LESSONS LEARNED & KEY IMPACTS REPORT

UKRI Innovate UK Future Homes Project

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We have proven that our Blind Screen product offers class-leading thermal performance. With your help, we've successfully validated the thermal technology of our blinds. Which led to a showcase at the House of Commons, featuring speeches from the Minister of Energy consumer, Miatta. This recognition has positioned us at the forefront of efforts to support the UK's net-zero targets and drive the nationwide rollout of our product..

Blind Screen

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Executive Summary

The Innovation Accelerator is an Innovate UK funded project that started in April 2023 and ends in March 2026. The collaboration explored how we better deliver new and existing homes, making them energy efficient and liveable. This was particularly relevant in the context of the Future Homes Standard, which was under development by the UK government when the project started and will come into force shortly.

The partnership consisted of the University of Salford (Energy House Labs and Acoustics Innovation Institute), The University of Manchester (Atmospherics and Sustainable Materials), Barratt Redrow, Bellway Homes, Saint-Gobain, RSK, the Energy Innovation Agency and Red Co-operative.

The project focused on the use of the Energy House 1 and 2.0 research facilities, a unique research capability to rapidly assess solutions under controlled conditions. In addition, the team integrated experimental and expertise from the state-of-the-art Salford Acoustics Laboratories and The University of Manchester's air quality assessment laboratories. The team worked together on all aspects of the performance of domestic properties and the systems and products used to build them. The team explored fabric, materials, heating systems, overheating, noise, air quality, and hot water systems, with a variety of partners including Panasonic, Vaillant, Curv, Ambion, and Honeywell. The team explored industry wide questions to better understand how the housing stock will perform now and in future climates.

The project did not only focus large companies. Working with the Energy Innovation Agency, the team worked with smaller companies and start-ups (SMEs), giving them access to facilities and expertise to help them take their products to market. Companies such as Thermocill, Homely, and Vector Homes had an opportunity to test their products under controlled conditions providing valuable insight to further develop products and create confidence for the market with independent evidence regarding how their products performance. Quantification of life cycle impacts and optimisation of physical parameters through the Sustainable Materials Innovation Hub helped teams understand authentic metrics for environmental impacts and derisk product development and installation.

This report is focused on the reflections of the whole team to understand what key lessons and impact the Future Homes Project delivered. It also outlines opportunities for further research and innovation.

Key Impacts

- *Accelerated Research & Innovation:* Energy House 2.0 enabled high-speed, iterative testing under controlled climatic conditions, compressing research timelines and providing robust, actionable data for industry.
- *Industry-wide Collaboration:* Competitors and supply-chain partners shared data openly, jointly funded research, and adopted unified approaches—creating a model of collaboration rarely seen in the sector.
- *Evidence-Based Insights:*
  - Off-site timber frame systems demonstrated predictable fabric performance and reduced the performance gap.
  - Heating system trials showed all technologies can work effectively but emphasised the critical importance of correct sizing, design, commissioning, and continuous-heating regimes for low-temperature systems.
  - Indoor air quality studies revealed significant risks in airtight homes without active ventilation and highlighted the need for regulatory evolution.
  - Overheating studies validated the requirement for mechanical ventilation and informed mitigation strategies for future climate conditions.
  - Acoustics research offered new understanding of heat-pump noise perception, informing emerging standards and installer guidance.
- *SME and Ecosystem Development:* Over 10,000 visitors and strong partnership working created a pipeline for SME engagement, technical development, and commercialisation—including direct adoption of innovations by major buyers.
- *Policy Influence:* Findings supported regional and national policymakers across areas such as retrofit, Home Energy Model development, heat pump regulation, and air-quality guidance.
- *Skills & Workforce Insights*: Research highlighted changing skills needs associated with modern construction methods, electrification of heating, and new commissioning practice

Lessons Learned

The project demonstrated that delivering high-performing, healthy homes requires whole-system thinking. Key lessons include:

- Interdependencies between energy efficiency, ventilation, acoustics, overheating, and IAQ must be addressed collectively rather than in isolation.
- Real-world modelling must be better aligned with measured performance, requiring higher-quality product data and improved modelling methodologies.
- Customer-facing technologies—particularly smart home systems—must be simplified to ensure user benefit and reduce complexity.
- Open data, clear communication, and cross-sector collaboration significantly accelerate innovation and market confidence.

Future Opportunities

Building on the success of the Accelerator, the partnership aims to expand research into retrofit, heat pump optimisation, energy flexibility, calibrated modelling, climate adaptation, ventilation and noise trade-offs, material emissions, and large-scale occupant trials. Planned new demonstrators and upgraded testing capabilities will deepen understanding of how homes can perform under future climatic extremes and support national policy and industry transition.

Project Foundations

What is the underpinning DNA of a project that creates success? The Future Homes project team identified the following key elements that we felt contributed to the success of the Future Homes project.

