Yew Tree House, 5b Preston Park Ave, Brighton BN1 6HJ

Overview

Age/period of house: 2010

Type: Detached

No of bedrooms: 3

No of other rooms: 3

No of floors: 2

Floor area: 180 sqm

Cost: £370,000

Wall: timber frame above ground level, concrete retaining wall below.

Features

+ Airtight construction
+ Wood burning stove
+ Green roof
+ High performance glazing
+ Low water use toilets & shower
+ Low energy LED lighting
+ Mechanical ventilation with heat recovery
+ Passive solar design
+ Rainwater harvesting
+ Solar thermal panels
+ Photovoltaic panels

Introduction and approach

Mick and Sue Paskins had this new house designed by award winning eco architects ZED Factory. It is an outstanding exemplar of urban low energy design. The house is orientated to maximise solar gain. It has high levels of insulation and heavyweight materials inside to store the sun's energy. It is very airtight and has a ventilation system with heat recovery for the winter.

Hot water is mostly supplied through a solar thermal array. A condensing gas boiler can top up hot water during winter and a wood burning stove can top up heating. Rainwater is harvested for flushing toilets and watering vegetables and fruit. The house is clad in Sweet Chestnut, which needs no treatment to preserve it and is grown in Sussex. There is a green sedum roof to attract beneficial insects and other wildlife. A 3.6kWp Photovoltaic array has recently been added to the house.

This house won the Federation of Master Builders Energy Efficiency Award 2011 as an 'Inspiring eco home needing no central heating and minimal water'.

Energy efficiency measures

The house is orientated to maximise solar gain and has extensive double glazing on the south / west elevations to allow solar gain. There is triple glazing on east and north elevations to reduce heat loss.

The external elements; walls, ground floor and roof are super insulated, whilst incorporating high levels of thermal mass. The house is partially earth sheltered as planning requirements restricted the building height to one story above ground level.

Energy systems

There are various energy systems in place:

Wood burning stove – located in the living room for top up heating.

Mechanical Ventilation System with heat recovery – much attention has been focused on achieving a highly airtight building which means a ventilation system is required to provide fresh air in winter. The system is an Itho HRU Eco4. Natural cross ventilation in summer provides cooling.

Solar Thermal – The system is a Navitron solar system. The gas boiler is generally turned off during spring and summer. During winter hot water is boosted by a condensing combi boiler to be topped up to the required temperature but only on when water is being used.

Condensing gas boiler – Alpha CD 25C was chosen because it was the only combi boiler which could take pre-heated warm water from solar thermal and just top it up to the required temperature. This suited two retired people whose lifestyle did not have fixed patterns, andth a likelihood of some HW needs during the day. The only central heating is in the bathrooms which have heated towel rails and underfloor heating.

LED lighting – this low energy form of light allows the large living area to be lit using 156 watts! The lounge is lit by 56 watts.

PV – A 3.6kWp system was recently retrofitted.

Energy Bills have been about £5 a month for electricity (before the PV panels were fitted) and the gas bill is negligible.

Water

There are various measures in place to minimise water use from 300 litres a day used by the average UK couple down to 70!

Rainwater harvesting – there is a 5,000 litre tank for flushing toilets and watering fruit and vegetables. Mick & Sue are aiming to grow as much food onsite as possible.

Low flush toilets – these are 2.6l/4.0l dual flush from the Wickes Eco Range.

Aerated showers – Hansgrohe showerhead. Taps are Bristan taps reduce hot and cold water use. All taps are Bristan 'eco-click' taps, again to reduce water usage. Area around/under bath is insulated to avoid consistently 'topping up' the hot bath water.

Grey water – Grey water recycling will be possible in the future if necessary, facilitated by fitting separate pipework for black and grey water .

Composting toilet – provision has been made for the inclusion of this in the future, including outside collection access.

Materials

Materials used during construction were as natural and low impact as possible:

Sweet chestnut cladding – this local wood grown in Sussex is used on the walls and needs no treatment to preserve it.

Glulam (laminated timber) frame – this enables large spans as a low embodied energy alternative to steel.

Terracotta vaulted block floor – this French system, achieving high levels of thermal mass with minimal amounts of concrete. This is the first application in the UK, to our knowledge.

Kitchen work surface – made by Glass Eco from completely recycled glass with the under support made from recycled plastic carrier bags.

Concrete – Ground Granulated Blast furnace Slag (GGBS), a waste from steel manufacturing, concrete was used. In the concrete blocks, 45% of the cement content of the blocks is replaced by GGBS and in the in-situ concrete, 28% of the cement content is replaced.

Insulation – recycled glass wool insulation used in walls and roof. Recycled glass block insulation (Foamglas) used at base of structural walls to minimise cold bridging.

Green roof – Sedum north facing roof encourages biodiversity

Professional contacts

ZedFactory – www.zedfactory.com

R&R Building Services – http://www.fmb.org.uk/member-builders/R-and-R-Building-Services-Limited-BN1-5AF

Materials supply

Foamglas: www.foamglas.co.uk

Aerated showerhead: www.hansgrohe.co.uk

Eco Open Houses is an annual collaborative project between Brighton Permaculture Trust, Low Carbon Trust and Brighton & Hove City Council. This year the event is run as part of the EcoFab 2 project and has been selected within the scope of the INTERREG IV A France (Channel) – England cross-border European cooperation programme and is co-financed by the ERDF

Brighton & Hove City Council

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