



Background briefing

# **Accelerating innovation in building retrofit for a net zero future**

2025

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## Key points

- Innovation in the materials, technologies and planning tools to support building retrofit can help deliver new buildings that are fit for the future. It represents both an economic opportunity and a means to deliver comfortable, climate-resilient, low-carbon homes.
- Opportunities for collaboration and creative thinking between industry and innovators are rare but support the acceleration of retrofit delivery and provide a valuable faster route to market for effective, impactful new products. The Better Futures Retrofit Accelerator helped to fill a gap in innovator support by facilitating these collaborations.
- In considering what support should be provided in future, the lens through which such programmes are assessed should be widened, to capture not only the financial success of innovations but also their broader impacts in supporting the industry transformation needed to achieve rapid decarbonisation along with employment and economic benefits.

## Innovation opportunities in building retrofit

Buildings are currently responsible for [over 40% of energy demand](#) in the UK, and 80% of buildings that will be occupied in 2050 [are already constructed](#). Retrofitting existing buildings is therefore essential to meeting the UK Government's commitment to net zero. However, this is a complex process and presents huge challenges in terms of planning and delivery.

The government has committed to delivering a large-scale [switching of gas boilers for heat pumps](#) in homes. As well as cost challenges, typical heat pump retrofit options are more challenging for many of the [22% of households](#) in England and Wales (55% in London) who live in flats, though some of these might be mitigated by emerging innovations such as [solid-state](#) and shared heat pumps. A scale-up in installation of low-carbon insulation will also be needed to ensure that heat pumps are cost effective to operate. Innovation in product design can help meet these challenges.

Retrofitting buildings can, however, involve [significant disruption](#) to occupants. Careful planning is required to carry out works during unoccupied periods, such as between tenancies, or to align with planned maintenance – roof or window upgrades for example. [Innovative software tools](#) can simplify planning and procurement, while the use of [prefabrication in construction](#) can radically reduce time on site. Retrofit also has an important role in addressing the challenges of adapting to a warming climate such as in preventing overheating. Crucially, as well as being a challenge, the retrofit sector presents huge economic opportunities. The [Clean Energy Industries Sector Plan](#), published alongside the UK's [Industrial Strategy](#), notes that “35% of emission reductions for net zero depend on technologies under development” and argues that “the UK is well placed to lead on such innovation, and reap the economic and energy security benefits.” The UK's housing retrofit market is projected to be worth over [£25 billion annually](#), and has good [potential to create jobs](#), while the value of retrofitting non-domestic buildings such as hospitals, and commercial buildings has been estimated at [around £500 billion](#) over the next 10 years.

Beyond retrofit, supporting built environment innovation can also help deliver objectives such as the [1.5m new homes](#) the government has committed to delivering this parliament. The [London Growth Plan](#), for example, identified London's world-leading built environment sector as an ideal showcase for new low-carbon technologies.

## How can we maximise the opportunities in retrofit innovation?

The government has an important role to play in terms of standard-setting and incentives for retrofit. Various measures are in place, including a [subsidy scheme for heat pumps](#), grants for [energy efficiency measures in social housing](#), and [energy performance requirements](#) for some buildings (with [plans](#) in place to tighten the standards for privately rented buildings). The forthcoming [Future Homes Standard](#) should help to ensure that new homes will not require future retrofit.

Alongside these policies, however, targeted support for innovation is also needed. 'Accelerator' programmes, generally provided by universities and commercial investors, can help early-stage innovators, while industry-focussed support, typically provided by third sector organisations such as the UK Green Building Council and National Retrofit Hub, can help scale commercial deployment. There is currently a distinct gap in provision, however, for new products and services that inhabit the space between these two development phases, creating a risk that many promising innovations will fail to reach the commercialisation stage.

The [Better Futures Retrofit Accelerator](#) aimed to fill this gap, joining the dots between innovator and industry support, to accelerate the development of new solutions and define routes to speeding up the delivery of market-ready products. The programme allowed innovators to consult with academics at Imperial College London, giving access to deep technical expertise, and facilitated engagement between industry and innovators to identify the common challenges to adoption of new solutions in retrofit projects.

The programme supported a wide range of product types such as:

- **Software/AI tools** covering retrofit planning, energy and carbon management, as well as materials specification and circularity
- **Engineering and energy optimisation solutions** covering energy and comfort (sensors that promote efficient use of air conditioning for example), refrigerant management and planned maintenance
- **Products** such as heating systems; air quality and ventilation products; insulation systems (such as underfloor insulation installed by robots); and eco-alternatives to traditional products such as wall studs, board products and finishes.

## Some key learnings from the programme

*Industry engagement is critical.* This includes defining the key challenges the built environment sector is facing; looking for emerging products that can help solve these problems; and then drawing on industry expertise to help shape their development. Bringing industry together with innovators allows potential buyers to share what information they need to know before adopting new products. This equips innovators with a clearer understanding of both the technical and the commercial assurances they need to provide for their products.

*Challenges vary greatly.* The support required varies by product type and stage of commercial readiness. A software product may have a lower development cost and be faster to get to market, for example, than a new hardware technology such as a heat pump which would require extensive laboratory testing, physical manufacture and product certification before it can be used in a real building.

*Piloting new solutions to evaluate their impact and test how they perform in real life is key to success.* One innovator (an algae-based paint company) installed a demonstrator panel with the paint applied to different materials to see how the algae grew and weathered, for example, while another (a shower humidity control) needed to carry out real life testing to see how users responded to different control systems.

## The need for future support

Opportunities for collaboration and creative thinking between industry and innovators are rare, but provide a valuable route for effective, impactful new products to get to market faster while supporting the acceleration of retrofit delivery that will be essential for delivering net zero.

The government, in delivering its industrial strategy and clean energy commitments, should consider how best to ensure that gaps in provision of innovation support are addressed, with a focus on solving those tough challenges in the buildings sector where the climate impact is greatest. Success in innovation funding is typically measured in terms of financial outcomes for individual innovators. Fresh thinking is needed in terms of how to capture the benefits that come from delivering - at a systems level - the industry transformation required to deliver the UK's climate and clean energy goals, while maximising the economic potential of the retrofit sector.

Further information and a summary of the Better Futures Retrofit Accelerator Programme can be found [here](#).

The innovators supported through the programme and relevant to the topics in this briefing include:

- **Systems & planning tools**
  - [Building Atlas](#), [Ecodriver](#), [Ecofy](#), [Firstplanit](#), [Map Mortar](#), [Material Index](#), [Pario](#), [Riise](#), [Smartshift](#), [Vulcan](#), [Upgreen](#)

- **Engineering solutions & energy optimisation**
  - [Cosysense](#), [Light Fi](#), [Verv](#)
- **Products**
  - [Airex](#), [Anzen](#), [BioTwin](#), [Carbon Cell](#), [Cresco Biotech](#), [Cyanoskin](#), [Isometric Outcomes](#), [Q-Bot](#), [Vox Aeris](#), [Vundahaus](#)

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