140 Year Old Cottage Receives Passivhaus Makeover

Posted on 21. Nov, 2011 by Maryruth Belsey Priebe in Articles

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External Insulation - Before and After

Ever wonder if it's possible to remodel a 140 year old house to Passivhaus standards? Believe it or not, it is, and there's a house in Herefordshire, UK to prove it. The Grove Cottage in Portfields, Hereford was originally built in 1869, but has recently received a makeover that would make any green house plan enthusiast dreams come true.

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Constructed primarily of brick, the old house garnered utility bills for heat in the range of 128,000 kWh per year and 113,800 kWh per year for power. That was enough to add a combined 13 tons of carbon dioxide to the atmosphere every year.

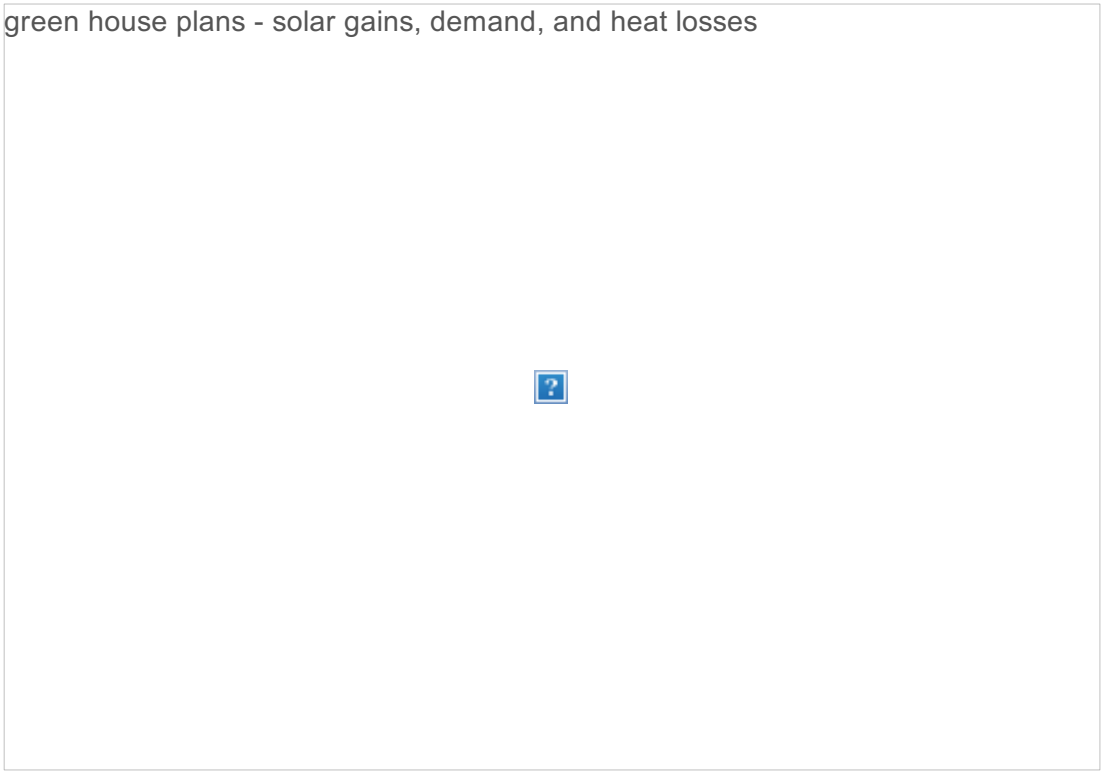
To combat these high energy bills, this little cottage received several important upgrades that helped to reduce its gas consumption by 80%. Here are the high points:

- The home was wrapped in insulation, including floors, ceilings, walls, and everything in between.
    - The majority of the existing brickwork walls and all of the new concrete blockwork walls were externally insulated using PermaRock polystyrene insulation rendering system, bonded with adhesive and mechanically to the masonry.
    - Sheep's wool insulation was used to block heat transfer between floor joists.
    - All insulation meets without breaks so that there is no unwanted heat loss.
- Super efficient windows and doors were installed to minimize heat transfer through the openings to the exterior.
    - The external doors are fully glazed with stainless steel spacers.
    - The window U-values are calculated based on glass uU-value, frame U-value, and glass-edge psi value. They now range from 0.75 to 1.0 W/m2K.
- Windows were also strategically chosen to maximize the amount of daylighting which helps to reduce electricity used for electric lights.
- A twin coil solar domestic hot water heater was installed for hot water in the house.
- A mechanical ventilation and extract system with heat recovery as also installed to maintain fresh air and minimize energy loss to air exchanges.

The result is a draft-free house that meets the EnerPHit Standard by the Passivhaus Institut, with an anticipated energy use of around 22 kWh/m2 annually. Because of the insulation methods used, the design team estimates that not only will the house

be cozy in winter months, it will also only experience days of overheating (where temperatures exceed 25 degrees centigrade) 2.5% of the year. This is well below the Passivhaus standard of 10% per year for days over 25 degrees.

The house now uses 45% less electricity compared to a conventional house of the same size. In fact, the combined gas and electric bills are only £500 annually.



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