

University of Bath Press Release

Embargoed to 9 February 2015

First straw eco homes could cut heating bills by 90 per cent

Research from the University of Bath's Department of Architecture & Civil Engineering has resulted in the UK's first affordable straw homes going on sale in Bristol this week. Promising fuel bills up 90 per cent cheaper than an equivalent brick-built house and costing less than the average Bristol house to buy, the new straw houses represent for the first time an affordable, low carbon and fuel-efficient means of house building.

Previously straw houses have been more familiar in fairy tales than as a realistic option for homebuilders, due to a lack of certified materials and concerns about durability. A new factory-built straw panel design developed at the University of Bath has received BM Trada's Q mark certification, meaning developers and house buyers can now insure and secure mortgages against homes, schools and offices built using this sustainable construction method.

The seven Bristol townhouses were built by developers Connolly and Callaghan using the innovative 3.2m by 2.9m ModCell straw panels, in which an engineered timber frame encloses the compressed straw bale insulation. Constructed with the load-bearing straw panels within an airtight design (plus triple glazed windows) the new houses will need significantly less conventional heating. Their super-insulated straw walls provide three times' greater insulation than required by current UK building regulations so fuel bills are anticipated to fall by up to 90 per cent.

The Q mark industry certification is the result of the University of Bath's three-year, EUR 1.8m EuroCell research project funded by the Executive Agency for Small and Medium-sized Enterprises (EASME) jointly with industry partners Integral Engineering Design and architects White Design.

To receive certification the University research tested the ModCell straw panel's energy efficiency, fire safety, durability and weather-resilience; including exposing the panels to heavy rain and extreme temperatures ranging from -20°C to 50°C.

Craig White of ModCell commented: "The Q mark industry certification means that straw is now a viable, affordable means of tackling the housing crisis in the UK. Using a 'fabric first' approach is ideal for private homes, social housing, and new, innovative projects such as custom-build. Straw now offers a simple and effective home-grown solution to the UK's housing needs."

[Professor Pete Walker](#), Head of the Department of Architecture & Civil Engineering at the University of Bath, led the University's research, which previously entailed building the innovative prefabricated straw bale building called the [BaleHaus](#) as a test site in 2009.

Commenting, he said: "The construction sector must reduce its energy consumption by 50 per cent and its carbon emissions by 80 per cent by 2050, so radical changes are needed to the way we approach house building. As a construction material straw is a low-cost and widely available food co-

product that offers real potential for ultra-low carbon housing throughout the UK. Building with straw could be a critical point in our trajectory towards a low-carbon future.”

In the UK up to seven million tonnes of straw remains after the production of wheat flour, and up to half this amount is effectively discarded due to its low value, to be used as animal bedding. This ‘leftover’ 3.8 million tonnes of straw could be used to build over 500,000 new homes, as an average three-bedroom house needs 7.2 tonnes of straw.

As well as utilising an agricultural co-product, straw has significant environmental benefits. Rather than releasing carbon dioxide (CO₂) during the process of producing a building material, as brick or cement does, it absorbs CO₂ as it grows. As a result, straw homes have one of the lowest carbon footprints available, with many buildings being net carbon-negative.

The many benefits of straw have seen a steady increase in straw bale construction around the world, with buildings to be found in countries from the USA to Australia and China and there are over 200 in the UK. Straw housing developments are currently in progress in Bristol (the European Green Capital 2015) and Cornwall, where a ModCell straw panel design is one of six now available to home buyers in the UK’s first [custom-build housing scheme](#).

At the multi-award winning LILAC straw-built co-housing community in Bramley, West Leeds, residents benefitted from a 20 per cent lower build cost and 90 per cent cheaper energy bills than on average in Leeds, demonstrating the significant savings that straw buildings can offer.

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The University of Bath’s Department of Architecture & Civil Engineering was ranked equal first in the UK in Architecture & the Built Environment for the high quality and international impact of its research (2014 Research Excellence Framework). In the assessment, 85 per cent of its research output was judged to be internationally excellent while 90 per cent of its research impact was judged outstanding.

The specific research papers that led to the Q mark certification can be accessed here:

[Wall, K., Walker, P., Gross, C., White, C. and Mander, T., 2012. Development and testing of a prototype straw bale house. Proceedings of the Institution of Civil Engineers: Construction Materials, 165 \(6\), pp. 377-384.](#)

[Structural development and testing of a prototype house using timber and straw bales, Proceedings of the Institution of Civil Engineers, Published online 29/07/2014](#)

Ends

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Notes to editors

University of Bath

We are one of the UK's leading universities, ranked number one in UK for student satisfaction for the last two years in the National Student Survey (NSS) and in the top ten of all national league tables, including being named 'Best Campus University' in the Sunday Times Good University Guide 2014.

Our Mission is to deliver world-class research and teaching, educating our students to become future leaders and innovators, and benefiting the wider population through our research, enterprise and influence. Our courses are innovative and interdisciplinary and we have an outstanding record of graduate employment.

The Government's recent REF 2014 assessment confirmed the excellence of the research carried out at Bath. A third (32 per cent) of our submitted research activity has achieved the highest possible REF classification of 4*, defined as world leading in terms of originality, significance and rigour, whilst 87 per cent was graded 4* or 3*, defined as 'world-leading/ internationally excellent'.

Within the field of architecture, the built environment and planning, half of our research achieved the top 4* rating, the highest percentage awarded to any submission and an impressive 90 per cent of our research was rated as either 4* or 3* denoting it as world leading / internationally excellent in terms of originality, significance and rigor.

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ModCell

ModCell[®] is one of the first products to make large-scale, carbon-negative building a commercial reality. The ModCell panel system utilises the excellent thermal insulation qualities of straw bale construction to form prefabricated panels. ModCell allows super-insulated, high-performance, low energy 'passive' buildings to be built using renewable, locally sourced, carbon sequestering, sustainable building materials.

This innovative, offsite-manufactured wall and roof cladding system can be quickly and efficiently installed, creating buildings with thermal performance up to three times higher than the current building regulations require.

This super-insulated system, combined with our airtight details, means that buildings constructed using ModCell[®] panels meet the demanding PassivHaus specification. As a result, ModCell[®] buildings can have zero heat requirements, saving money and CO₂ emissions.

Bath's Hayesfield Girls' School opened its new straw-built science building in September 2012, constructed using ModCell panels manufactured with straw from a local farm. The super-insulated, airtight and moisture-breathable construction features controlled daylight and cross-ventilation, a thermal mass/night-time cooling strategy, careful use of orientation, glazing and solar panels – and as a carbon negative building it will offset its operational CO₂ emissions for seven years.

ModCell has received numerous awards including the following: The Sustainable Housing Awards 2014 – Winner Green Housing Performance Award 2014'

CIOB International Innovation Achiever's Award 2014
Construction 21 Green Building Solutions Award 2104
Place Making Awards 2013
3 x Gold Green Apple Award
National LABC Award 2013

<http://www.ModCell.com/>