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New research “Retrofit Revisit” reveals crucial lessons for future retrofits

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Co-authors Marion Baeli, Principal – Sustainability Transformation at 10 Design (part of Egis’ Architecture Line) and Julie Godefroy, Head of Net Zero Policy at CIBSE, announced the launch of *Retrofit Revisit* published via CIBSE.

Supported by Innovate UK and Historic England as well as in-kind contributions from project partners including Studio PDP, *Retrofit Revisit* investigates how ten housing projects of varying archetypes and locations are performing 10 years after their original retrofit. The findings reveal that despite small fluctuations in performance over a decade, the retrofitted residences outperform the non-retrofitted housing stock overall. Residents’ feedback on their ten years of occupancy in these retrofits has been positive, with increased comfort, especially during the colder months and with reduced energy bills.

Marion Baeli, Principal – Sustainability Transformation at 10 Design said:*“In publishing “Retrofit Revisit,” our goal is to boost confidence in the lasting benefits of retrofitting while also emphasizing the insights gained from building performance evaluations and identifying areas needing further research to ensure the reliability and longevity of building fabric and operations. Through this collaborative research effort, we aim to support the nationwide retrofitting of existing homes across the UK.”*

The projects build on pioneering case studies from ten years ago, which were considered ‘deep retrofit’ (aiming towards 80% CO_2 emission reduction) and exemplar at the time, including some from the Retrofit for the Future programme. Six of the *Retrofit Revisit* case studies were covered in *Residential Retrofit: Twenty Case Studies,* published by RIBA in 2013 and completed while Marion Baeli was at Studio PDP.

All ten projects underwent a rigorous Building Performance Evaluation (BPE) to assess various aspects

such as fabric, energy efficiency, indoor environment, airtightness, and user feedback. These evaluations employed a blend of standard and non-intrusive techniques to ensure a thorough analysis, learn about the value of innovative evaluation techniques, as well as the performance of the buildings over time.

Julie Godefroy, Head of Net Zero Policy at CIBSE, said:
"Retrofit Revisit shows that, when done well, retrofit provides huge energy savings as well as comfortable homes. I hope this will encourage more studies to gather lessons on more retrofit typologies and larger samples, but that it will also give confidence to industry and policy makers to implement retrofit at scale".

The evaluations, completed by a team comprised of well-known experts in the retrofit sphere, emphasise the crucial role of good design and detailing, and regular maintenance in optimising the performance of buildings, regardless of their retrofit status. Neglected components such as gutters and ventilation filters can lead to problems like water ingress and inadequate air quality. Easy-to-maintain retrofitted homes are more likely to stand the test of time, whereas those with complex maintenance requirements will not.

The research demonstrates the reliability of deep retrofit measures, when implemented with attention to detail at the design stage and on-site. The homes provide high levels of comfort while maintaining low energy demands over a long period of time, instilling confidence in the industry that retrofitting initiatives are a worthwhile investment.

Additionally, the research sought to evaluate the practicality and resilience of various testing methodologies and techniques, with the goal of making BPE more routine and widespread. The projects show the high potential for more routine BPE, combining well-established tests such as airtightness testing with more innovative testing for fabric thermal performance, fabric degradation and ambient mould.

The UK Climate Change Committee (CCC) recognises that retrofits are a large part of the net-zero trajectory of the UK. Achieving the nation's carbon reduction targets necessitates a significant increase in the efficiency of existing housing stock. *Retrofit Revisit*'s aim, therefore, is to inspire confidence and encourage the rollout of retrofit measures on a national scale.

Mat Colmer, Senior Innovation Lead – Construction & Net Zero Heat at Innovate UK, UK Research and Innovation, said:

"It's been over 10 years since Innovate UK invested £25million in the Retrofit for the Future programme. It is important that we learn from such programmes and how they fair over time. Retrofit Revisit does exactly this, providing designers and decision-makers, as well as home occupants, the confidence that when a job is done well it delivers on performance and market certainty for the retrofit industry."

Hannah Reynolds, Architect Historic Building Retrofit at Historic England, shared:

"BPE and maintenance are key to the successful retrofit of traditional buildings. The project demonstrates the need for testing of moisture and fungal levels as a vital part of evaluation, to understand the suitability and longevity of deep retrofit proposals. The research also highlights the critical role of maintaining building fabric and services in order to achieve long term positive outcomes."

The Retrofit Revisit is available to download here Retrofit Revisit (2024) (cibse.org)