To tackle the continuing performance gap evident in new homes, it is time for government and housebuilders to act together. ROGER HUNT reports

BRIDGING the GAP

A Passivhaus project currently under construction on the Isle of Wight. The homes are being built using the thin joint system from H+H to ensure airtightness and low U-values for the walls

Last month's publication of the End of Term Performance Gap Report by the Zero Carbon Hub was significant. Potentially the report's recommendations bring the housebuilding industry one step closer to the 2020 ambition of being able to demonstrate that at least 90% of all new homes meet or perform better than their designed energy/carbon performance.

The report is part of the Zero Carbon Hub's Closing the Gap Between Design and As-Built Performance project, which has been running since it was officially launched at Ecobuild 2013 by the Department for Communities and Local Government. Since then, the information reviewed and gathered has revealed widespread evidence of the existence of a performance gap in new homes. The End of Term Report builds on two previous outputs – the Interim Progress Report (July 2013) and the Evidence Review Report (March 2014) – together with subsequent work continuing the evidence gathering process and developing solutions to tackle various aspects of the performance gap.

According to the research, there is no one element or factor that causes the performance gap. It can result from all stages of the process of providing new homes, either inadvertently, or as a consequence of conflicting drivers within the industry or through poor practice.

From a government perspective, the performance gap is serious. As the End of Term Report states: "A gap in a building's energy and carbon performance undermines their vital role in delivering the national carbon reduction plan." For the housebuilding industry, the gap presents reputational dangers and undermines consumer confidence if energy bills are higher than anticipated. Identifying the origin, size and extent of any gap between design and as-built performance is, therefore, seen as a high priority not only by government, but also industry.

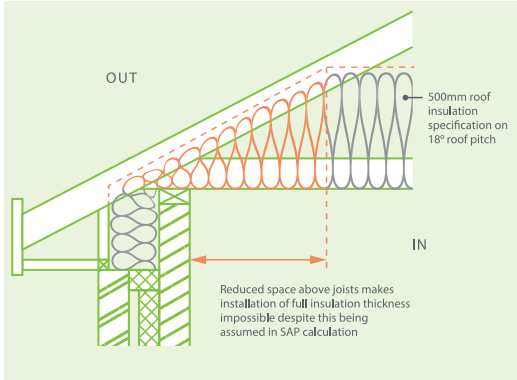
Rob Pannell, the Zero Carbon Hub's managing director, believes that the housebuilding industry realises that, if it is going to be able to differentiate new build homes from existing stock based on their energy performance, it needs to have a larger degree of certainty that the homes being built are achieving the savings to which the designs aspire.

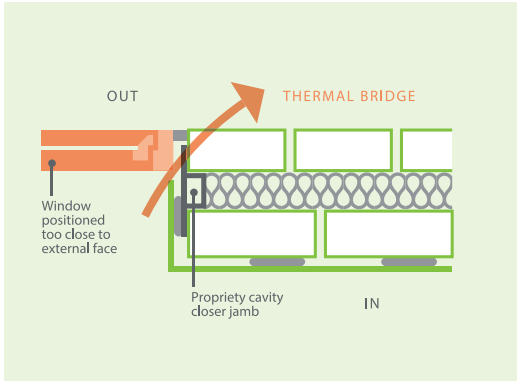
"Housebuilders know that 2016 is coming and zero carbon homes are a requirement. However, for them to realise the additional value of the significantly different and higher performing homes that they'll be producing, they must be confident that they can stand up and say that they are low carbon, low energy homes," says Pannell.

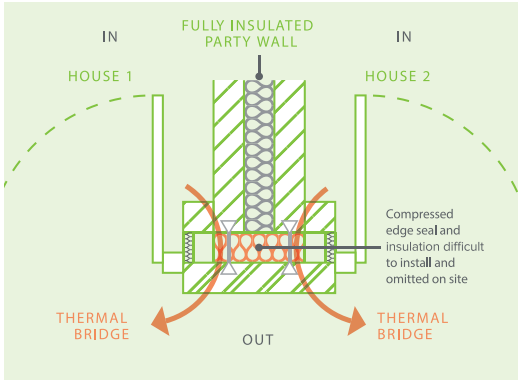
The report states that "the level of engagement in this project is a clear indication of the commitment by industry to close the performance gap". Some in the industry though will, undoubtedly, be concerned that such a goal will be onerous in regulatory and financial terms.

One of the report's recommendations for government is to clearly indicate that, in place of additional regulation, it expects the construction industry to act now and have put in place a number of measures to ensure that the energy performance gap is being addressed and to demonstrate this by 2020.

This scenario is not new. In 2001 the government announced its plans to require post-completion acoustic testing under Part F of the Building Regulations. This galvanised industry to invest in





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innovative solutions to develop a more commercially viable method of demonstrating compliance. The resulting Robust Details scheme was launched in 2004 using a combination of type testing, process control and randomised end of line testing to ensure quality is maintained.

If a construction details scheme were to be introduced to tackle the performance gap it could provide 'assured' as-built energy and performance for the most common major fabric junctions and systems including, for example, window junctions and what a good as-built cavity wall should look like, and the tolerances expected.

As with Robust Details, such a process would need to be vigorously audited and a review methodology would be essential before each system could be approved. Ongoing monitoring would also be necessary to 'close the loop' and ensure any problems subsequently found were corrected.

