



## Low energy buildings - Case Study: Kingspan Lighthouse



Category / year

New construction: nearly zero energy building or better - Small residential (1-2 family houses) / 2007



Address

BRE Innovation Park, Bucknalls Lane, WD25 9XX (UK)



Contact details

**Developer:**

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Pictures





## Description of the building

### 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 2006 Code for Sustainable Homes (CSH), level 6.

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.

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.

### Building envelope:

The Kingspan Lighthouse adopted a 'fabric first' approach utilising the Kingspan TEK Building System which consists of SIP panels comprising a rigid urethane core with OSB autohesively bonded on either side. This created a construction with a highly insulated envelope (U-values of 0.11 W/(m<sup>2</sup>·K) in the floors, walls and roof) with minimal thermal bridging and excellent air-tightness (air leakage rates of approximately 1 m<sup>3</sup>/h/m<sup>2</sup> at 50 Pa).

### Renewables:

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.



## Energy consumption

### Energy values:

- Lighting: 4 kWh/m<sup>2</sup>/year
- Fans & Pumps: 2 kWh/m<sup>2</sup>/year
- MVHR fans: 4 kWh/m<sup>2</sup>/year
- Domestic hot water: 29 kWh/m<sup>2</sup>/year
- Space heating: 16 kWh/m<sup>2</sup>/year
- Catering: 9 kWh/m<sup>2</sup>/year
- Occupant electricity use: 20 kWh/m<sup>2</sup>/year
- *Total* = 83 kWh/m<sup>2</sup>/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.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=Yj9b48iTvRI>
- <http://www.youtube.com/watch?v=Hfr2Xi1vzb0>