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LZ CARBON PROFILE

Profile: 009
June 2009

Miller Homes Miller Zero Housing Project

Level 6 Code for Sustainable Homes

CO2 emissions: **Targetting 148% 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 6 house is a two-storey 4-bedroom house with a floor area of 105m^2. It uses products that are available on the market and aims to put them into functional use while demonstrating that zero carbon housing can be achieved today.

Low-carbon approach

Fabric The walls are fabricated from storey high aircrete concrete planks. An advantage of using this system is that due to the large size of the planks and the thin joint mortar, there are fewer smaller joints through which air can leak, thus creating a more airtight envelope. Another advantage is their high thermal mass, which provides passive heating and cooling throughout the seasons. Exterior insulation minimises heat losses through the building envelope and through reduced thermal bridging.

Heat and power generation All heat and power generation comes from renewable resources. These include a biomass boiler connected to under floor heating and a hot water cylinder for maximum efficiency. A large photovoltaic array on the roof provides power.

Ventilation The house uses a mechanical ventilation system with an in-built heat recovery unit and summer by-pass option.

LZ CARBON PROFILE: Miller Homes Miller Zero Housing Project

Outline energy strategy

The design targets a carbon emission reduction of 148% compared to 2006 Part L levels and involves improving building fabric performance and inclusion of low carbon heat and power micro-generation equipment

Envelope

Walls EWIS wall U = 0.09 W/m^{2}K
200mm of rigid phenolic insulation.

Timber rainscreen U = 0.11 W/m^{2}K
110mm SIPS with rigid polyurethane insulation.

Roof Main mono-pitch roof U = 0.12 W/m^{2}K
190mm polyurethane insulation between rafters underclad with thermalboard.

Utility flat roof U = 0.21 W/m^{2}K
105mm of rigid polyurethane insulation.

Small GRP kitchen bay U = 0.22 W/m^{2}K
Filled with polyurethane insulation.

3rd bedroom U = 0.16 W/m^{2}K
165mm of rigid polyurethane insulation.

Windows U = 0.68 W/m^{2}K
Triple glazed low e glass, Krypton gas filled, insulated edge technology and uPVC frame.

Airtightness 1.5 m^3/m^2/hr at 50 Pa. Internal wall plaster and large aircrete concrete planks/thin-joint mortar minimise air-leaks.

Low impact heat and power

Biomass Boiler 15kW
A Baxi Multi-Heat wood pellet biomass boiler (located in an exterior boiler house) provides underfloor space heating and hot water for two homes.

PV Roof Tiles 4.8 kWp - 38m^2
Solar Century PV laminated roof tiles generate power from the south/west-facing roof.

Mechanical Ventilation Heat Recovery
A Vent Axia MVHR system provides fresh clean air and recovers heat from out-going air.

Contacts
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Acknowledgement
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Low energy alignment with the Code for Sustainable Homes (Design Stage)

Energy Issue	Credits awarded
ENE 1 Dwelling Emission Rate 148% reduction in carbon emissions	**15 of 15**
ENE 2 Building Fabric Heat loss parameter of 0.79	**2 of 2**
ENE 3 Internal Lighting 100% of fixed fittings are dedicated and energy efficient	**2 of 2**
ENE 4 Drying Space Rotary dryer in garden and secured by fence and gate	**1 of 1**
ENE 5 Energy Labelled White Goods A rated washing machine and dishwasher with A+ rated fridge freezer	**2 of 2**
ENE 6 External Lighting Space light fittings are dedicated and energy efficient, and security lighting fitted with PIR sensor	**2 of 2**
ENE 7 Low or Zero Carbon Technologies 68% reduction in carbon emissions	**2 of 2**
ENE 8 Cycle Storage Communal bicycle storage area is water-proofed, of adequate size and accessible, with fixings set into the ground for security	**2 of 2**
ENE 9 Home Office Bedroom provided with desk, operable windows for ventilation and daylighting, power sockets and telephone sockets for internet connectivity	**1 of 1**
	Total 29 credits*

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

Construction type

Foundation: Concrete strip
Ground Floor: Pre-cast reinforced aircrete planks
EWIS Walls: Storey height aircrete panels over clad with phenolic insulation, finished with render
Mono-Pitch Roof: Rigid 'I' beam joists/single ply membrane.

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.

bre NHBC Foundation — Housing research & development in partnership with BRE Trust — Modern Built Environment Knowledge Transfer Network