Clearly the government is just as keen to achieve an acceptable balance between regulation and commercially viable methodologies as the industry. While the government needs housebuilders to demonstrate that they are delivering the carbon savings required, it does not unduly want to hinder the delivery of homes at the scale and speed that it desires.

"The overarching message is that industry is willing and capable of dealing with the issue itself but, in the same way as when Robust Details was created, some refinement to the regulatory regime as it stands would help industry move quicker," says Pannell.

With this in mind it seems likely that tweaks to the way U-values are integrated into SAP and refining the way that the building control and the SAP certification bodies, and the assessors themselves, deal with the information that is available will be considered appropriate. Indeed, among the priority actions for government, the report recommends it "take action by 2016 to ensure the Zero Carbon Hub recommended revisions to energy modelling practices, SAP processes and verification procedures, together with a strong regime to ensure that only suitably qualified persons carry out energy modelling and assessment, can be put in place".

Pannell sees this as a means for the problem of the performance gap to be tackled in a way that is commercially viable, "rather than some overly detailed way where you have people in white coats crawling over every new home".

The report suggests that solutions may be achieved that are cost neutral. Here manufacturers have a part to play. One example might be by producing easily used seals for junctions, which may cost more initially but which save time on-site in the long run.

"As we know, a big proportion of the cost on-site in the UK is the labour, so if you can save time on-site and you can make things more robust first time round, the extra investment from the manufacturer can be offset later down the line," explains Pannell.

This inevitably raises the question of R&D. The report calls on the industry to commit to providing investment to undertake the research and development necessary to create innovative testing, measurement and assessment techniques to understand the performance gap and develop commercially viable methodologies acceptable across industry for 'demonstrating performance'.

Finding solutions has to be a combination of the housebuilder and the product manufacture believes ▶


THE STRUCTURAL TIMBER ASSOCIATION

OPPOSITE PAGE

BOTTOM LEFT Solar PV must be carefully installed to gain maximum performance and ensure the building envelope is not compromised in the process

BOTTOM RIGHT Windows need to be carefully specified

RIGHT TOP When calculating the roof U-value it would be incorrect to simply assume that the same thickness of insulation could be installed over the entire roof area

RIGHT MIDDLE Windows were pulled forward from design position on all but one of the sites visited under the House-building Process Review undertaken by the Zero Carbon Hub

RIGHT BOTTOM Inadequate understanding/consideration of design implications were identified on all sites reviewed by ZCH

THIS PAGE

LEFT Timber frame

BELOW Saint-Gobain insulation being installed in a cavity wall

BOTTOM Greenwatt Way, in Slough, Berkshire, is a Code for Sustainable Homes Level 6 development

One report recommendation is for government to indicate that, in place of additional regulation, it expects the construction industry to act now and ensure the performance gap is being addressed


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STEWART MILNE TIMBER SYSTEMS


ROGER HUNT

ABOVE Oyster Reach Development in Whitstable, Kent. H+H Jumbo Bloks were specified to meet the demands of this Passivhaus construction. H+H aircrete blocks offer an advanced thermal performance, which adheres to Passivhaus standards. The Thin-Joint system was chosen in particular for its speed of construction, which allowed follow-on trades to start work sooner in a weatherproof environment, while retaining the flexibility of on-site construction

RIGHT Insulation materials need careful installation to avoid a performance gap

LEFT DuPont Tyvek Supro breather membranes installed for reliable protection and performance beneath the slate roofs of a new build development by Persimmon Homes

BELOW LEFT Timber frame being prefabricated off-site

Pannell. "Without better understanding from the housebuilders, and the subcontractors that are on-site assembling these products and materials, even the best designed and tested products will underperform in the real word."

Fabric-first principles are clearly high on the agenda and it seems likely that, in order to design out risk, more systems that bring together sets of building components that work effectively together will become increasingly common.

In tandem with innovation, perceptions will have to alter. The report suggests a pan-industry shift in focus is required to create the necessary cultural change to address the issues identified. Interestingly, as an example of how this can be achieved, the report cites health and safety and the systemic approach that has been taken to the process of embedding this within the industry consciousness and everyday quality processes. Such a shift is undoubtedly likely to put pressure on subcontractors, technical teams and manufacturers as housebuilders will expect them to demonstrate that they are fully aware of where the risks are and that they have the ability to ensure they are removed.

To meet these needs, training is imperative and for this reason 'energy literacy' forms a major plank of the route map towards 2020 proposed within the report. Pannell explains that the idea of a certified trades scheme needs to be considered carefully. "One of the things that was said to us was 'Please don't set up an entirely new scheme but embed it in the existing structure'."

The hope is that a large part of the education process will be incorporated into existing training, CPD and toolbox talks. Even so, it is probably naive to think there will be zero cost to achieve the necessary upskilling and there appears to be a certain element of carrot and stick going forward. "In the report we've proposed that public land developments from 2017 onwards would require 'energy certified' professionals and operatives as part of their procurement process," says Pannell.

Ultimately much of the incentive for closing the performance gap will result from a greater value being put on energy. Housebuilders must have the ability and confidence to demonstrate to their buyers that the homes they are offering are a different animal to the Victorian terraces down the road and that a new home is going to save money and provide long-term protection from future fuel cost rises. sh

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