



Low energy buildings - Case Study: **Kingspan Lighthouse**



Category / year of construction or renovation

New construction: nearly zero energy building or better / 2007



Address of the building

BRE Innovation Park, Bucknalls Lane, WD25 9XX



Pictures





Description of the building

Type of building:

Small residential (1-2 family houses)

Detailed description:

The Kingspan Lighthouse was launched at the UK Building Research Establishment's (BRE) Innovation Park in 2007 and at the time was the most advanced house ever produced in the UK for mainstream construction. With annual fuel costs of just £30, Lighthouse pushed the boundaries of modern housing design and was the first house to achieve the highest level of the UK government's Code for Sustainable Homes (CSH), level 6.

The Kingspan Lighthouse adopted a 'fabric first' approach utilising the Kingspan TEK Building System which consists of SIP panels comprised of a rigid urethane core with OSB autoadhesively bonded on either side. This created a construction with a highly insulated envelope (U-values of $0.11 \text{ W/m}^2\cdot\text{K}$ in the floors, walls and roof) with minimal thermal bridging and excellent air-tightness ($1 \text{ m}^3/\text{h}/\text{m}^2$ at 50 Pa).

A Mechanical Ventilation with Heat Recovery (MVHR) unit was installed to provide fresh air and maximise the thermal efficiency of the building's fabric. The house was designed to passively maximise solar gain in the winter and provide solar shading in the summer. Photovoltaic panels provide all of the electricity needs while solar thermal panels and wood pellet fired boiler provide all of the hot water and space heating requirements.

100 % low energy lighting is used throughout the house and all appliances are A++ rated (the most energy and water efficient). In addition all water dispensing units (shower, taps etc) are 'low flow', grey water recycling is used to flush the toilets and rain water harvesting is used for the washing machine and irrigation.



Energy consumption

Energy values:

Lighting: 4 kWh/m²/year

Fans & Pumps: 2 kWh/m²/year

MVHR fans: 4 kWh/m²/year

Domestic hot water: 29 kWh/m²/year

Space heating: 16 kWh/m²/year

Catering: 9 kWh/m²/year

Occupant electricity use: 20 kWh/m²/year

Total = 83 kWh/m²/year

Use of renewables:

All electricity is provided by the photovoltaic panels.

Most of the hot water is provided by the solar thermal panels. The remainder is provided by the wood pellet fired boiler.

All space heating is provided by the wood pellet fired boiler.



Awards won

TTJ Awards - Achievement in Engineered Timber
Builder & Engineer Awards - Energy Efficient Project of Year
International Design Awards
Building Services Awards
Mail on Sunday - British Homes Awards



Links

Websites illustrating the building:

www.kingspanlighthouse.com

<http://www.bre.co.uk/page.jsp?id=959>

Promotional material online:

<http://www.kingspanlighthouse.com/pdf/lighthouse.pdf>

<http://www.youtube.com/watch?v=aDqCdWnxmQc>

<http://www.youtube.com/watch?v=Yj9b48iIvRI>

<http://www.youtube.com/watch?v=Hfr2Xi1vzb0>



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