Knowledge Sharing and Communication

Universities have the independence required to convene industry and other stakeholders around shared problems, but they require partners to recognise the benefits of collaboration. This is reflected in the development of the relationship between the core industry partners, which includes two market competitors, Bellway Homes and Barratt Redrow, and a significant member of the housebuilding supply chain, Saint-Gobain. Early in the project, the core partners understood the need for collaboration and sharing data with each other and the wider industry. They jointly funded researcher to ensure that whole project delivered added value. These companies agreed to fully share results, with the reports publicly available, including making data open source for other researchers.

As core partners working with the research teams, this set the tone for the project, with wider partnership communicating and sharing information. Competitor companies worked within the same project (i.e. Vaillant and Panasonic both worked with the team on air source heat pump research). The project created a network of large and small businesses collaborating with academia to create research that could be shared with the sector.

The team also shared their work more widely with the public. During the life of the project there were articles in the Times, Guardian and Observer, as well as coverage on Radio 4, BBC tv and Channel 4. This engagement helps people understand the value of research and how it can impact their lives. The this was an important part of the mission; not just doing things for academia and industry but making sure that what we do is visible to as many people as possible.

Unique Facilities

Energy House 2.0 represents a globally leading research and innovation facility. It has a unique capability within the EU and provides a focal point for the team. The partners felt that being part of the facility allowed the team to carry out research that was not possible anywhere else. The use of controlled conditions massively compressed the research times, allowed iterative solutions to be explored, and allowed innovators to quickly understand where their products needed to go next.

The partners also reflected on the ability the research facilities gave them to show people what we were doing. The houses, EHome2 and the Future Home, allowed external partners to understand clearly the nature of the research and understand the types of products and solutions that were being explored. This was supported by the world-class Salford Acoustics laboratories, including reverberation rooms, anechoic chambers and state of the art equipment and instrumentation. Salford Acoustics is the Designated Institute for Sound in Air (Airborne Acoustic Metrology) in the UK, and its research brings fundamental research into real life applications. Additionally, world-leading expertise in air quality and materials, was provided by the University of Manchester, helping teams to evaluate unintended consequences and derisk growth.

Since 2023, Energy House 2.0 has had more than 12,000 visitors, from Ministerial visits to school children. The physical nature and scale of the facilities make this kind of engagement possible.

Collaboration and the "Triple Helix"

The idea of the "triple helix" identifies that high quality innovation comes from a collaboration between academia, industry, and policy makers – we had to engage far beyond the original project team. The idea behind the Innovation Accelerator was to foster these types of collaborations in Greater Manchester. The project had strong engagement between academia and industry but also linked to both national and regional policy makers. The partnership supported Greater Manchester's Totally Affordable Net Zero (TANZ) group, which explored new build affordable housing, as well as the Retrofit Taskforce and the GMCA 5-Year Environment Plan. Circularity plans for new GMCA investments in material recovery facilities were extended to retrofit and construction industry sectors through the GMCA MRF Design Oversight Group. This allowed policy makers access research output, expertise, and industry engagement in shorter timeframes than would otherwise be the case.

At a national level, the team liaised with both the Department for Energy Security and Net Zero (DESNZ) and the Ministry of Housing Communities and Local Government (MHCLG). This has led to ministerial and civil servant visits to better understand the project and wider partnership. The team were represented on the Warm Homes Advisory Group and are currently engaged in discussions around the forthcoming Home Energy Model. Salford Acoustics has liaised with DESNZ, the Microgeneration Certification Scheme, the Institute of Acoustics and the Heat Pump Association (UK) to inform the update of air source heat pump noise emissions planning guidance and regulations. The Sustainable Materials Innovation Hub team has work on UN, national and Australian policy documents on reuse and recycling within the construction sector.

To deliver excellent applied research requires a broader understanding of the problem than a single discipline can provide. The bringing together of multiple disciplines created opportunities for learning for all of the partners, and this is explored with the lessons learned.

Project "DNA"

Critical success factors to deliver healthy and sustainable homes

Knowledge Sharing and Communication
Convening around a shared problem, sharing data and working with the wider industry

Unique Facilities and Expertise
Physical space and demonstrators to explore the problem – bringing multiple disciplines together to address "real world" situations

Collaboration and the "Triple Helix"
Academia, industry and policymakers creating an essential link for built environment – shaping policy and regulation and feeding back to the sector

Underpinning Findings

Experimentation and learning that helps shape industry understanding

Performance of Buildings and Systems
Fabric, systems, controls – understanding performance and solutions

Unintended Consequences
Detailed understanding of the impacts of overheating, air quality and acoustic issues and finding solutions

Modelling and Measurement
Identifying gaps and providing evidence for better modelling to support regulation and delivery

