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Fabric First: PassivHaus and Prince's House debate. Issue 1

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A sunbathed rooftop terrace was the ideal location to sit down recently with Justin Bere of [bere:architects](#) and James Hulme of [the Prince's Foundation for the Built Environment](#), for a discussion on differing attitudes to energy efficiency and wider issues of sustainability. The recent completion of two bere:architects PassivHaus social housing prototypes in south Wales – the [Larch House](#) and the [Lime House](#) –, and the Prince's Foundation's [Prince's House](#) at the BRE Innovation Park in Watford, provide clear case studies for the approach of both organisations, and demonstrate their agreed importance of a *fabric first* approach to building for energy efficiency.



Larch House by bere:architects © bere:architects



Prince's House by the Prince's Foundation for the Built Environment © Prince's Foundation

You could be forgiven for thinking that the uber-German PassivHaus standard and oft-derided traditionalists at the Prince's Foundation would fail to see eye-to-eye when it comes to issues of energy efficiency, particularly when reading comments by Prince Charles such as "[The Prince's House] doesn't wear its 'greeniness' as if it were the latest piece of haute couture". Such expectations however were quickly set aside by Hulme, the Foundation's Director of Research, who declared that "the highest level [of energy efficiency], I absolutely agree, is PassivHaus."

Developed by the German physicist Wolfgang Feist, PassivHaus is an ultra-efficient building standard which aims for energy consumption of less than 15kW/m² per annum – a 90% saving on equivalent UK building regulation standards – which enables the elimination of traditional heating systems. This is achieved through a package of extreme insulation, air tightness, minimization of cold bridges, mechanical ventilation heat recovery, and renewable energy generation, including solar thermal and photovoltaics, along with maximization of solar gain. So far around 30,000 PassivHaus projects have been constructed worldwide, with some 13 certified in the UK and many more under development (for a full map of UK PassivHaus projects see [here](#)).

The Prince's Foundation was well aware of PassivHaus before they began work on the Prince's House project, even going on a tour of Germany to visit a number of PassivHaus developments, including apartment blocks, terraces, and one-off houses. As Hulme explained, the Foundation's decision to develop a less energy-efficient proposal – 70% rather than 90% reduction – was not based on any ideological differences to the PassivHaus approach, but was rather a stripped-down focus on what they saw as the main issue: the actual fabric of the building.

As both Bere and Hulme agreed, a sustainable building cannot be reliant on technological add-ons such as solar panels and wind turbines alone. If the fabric of a building is not sufficient, then any energy gains generated by such technologies will merely offset the losses of the building's overall inefficiencies. Given the nation's limited financial resources, this would hardly make for an effective green investment strategy, far better to invest in a more efficient fabric and add the 'eco-bling' later on.

As the Prince's House, Larch and Lime houses demonstrate, an ultra-efficient fabric can be achieved in a variety of different ways. The Foundation's prototype was constructed out of [Ziegel blocks](#), a honeycomb clay block with excellent thermal insulation properties which is similar to a traditional masonry construction, whilst the two passive houses were built with timber frame and woodfibre insulation. Although the Ziegel blocks do not in themselves meet PassivHaus equivalent U-values for the walls, they easily could with an extra layer of external insulation.

Ventilation too was handled in different ways, PassivHaus standards demand a mechanical heat-recovery system to keep heat losses to an absolute minimum, whereas the Prince's House team opted instead for passive ventilation. Vents in each of the rooms duct out through a stack-ventilation shaft within the chimney, alongside the flues for the wood-burning stoves.



Prince Charles laying a Ziegel block for the Prince's House © Prince's Foundation



Interior of the Larch House during construction © bere:architects

Whilst the Prince's House only achieves code for sustainable homes level 4 (compared to the highest level 6 of the Larch and Lime Houses), Hulme argued that the basic design of the building could easily achieve PassivHaus standards, largely through the extra wall insulation and incorporation of MVHR. So will the Prince's Foundation be developing another even more efficient prototype? Probably not says Hulme, "we've put our mark in the sand. I'm perfectly happy to put it on a spectrum, on which PassivHaus is at the upper end of that spectrum, and everything is down there. We and other projects are somewhere in the middle".

Although the Prince's House is clearly a significant step forwards compared to most of what is currently built in the UK it is clear from PassivHaus that they could easily go further. I only wish they would.

The PassivHaus – Princes House debate covered a wide-range of topics, including the UK building industry, supply chains, urban design, and beauty in relation to sustainability, all of which will be addressed in a series of articles to be published on the RIBA sustainability hub in the coming weeks.

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