power underfloor heating and provide hot water.

### Mechanical Ventilation Heat Recovery (MVHR)

A Vent Axia MVHR system provides fresh, clean air and recovers heat from out-going air.

### 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 (Design Stage)

Energy Issue	Credits awarded
<b>ENE 1 Dwelling Emission Rate</b> 44.8% reduction in carbon emissions	<b>8 of 15</b>
<b>ENE 2 Building Fabric</b> Heat loss parameter of 1.51	<b>0 of 2</b>
<b>ENE 3 Internal Lighting</b> 100% of fixed fittings are dedicated and energy efficient	<b>2 of 2</b>
<b>ENE 4 Drying Space</b> Rotary dryer in garden and secured by fence and gate	<b>1 of 1</b>
<b>ENE 5 Energy Labelled White Goods</b> A rated washing machine and A+ rated fridge freezer	<b>2 of 2</b>
<b>ENE 6 External Lighting</b> Space light fittings are dedicated and energy efficient, and security lighting fitted with PIR sensor	<b>2 of 2</b>
<b>ENE 7 Low or Zero Carbon Technologies</b> 8.4% reduction in carbon emissions	<b>0 of 2</b>
<b>ENE 8 Cycle Storage</b> Bicycle sheds are water-proofed, of adequate size and readily accessible, with fixings set into the ground for security	<b>2 of 2</b>
<b>ENE 9 Home Office</b> Bedroom provided with desk, operable windows for ventilation and daylighting, power sockets and telephone sockets for internet connectivity	<b>1 of 1</b>

**Total 18 credits\***

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

## Construction type

**Foundation:** Concrete strip

**Ground Floor:** Pre-cast concrete beams with EPS insulation

**Cavity Wall:** Thin joint aircrete block cavity system

**Rainscreen Wall:** SIPS with rigid polyurethane insulation

**Mono Pitch Roof:** Rigid 'I' beam joists with polyurethane insulation

## Learning from Merton Rise Code 4 House

**Energy strategy** By developing Code level 3, 4, 5 and 6 homes on the same site, Miller Homes obtained a greater understanding of the Code for Sustainable Homes and the effects of build shape, form, construction and renewables on energy use.

**Solar overheating** MVHR suppliers can provide mechanical ventilation systems where the heat exchanger can be turned off in summer to minimise potential for solar overheating.