Sector Impact

Supporting wider stakeholders that underpin the wider impacts of the research and innovation activities

Helping Consumers and Occupants
Providing evidence and advice for occupants and communicating it effectively

Building an SME Innovation Eco-System
Supporting innovators to access facilities and expertise rapidly develop products and help bring to market

Skills, Productivity and Future Workforce
Identifying the future skills that will be needed to deliver a high performing built environment

Lessons Learned and Impacts

Performance and the Future Homes Standards

The UK Construction Industry is subject to wide array of standards and regulations. Given we are talking about making safe, warm and healthy places for people to live, this is both understandable and important. However, thinking about multiple changes to the building regulations, as proposed by the Future Homes Standard, does require expertise to understand the interconnections between different issues in housing performance. The research team brought together expertise on Part E (Acoustics), Part F (Ventilation), Part L (Energy Efficiency) and the new Part O (Overheating).

Fabric energy efficiency formed a large part of the work, allowing us to explore the fabric performance of the new Future Homes Demonstrators. Detailed exploration of the building fabric and heating systems gave a realistic understanding of the performance of the homes, particularly under colder conditions and under different heating regimes.

We saw that the use of off-site technology (open and closed panel timber frame) and a commitment to installation quality created more predictable fabric performance, closing the performance gap significantly.

Minor areas of underperformance were easy to identify and address – "the little things

We carried out detailed work on **heating systems**, undertaking 28 separate tests on air source heat pumps and infrared heating in the new build houses. We also conducted wider tests on heat pumps and electrical heating as part of our wider work under the project. Some of the key findings were as follows:

All the heating worked but no "magic solution" emerged.

Commissioning problems caused systems to not function as expected – design and commissioning are essential.

Intermittent heating (such as the Standard Assessment Procedure (SAP) pattern 7-9am and 4-11pm) did not work well for low temperature systems, such as heat pumps. Continuous heating is recommended in Future Homes.

SAP and the new Home Energy Model (HEM) need to reflect real world usage.

The team introduced a new metric System Energy Efficiency (SEI) to address issues of relying only on the Coefficient of Performance to allow comparison of systems.

After the first round of tests the team undertook a systems improvement and retrofitting exercise on the heating systems.

Tuning and minor adjustments to the re-commissioning of the heating systems delivered substantial performance improvements. This led to an improvement of 30% - small changes could deliver big gains.

Issues such as appropriate sizing and configuration, provision of adequate system volume, identification of components and their locations, simplification of controls all had an impact on the improvement of performance.

Partners introduced optimised specification of ASHP installations into their guidance for installers.

As homes become more energy efficient, the provision of **domestic hot water** becomes a larger part of energy demand. The Future Homes project explored the impact of changing heating systems to electrical systems on the delivery of hot water.

Hot water systems performed as expected.

Technologies selected were able to meet customer demand, even under high-load tapping cycles.

All parties agreed it is important to be able to communicate these findings to customers.

The Future Home and eHome2 representing a unique opportunity to explore these issues collaboratively and to a high level of detail not possible in field trials.

Unintended Consequences – Indoor Air Quality, Overheating, Acoustics and Environmental Impacts

Underpinning a healthy home is ensuring that internal environments are well managed, not just in terms of being warm but also addressing wider environmental concerns. In terms of Future Homes, higher levels of airtightness and required ventilation, overheating, and the acoustic issues of heat pump noise were explored in detail.

Indoor air quality studies were undertaken in collaboration with The University of Manchester. The Future Homes Innovation Accelerator allowed the team to explore indoor air quality at the whole house level in ways that were not possible in the field.

In addition to undertaking whole-house air quality experiments, the team at The University of Manchester developed a structured experimental protocol for evaluating ventilation and mitigation strategies under controlled conditions. By creating a repeatable and standardised approach to pollutant generation, monitoring and mitigation assessment, the project contributes toward the development of a methodology that could underpin future regulatory testing and guidance. The ability to undertake reproducible experiments at whole-house scale is essential if indoor air quality is to be embedded properly within building standards.

Through a series of standardised pollutant release and cooking experiments, the team was able to quantify the risks associated with increasingly airtight homes. The findings were:

Without active ventilation, pollutants persisted for over 17 hours, highlighting a serious indoor air quality risk in airtight homes.

Standardised cooking experiments generated pollutant spikes exceeding World Health Organisation guideline levels by more than 200-fold under certain conditions.

Active mitigation strategies, including Decentralised Mechanical Extract Ventilation, Mechanical Ventilation and Heat Recovery and standalone air purification, reduced pollutant concentrations by up to 95%, significantly reducing occupant exposure.

As homes become more energy efficient and airtight under the Future Homes Standard, ventilation and indoor air quality must be treated as a design and regulatory priority alongside energy efficiency. The project demonstrates that energy performance and health outcomes cannot be considered in isolation; they are fundamentally interlinked.

