15 Lloyd Close, Hove BN3 6LZ

OVERVIEW

Year built: 2010

Type: Detached

No of bedrooms: 3

No of other rooms: 3

No of floors: 3

Floor area: 170m²

Cost: £550,000

Wall: Timber (solid cross laminated)

FEATURES

+ Airtight construction
+ Biomass boiler
+ Green roof
+ Low energy appliances
+ Natural materials
+ Rainwater harvesting
+ Solar pv panels
+ Solar thermal panels
+ Solid timber construction
+ Underfloor heating
+ Zero carbon (close to)

Introduction and approach

This is a recently completed new build detached eco house designed by eco architects Mark Pellant and Abi Torr of Koru Architects for their family.

The house is almost zero carbon, benefiting from a good orientation, very high levels of insulation and air-tightness which exceed building regulations. A wood pellet boiler and solar thermal array provide the small amount of heat required. A large underground rainwater harvesting tank provides water for flushing the toilets.

The photovoltaic array exports energy to the 'grid'. Materials are mostly natural, low impact and environmentally friendly and reflect the architects' desire to promote green architecture.

The house is the realisation of a long held dream, following a five year journey of searching for a suitable site in Brighton & Hove, negotiating, designing the house and building

Energy efficiency measures

The house is very well insulated with 300mm hemp insulation in the roof, 100mm hemp plus 160mm wood fibre insulation in the walls, 200mm hemp plus 30mm wood fibre insulation in the floors. The windows are high performance double-glazed with timber frames. U-values: walls 0.15w/m²k, roofs 0.20w/m²k, floor 0.24w/m²k, windows 1.40w/m²k. The tested air-tightness level is an impressive 1.5m³/h/m².An automated Vent Axia Sentinel multi vent, coupled with wall vents, was chosen as the most energy efficient option for ventilation, rather than MVHR, given that heating is almost carbon free. The living rooms and bedrooms have been positioned on the south side of the house and have large areas of glazing to benefit from passive solar gain, while the bathrooms and utility are situated on the north side and have relatively small windows. There is a generous roof overhang and louvred solar shading to the south façade to reduce summer over-heating and high-level rooflights draw air through the house to assist with cooling during the hotter months.

Renewable energy systems

A 6kW Schuco Premium line solar thermal system has been installed on the south-west facing sloping roof which will yield approximately 2,200 – 2,400kWh annually. This energy is fed into an 850 litre accumulator tank for heat distribution to the under-floor heating system and domestic hot water recirculation system. A 10.5kW fully automated wood pellet boiler also feeds into the accumulator tank to supplement the solar thermal energy. The south-west facing sloping roof also accommodates twelve 340W Schuco Premium line photovoltaic panels giving a peak output of 4.08kWp and an annual output of approximately 3800kWh. This energy is fed back to the grid when not being used within the house.

Electrical systems

The lighting for the house is 95% low energy, consisting of a mixture of compact fluorescent fittings and LED fittings. The kitchen appliances and all heating pumps are A rated and above.

Water

All the taps and showerheads have been specified with low flow rates and the WCs are dual flush. A 4,700 litre Freewater UK Elite rainwater harvesting system has been installed to supply the WCs, the washing machine and outside tap.

Materials

The house has been largely constructed from natural materials that breathe including solid cross-laminated timber frame, hemp and woodfibre insulation, lime- based render, oak cladding, zinc roofing, sedum roofing, oak flooring and natural paints and hard oils.

Code for Sustainable Homes

While not a planning requirement, Tom wanted to attempt Code Level 5, but the house will actually fall short by 2 points. The house scored almost maximum points in almost all categories of the Code, but the Lifetime Homes points were not achieved because the house is built on a sloping site. Points were lost under security as external joinery was fabricated by a local joiner and not part of the 'secured by design' scheme, even though the joinery was up to that standard.

