Not any old chestnut

A Passivhaus competition led to the construction of a house illustrating that a traditional aesthetic is compatible with low energy requirements, writes Rebecca Waller-Davies

The science of building homes with little or no environmental impact is constantly being honed. Creating sustainable homes with little or no impact on the existing aesthetics of a neighbourhood is not so prevalent, however.

The Chestnut House is one such project forging ahead. Created for BRE's Innovation Park by Passivhaus specialists Bere Architects, Hastoe Housing Association and environmental charity the Prince's Foundation for the Built Environment, the Passivhaus has been designed both to combat the issue of rural fuel poverty and blend in with an ordinary townscape or village surrounding.

The partners came together to submit a joint entry for a BRE-run Passivhaus competition. The criteria for winning were open for interpretation. BRE'S Kym Mead says: "We didn't want to give a scenario… we wanted people to demonstrate that they had wider knowledge and were engaging [locally]. These are established companies; they should be able to design a Passivhaus."

SHARED HISTORY

The partners' shared history meant that they had a pre-prepared knowledge pool to dip into. Passivhaus specialists Bere and rural housing association Hastoe had both worked with the Prince's Foundation.

The foundation's chief executive Hank Dittmar says: "At the heart of our mission is promoting low energy buildings and construction. We already had an affiliation with Bere. So when [they] wanted to do a combined project, we added what we knew.'

Hastoe provided the team with practical knowledge gained through years of working in the social housing market. This meant that the team considered in-use implications and worked them into the design. This included elements of the build that are often overlooked but vital to a construction method as precise as Passivhaus as its efficiency relies on airtightness.

Kevin Hartnett, Hastoe's business development director says: "We made sure that we incorporated Sky satellite dishes [into the design], so airtightness was not spoiled by an outside engineer."

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PASSIVHAUS

Passivhaus aims to reduce heating and cooling requirements of a space to an absolute minimum. By creating a thermal envelope with high levels of insulation and air tightness, Passivhaus engineers are able to save 90% on energy used to heat and cool properties.

Nick Newman, Bere's associate director and devotee of the method explains the design process as a continuous redrafting. He says of the Chestnut House: "[We] built a test house then refined and refined it. It's a detailed, glorified Excel spreadsheet.

"You work out how much heat is going into the building – solar and people heat gain – then work out the losses. It's driven by physics which makes everything much simpler. You are checking the design at every stage to make sure the architecture is a reality."

Relative Passivhaus newcomer Hartnett comments: "Passivhaus is a different way of thinking; different methods with incredibly high attention to detail both in design and on site construction. And it has rigorous standards."

AESTHETICS

Although Passivhaus is a relatively novel building technique, creating a seemingly traditional home was key to the partners' vision of the Chestnut House. This was for practical reasons as well as pure aesthetics. After all, residential developments are more commercially viable when they appeal to a broad cross-section of the general populace.

Newman says: "One of the barriers to getting homes to market is convincing the local village or town council or conservation area… this house could be built in the middle of a village or conservation area."

The Prince's Foundation has worked on what the average consumer wants from a home. Dittmar says: "What we consider to be acceptable may be contemporary or modern design but would fit into context of any town or village… timeless in the sense of regular proportion, not subjective (fashion wise) and acceptable to the average home buyer."

Blending in with the local setting is essential. Newman adds: "Separat[ing] efficiency from the big add-ons, which are at odds with the local vernacular – that's the key driver."

FUEL POVERTY

A well publicised issue in the national newspapers, recession- led fuel poverty is exacerbated by rising energy prices. What is not so widely known is the burden shouldered by those in rural areas.

Hastoe's Hartnett says: "If you look at villages, hamlets and rural towns on mains gas there is 50.7% fuel poverty. In villages without gas it is 25% fuel poverty against 11% in urban areas." This is due to lower wages in rural areas and the cost of transporting fuel.

A Passivhaus' decreased need for fuel is striking. The first rural affordable Passivhaus scheme was built in 2011 in Wimbish, Essex, by Hastoe and was designed by architects Parsons & Whittley. Hartnett says: "Residents' energy bills were reduced by 90% to something like £10 a quarter."

Despite these impressive statistics, Dittmar says: 'We're not counting our chickens – we want to build in a live scenario and build a home which is subsequently lived in in real conditions.'

He adds: "This type of simple, traditional house design, focusing on local vernacular and materials, is not a usual winner in design competitions and we hope… both the industry and the public [will] appreciate the merits of a design based upon these ideas."

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