

LZ CARBON PROFILE

Profile: 007
February 2009



Tarmac Homes Project by Lovell Partnerships

Level 6 Code for Sustainable Homes

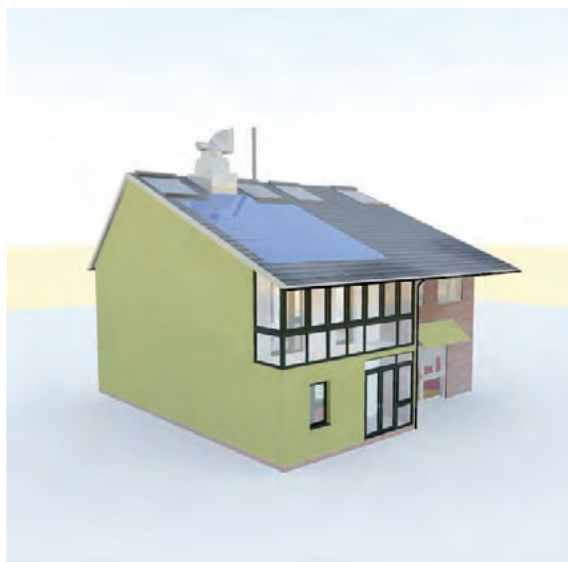
CO2 emissions: **Targeting 150% reduction over Part L2006**

Developer: **Tarmac Ltd** Construction: **Lovell Partnerships Ltd**

Architect: **ZEDfactory Ltd**

Completion: **Expected August 2009**

Location: **University of Nottingham**



Tarmac Homes Project is constructing two semi-detached, low energy masonry homes at the University of Nottingham's School of the Built Environment as part of a showcase of innovative energy efficient homes of the future. The homes form part of the Creative Energy Homes research project, managed by the University of Nottingham, that aims to stimulate new design ideas for environmentally sustainable housing. One home will be built to meet Code Level 4. The other, featured here, is being designed by ZEDfactory Ltd to meet Code Level 6 requirements. Lovell Partnerships are build partners on the project.

The project aims to develop the lowest cost solution for a 3 bed semi-detached Code Level 6 home, incorporating where possible and practicable masonry materials and existing industry best practice.

Low carbon approach

Fabric A masonry building envelope with internal walls coated with lightweight plaster is used to achieve a high airtightness standard which, together with external insulation, minimises heat loss and reduces energy demand.

The masonry fabric, with a high thermal mass, will achieve passive heating and cooling, integral to achieving the targeted carbon saving in this design.

Heat and power generation A mix of heat recovery and microgeneration technologies, including a biomass boiler, a solar thermal array, photovoltaic panels and a passive wind cowl deliver the heat, power and ventilation for the house.



LZ CARBON PROFILE: Tarmac Homes Project

Outline energy strategy

The design involves using existing masonry products and industry best practice combined with microgeneration and low-impact heating and ventilation equipment to achieve a CO₂ reduction target of 150% compared to 2006 Part L levels.

Envelope

Walls U = 0.15 W/m²K
215mm solid wall aircrete blocks with external expanded polystyrene (EPS) insulation provides continuous layer of thermal insulation with minimal thermal bridging.

Roof U = 0.10 W/m²K
Timber trussed with an asymmetric pitch south facing at a 22 degree angle to the horizon to maximise micro generation of electricity.

Windows U = 1.5 W/m²K
Argon filled double glazing units.

Airtightness 2.0 m³/m²/hr at 50 Pa
Achieved by finishing the internal walls with a traditional lightweight plaster.

Low carbon heat and power

Biomass Boiler Space heating generated from the 10-15 kW wood pellet boiler that acts as shared resource for 2 semi-detached homes but can also act as a community heating system.

PV Panels 19m²
Roof mounted solar photovoltaic panels generating 3.32 kW peak of electricity.

Solar Thermal Array 3.05m²
Roof mounted flat-plate solar thermal panels to provide majority of hot water.

Passive Wind Cowl
Supplies and extracts air to and from the home to maintain good air quality while minimising heat loss. The cowl design ensures a throughput of air for no power input.

Contacts

Developer: Tarmac Ltd
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Construction: Lovell Partnerships Ltd
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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
ENE 1 Dwelling Emission Rate 159% reduction in carbon emissions	15 of 15
ENE 2 Building Fabric Heat loss parameter of 0.73	2 of 2
ENE 3 Internal Lighting 100% dedicated low emission energy efficient fittings	2 of 2
ENE 4 Drying Space Drying space over the bath	1 of 1
ENE 5 Energy Labelled White Goods All appliances A+ rated including fridge freezer and washing machine	2 of 2
ENE 6 External Lighting Low energy light fittings with PIR and daylight sensors	2 of 2
ENE 7 Low or Zero Carbon Technologies 99.6% in carbon emissions	2 of 2
ENE 8 Cycle Storage Adequate cover and secure, provision for a minimum of 2 cycles	2 of 2
ENE 9 Home Office Space provided in the sunspace area including desk, power sockets and telephone sockets.	1 of 1

Total 29 credits*

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

Construction type

Foundation: Concrete strip foundation
Walls: Aircrete block solid wall construction
Ground floor: Pre-cast concrete beams infilled with EPS panels
Roof: Trussed rafters and concrete tiles.

Learning from the Tarmac Homes Project

Masonry construction The project aims to show that masonry materials and existing industry best practice can be used to build sustainable, affordable Code for Sustainable Homes Level 6 homes that appeal to the mass market.

Monitoring The houses will be fully occupied and monitored for 10 years to provide feedback to designers on zero carbon performance over time.