

# LZ CARBON PROFILE

Profile: 013  
June 2009



## The Creo House

Level 6 Code for Sustainable Homes

CO2 emissions: **Targetting 131% reduction over Part L2006**

Developer: **Creo ProKoncept**

Architect: **MJP Architects**

Completed: **Expected May 2009**

Location: **Watford, Hertfordshire**



The Creo house is a 4-storey demonstration mixed social housing complex designed to meet the highest level of the Code and zero carbon home criteria, while providing cost effective community living. Its 317m<sup>3</sup> floor area is split into three units (retail and residential) highlighting its design versatility:

**Ground Floor** – Marks & Spencer display area showcasing sustainable solutions and technologies

**1<sup>st</sup> Floor** – one bedroom apartment with terrace

**2<sup>nd</sup>, 3<sup>rd</sup> & 4<sup>th</sup> Floors** – three bedroom apartment with mezzanine and terrace.

The house has a distinctive, highly glazed South elevation with external render, coloured render panels and coloured metal rainscreen panels.

### Low-carbon approach

**Fabric** Walls have been built using an insulated concrete formwork system, to provide a high thermal mass and airtightness which, combined with continuous external insulation in the ground floor, walls and roof with few thermal bridges, helps minimise heat losses.

**Heat and power** An air source heat pump (ASHP) provides mechanical ventilation and heat for both hot water and underfloor heating. PV panels provide electrical power. Creo house will produce no on-site carbon emissions from gas or biomass combustion.

Solar gain will be maximised in winter through the glazed South façade, while Brise Soleil above the glazed openings will help minimise excessive solar gain and the need for ventilation during summer.

## Outline energy strategy

The design uses a high performance building fabric together with microgeneration, low-impact heating technologies and mechanical ventilation, to achieve significant reduction (131%) in carbon emissions compared to 2006 Part L Levels.

## Envelope

**Walls**  $U = 0.15 \text{ W/m}^2\text{K}$

Insulated concrete formwork (ICF) walls with 150mm concrete core and grey expanded polystyrene (EPS) blocks with a 150mm outer wall and 50mm inner wall.

**Roof**  $U = 0.15 \text{ W/m}^2\text{K}$

150mm grey EPS interlocking blocks.

**Windows**  $U = 1.16 \text{ W/m}^2\text{K}$

Triple glazed windows with low E glass, krypton gas fill, warm edge spacer and five-chamber uPVC frame.

**Airtightness**  $2.5 \text{ m}^3/\text{m}^2/\text{hr}$  at 50 Pa (Design)

Monolithic nature of the ICF wall system provides a continuous airtight barrier. When combined with a minimum of penetrations and openings in the North, East and West walls, air leakage is reduced.

## Low impact heating and power

### ASHP, MVHR and Domestic Hot Water

A Daikin high temperature ASHP performs several functions including mechanical ventilation, under-floor heating & water heating. The mechanical ventilation provides fresh air and cooling, while underfloor heating provides uniform efficient unobstructed space heating. An electrical immersion heater within the water tank provides additional water heating when needed.

### PV Panels

Photovoltaic panels on south facing mono-pitched roof provide electrical power.

### Contacts

Design: MJP Architects

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Construction: Creo Prokoncept

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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> Awaiting information	<b>15 of 15</b>
<b>ENE 2 Building Fabric</b> Awaiting information	<b>2 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> Retractable clothes line located on terraces	<b>1 of 1</b>
<b>ENE 5 Energy Labelled White Goods</b> A+ rated fridge freezer, A rated washing machine and A rated dishwasher with leaflet on the EU Energy Labelling Scheme	<b>2 of 2</b>
<b>ENE 6 External Lighting</b> Space and security lighting are dedicated and energy efficient	<b>2 of 2</b>
<b>ENE 7 Low or Zero Carbon Technologies</b> Awaiting information	<b>2 of 2</b>
<b>ENE 8 Cycle Storage</b> Water-proofed lockable external store, 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> Living room in one bedroom flat and mezzanine in three bedroom flat provided with desk, operable windows for ventilation and daylighting, power sockets, telephone sockets and wireless for internet connectivity	<b>1 of 1</b>

**Total 29 credits\***

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

## Construction type

**Foundation:** Driven steel screw piles.

**Ground Floor:** Lightweight steel framework carrying EPS insulation boards and in-situ concrete.

**Walls:** Plasterboard, ICF system using grey EPS/concrete core.

**Roof:** Plasterboard, trussed rafters, interlocking grey EPS insulation blocks, concrete tiles

## Learning from the Creo House

**Compact ASHP Units** Using compact heat pump units which provide ventilation, underfloor heating and water heating can help save on construction time, costs, maintenance and space.

**Construction Method** Energy efficient homes can be produced using construction techniques such as ICF systems, which can be erected rapidly on-site.

