



LZ CARBON PROFILE

Profile: 002
February 2009

ecoTECH ORGANICS Smart House

Level 4 Code for Sustainable Homes

CO₂ emissions: **At least 44% improvement over Part L2006**
Developer: **ecoTECH Swedish Sustainable Homes Ltd**
Architect: **Bo Bengtsson**
Completed: **June 2007**
Location: **Watford. Hertfordshire**



The ecoTECH Zero Carbon Build System is an affordable modular housing solution utilising a Swedish manufactured closed panel timber frame with UK-built or assembled elements. It is currently being mass produced for the UK market and is available in 16 pre-designed standard layouts together with a bespoke design option up to 4 storeys. The ORGANICS Smart House built on the BRE Innovation Park at Watford has three stories, three-bedrooms and an area of 154m². It has LANTAC System Approval, BLP System Defects Warranty, and the ecoTECH GEM mortgage.

Build time can be as short as 1.5 days to weathertight and 7 days complete from slab up. Rapid installation is due to the use of factory made wall panels, integrated floor and ceiling cassettes, central service pods and pre-installed M&E, which connect easily together on-site helping increase affordability and minimising construction defects and waste. The cost of homes are quoted from £495/sq.m (supply and installation of the timber frame) to £1201/sq.m (top specification house).

Low carbon approach

Fabric Well insulated walls and roof combined with pre-installed components (e.g. triple glazed windows) and a central service core help achieve high airtightness, minimising heat losses.

Heat and power A mix of heat recovery and micro generation technologies, including a combined air source heat pump/mechanical ventilation heat recovery/hot water unit. A roof mounted solar hot water array provides majority of hot water needs.



The ecoTECH Zero Carbon Build System can be modified to produce Code Level 5 and 6 homes.

Outline energy strategy

The design uses a high performance factory built panellised building fabric together with micro generation, mechanical ventilation and low-impact heating technologies, that help achieve significant reduction (>44%) in carbon emissions.

Envelope

Walls U = 0.15 W/m²K

240mm mineral wool insulation between timber stud.

Roof U = 0.06 W/m²K

200mm mineral wool insulation laid in two lightly compressed layers over 300mm polyurethane insulation laid in three layers. All joints staggered to minimise air gaps.

Windows U = 1.3 W/m²K

Triple glazed with low e glass, argon gas fill, aluminium spacer and timber frame.

Airtightness 1.6 m³/m²/hr at 50 Pa

Off-site manufactured wall and roof systems with central service pods minimise envelope penetrations reducing air leakage. Pipe work for solar thermal array and windows pre-installed in controlled factory environment further reduce leakage.

Low carbon heat and power

Air Source Heat Pump (ASHP), MVHR and Domestic Hot Water

A Viessmann compact energy tower provides mechanical ventilation and space & water heating. The tower incorporates an ASHP, a ventilation unit and hot water tank, which is connected to the solar thermal array. An electrical immersion heater provides additional water heating when needed.

Solar Thermal Array 3.2m²

Two Viessmann solar hot water evacuated tube collectors are mounted on the roof and supplement the ASHP in meeting the majority of hot water needs.

PV Panels (Code Level 5 option)

Addition of up to 45m² of PV panels on south facing mono-pitched roof provide electrical power.

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
ENE 1 Dwelling Emission Rate 47% reduction in CO ₂ emissions	8 of 15
ENE 2 Building Fabric Heat loss parameter of 0.82	2 of 2
ENE 3 Internal Lighting 100% of fixed fittings are dedicated and energy efficient	2 of 2
ENE 4 Drying Space Rear garden with rotary dryer with at least 6m of line	1 of 1
ENE 5 Energy Labelled White Goods A+ rated fridge freezer and A rated washer dryer	2 of 2
ENE 6 External Lighting Space light fittings are dedicated and energy efficient	2 of 2
ENE 7 Low or Zero Carbon Technologies 40.7% reduction in carbon emissions	2 of 2
ENE 8 Cycle Storage Storage provided under accessible water-proofed external stairs with over 3m ² of space and a lockable door for security	2 of 2
ENE 9 Home Office Second floor room provided with desk, operable windows for ventilation and daylighting, power sockets, single telephone sockets and hub for wireless internet connectivity	1 of 1

Total 22 credits*

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

Construction type

Foundation: Concrete raft

Ground Floor: Load-bearing extruded polystyrene (XPS) board on in-situ concrete

Walls: Closed panel timber frame panels

Roof: Steel roof cassettes with light gauge steel trusses

Learning from ecoTECH ORGANICS

Combined Units The compact energy tower incorporates several technologies and can save on construction time, costs and space.

Off-Site Manufacture Factory produced homes allow M&E and other building envelope penetrations to be pre-installed to a high standard thereby reducing air leakage. Result is less need for remedial work to meet airtightness target and reduced heat losses.