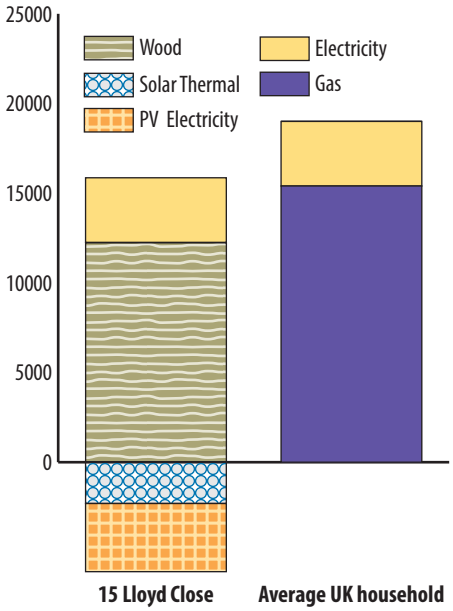
Further points were lost as the main contractor was not part of the 'considerate constructors scheme', even though he managed the site as expected by the scheme. This perhaps highlights how stringent the Code is.

Professional contacts

Architects Koru Architects www.koruarchitects.co.uk
Structural engineer QED www.qedstructures.co.uk
Thermal modelling John Packer Associates www.jpa.uk.com
M&E engineer Robinson Associates www.robinsonengineers.co.uk
Air pressure testing Falcon Energy Ltd www.falconenergy.co.uk
Lighting consultant Cadenza Lighting www.cadenzalighting.co.uk
Landscape architects Incredible Gardens www.incrediblegardens.co.uk
Main contractor Coastal Building Services
Piling sub-contractor Southern Piling www.southernpiling.co.uk
Solid Timber super-structure installer KLH UK Ltd www.klhuk.com
External and internal timber joinery supplier Westgate Joinery www.westgatejoinery.co.uk
Zinc roofing sub-contractor Imperial Leadwork www.imperialleadwork.com
Green roof sub-contractor Cobsen-Davies www.cobsen-davies.co.uk
Plastering and rendering sub-contractor B Mather Plastering
Ventilation sub-contractor Service Vent Ltd www.servicevent.co.uk
Electrical sub-contractor D A H Electrics
Heating and plumbing sub-contractor Verdi Environmental Ltd
Underfloor heating sub-contractor Jupiter Heating Systems Ltd www.jupiterunderfloorheating.com
Wood pellet boiler Frohling 8kW P4, installed by Kithurst Builders kithurstbuilders.co.uk
Solar thermal and PV array installer Freesource Energy Ltd www.freesource.co.uk
Timber flooring supplier Broadleaf Timber www.broadleaftimber.com
Ceramic tiling supplier Royal Mosa www.mosa.nl
Cabinet joinery Aaron Miller Woodworking
Fencing sub-contractor Vertwood Ltd

Energy and CO_2 performance

Energy performance kWh

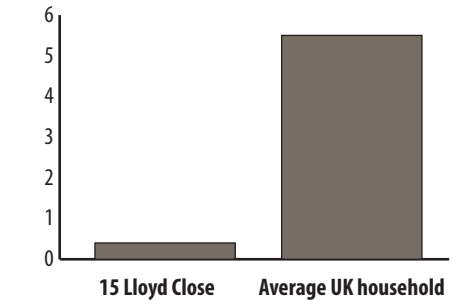


Energy use (generation) kWh

	15 Lloyd Close	Average UK household[1]
Gas	0	15400
Electricity	3600	3600
Wood	12200	0
PV Electricity[2]	-3800	0
Solar Thermal	-2300	0
Totals	**9700**	**19000**

[1] 15400 kWh average gas use (DECC Energy Trends March 2013), 3600 kWh average electricity use (EST 'Powering the Future' 2012)
[2] Total generation figure, of which 500 kWh is assumed used by household

CO_2 performance Tonnes CO_2



CO_2 emissions (tonnes)[3]

15 Lloyd Close	Average UK household[4]
0.4	5.5

93% below average

[3] CO_2 fuel emissions factors from SAP 2009
[4] Average fuel emissions 0.233kg CO_2/kWh (from EHS 2009 fuel split)

Eco Open Houses is an annual collaborative project between Low Carbon Trust, Brighton Permaculture Trust and Brighton & Hove City Council. This year the event is run as part of the Ecobee Project and has been selected within the scope of the INTERREG IV A France (Channel): England cross-border European cooperation programme and is financed by the ERDF. For more information on the Ecobee Project see: www.ecobeeproject.eu

Brighton & Hove City Council
Low Carbon Trust
Brighton Permaculture Trust
ECO BEE project
france (manche) england interreg
European Regional Development Fund
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