

SUSTAINABILITY INITIATIVE

Future Home 2.0 Wrap-around Report



THE FUTURE HOME
@ The University of Salford

BETTER WITH **Bellway**



SUPPORTING INFORMATION TO ACCOMPANY UNIVERSITY OF SALFORD RESEARCH REPORT

Bellway has laid the foundations for the future by building an experimental new zero carbon-ready home - The Future Home @ The University of Salford.

Designed, built and tested to be better for the people who live there and better for the environment, this ground-breaking research is part of the Energy House 2.0 Project @ The University of Salford, in partnership with others - and will strongly influence how we use our homes in the future.

Bellway's dedicated testing facility, The Future Home, began early in 2022 and the official launch took place in January 2023. Testing on the home began earlier in the year and this report covers the first milestone in the research analysis - covering the performance of the fabric of the home - the floor, walls, window, door and roof.

Bellway's Future Home @ Energy House 2.0

IS THE BELLWAY THE FUTURE HOME @ ENERGY HOUSE 2.0 INDICATIVE OF THE HOME OF THE FUTURE?

The journey to the delivery of the Bellway prototype Future Home @ Energy House 2.0 started in July 2021, with an expression of interest to the University of Salford. Within this document Bellway described the dwelling to be constructed, its key features, desired outcomes, and deliverables from collaborative research with the academic team at The University of Salford.

Bellway has always prioritised a fabric first approach to the design of our homes. The need to evaluate the "As Built" performance of individual building elements was identified as a key requirement of the research project. The work undertaken by The University of Salford, the results of which are laid out within their report has enabled us to gain a better understanding of how the wall, roof, floor, windows, and door designs incorporated into our prototype dwelling perform in reality, both individually and collectively.

Valuable lessons have been learned during the entire process, from incorporating multiple mechanical and electrical solutions into house type design through to their installation, commissioning, and operation.

The Bellway Future Home fabric report will be the first of many publications by the academic team at The University of Salford. In due course the fabric report will be followed by reports on space heating, water heating, ventilation, and thermal comfort.

The fabric report identifies that the over all fabric heat losses are 7.7% worse than the theoretical design model (The SAP calculation). Typically, from previous research conducted by academics, the actual performance of buildings can vary by between 5% and 140% so losses on Bellway's Future Home are at the lowest end of this range.

It was identified that this performance gap was substantially due to infiltration heat loss. In practice this means that we set out with the intention of delivering a fairly airtight prototype home with a target air permeability of 2.5m³/h-m² at 50Pa, on completion The Future Home was found to meet 4m³/h-m² at 50Pa.



SO, DOES THIS MEAN THAT BELLWAY HAS DELIVERED POOR DETAIL OR POOR CONSTRUCTION QUALITY?

To answer this, we would draw the reader's attention to the comments held within the report. The Future Home prototype contains multiple heating and ventilation solutions. There is also the provision of duct work for the installation of extra solutions further into the research project. The result of this is a far greater number of penetrations through the air tightness barrier than would be found in anything other than a prototype home. For example, the late addition of the prototype roof mounted Air Source Heat Pump (ASHP) contributed to higher U-values in the roof space as the design spec had to be altered to accommodate.

Bellway will conduct a forensic examination of the dwelling to identify where air leakage is occurring. These areas can then be remediated to reduce heat loss through air leakage. We will then incorporate these lessons into our Future Homes designs and will share these lessons with the wider industry as they transition towards Future Homes Standard.



Bellway's Future Home can be tested in various weather conditions such as snow. The home will trial a variety of heating solutions, including a roof-mounted air source heat pump.

FUTURE HOMES STANDARD CONSULTATION

The release of the long-awaited Future Homes Standard consultation document has identified that the Bellway Future Home "As Built" fabric performance aligns closely with those published within the consultation. The measured elemental U-values for, walls, roof, floor, windows, door and airtightness are a close match.

Element	Bellway Future Home. As Tested U-value	Future Homes Standard Consultation reference U-value
Wall	0.17W/m2K	0.18W/m2K
Floor	0.14W/m2K	0.13W/m2K
Roof	0.14W/m2K****	0.11W/m2K
Door	1.0W/m2K	1.0W/m2K
Window	1.2W/m2K	1.2W/m2K
Air Tightness	4	4 option 1, 5 Option 2

**** Roof to be remediated to close gap

The ability to thoroughly test electrical heating and mechanical ventilation solutions in a building that so closely matches the fabric requirements of the Future Homes Standard will be a real benefit to Bellway and the wider house building industry. We look forward to publishing further reports on completion of the various test programmes.



Bellway's Future Home @ Energy House 2.0 is part of a wider project. Some exemplar homes are being built at developments in Newcastle, Bolton and Stafford.