Energy House 2.0 allowed the team to explore the issues of **overheating** in the context of the introduction of Part O of the Building Regulations. The team undertook studies, in partnership with Loughborough University, to explore how the Future Homes would perform in protracted period of overheating and how this might best be managed. Some of the key findings were:

The impact of thermal mass between the two properties was limited.

Overheating in windless conditions identified a need for mechanical ventilation.

Opening windows is not a sufficient mitigation in “tropical evening” conditions, with high temperatures and humidity.

An MVHR plus cooling solution was tested as a mitigation. However, it was undersized and could not deliver full house cooling.

Heat pump reverse cycle cooling tests are currently being undertaken.

The issue of **noise and air source heat pump installations** was highlighted to the team as a major barrier in roll out of heat pumps. The Innovation Accelerator created a major opportunity for a collaboration between Salford Acoustics, Energy House Labs and industry partners. The work started on campus and quickly expanded to field trials, supported by the Heat Pump Association, to better understand the real impact of noise on occupants.

Our research programme has shown that effective management of air-source heat pump (ASHP) noise benefits from combining improved measurement practices with insights from real installations and psychoacoustic studies.

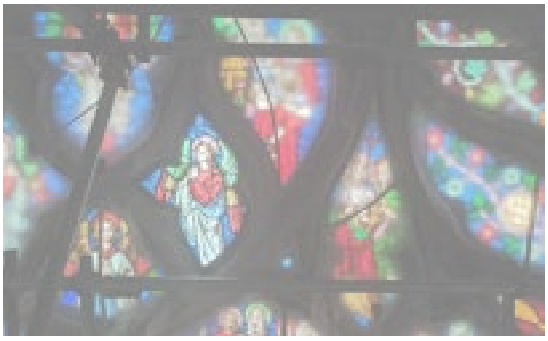
Field work indicates that cumulative noise from neighbouring ASHPs can be reliably estimated using standard logarithmic decibel addition methods, providing useful clarity for planning and assessment.

The findings highlight limitations in common mitigation strategies—such as the use of timber fences—which often reduce mid-to-high broadband noise but leave low-frequency tones more prominent and potentially more annoying.

These insights reinforce the importance of optimised unit placement and context-appropriate barriers rather than reliance on simple decibel-based assessments.

A key lesson emerging from our psychoacoustic and international work is that perception of ASHP noise is shaped by ambient conditions, operating levels, and tonal content, helping explain why similar installations elicit different responses. Our listening experiments emphasise the need for assessment frameworks that better account for human perception and real-world neighbourhood contexts, particularly as heat pumps become more common and operate in clusters. Across engagement activities, from the UK-wide policy workshop to industry collaborations, it is clear that coordinated action between researchers, manufacturers, installers, and policymakers will be essential to ensure future ASHP deployment is both scalable and socially acceptable.

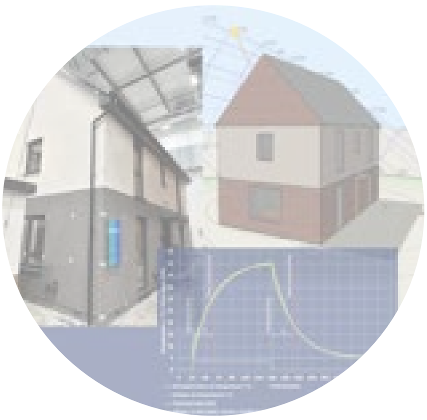
System sustainability evaluations require not only an evaluation of efficiency during use but throughout the whole life cycle. Evaluation of the material and installation footprints for retrofit innovations were used to define breakeven points between different scenarios.



This was highlighted by work with Salford Cathedral, Barley Studios and Purcell UK quantifying impacts from complex retrofit options to retain stain glass windows for social sustainability and improving heat loss leading to a lower installation requirement for heating provision, reaching economic parity in under 1.5 years. The calculations and core principles were used by Purcell as part of their Westminster refurbishment appointment.

Modelling and Measurement

The Future Homes project was very much about the data. However, the industry has to rely on models to understand all aspects of the performance of buildings; energy efficiency, air quality and acoustics, all require good models to understand the performance of buildings. In some cases, these models are based on robust building physics models and experimental data. However, in some cases we can see that there is room for improvement and better understanding of how models can be most effectively calibrated. Building performance is a dialogue between the measurement and modelling disciplines and the team took the opportunity to better understand this link to inform the models. The project provided a vital link in being able to compare modelled with measured data. The team identified areas where the models and measurement disagreed and explored the underlying reasons for this. The standardised and controlled testing approach within the chambers allowed the team to provide data with less uncertainty than in the field.



- The modelling team identified the value of exploring modelling methods and comparing this with real data. Approaches such as the use of TM54, CIBSE dynamic simulation modelling method, for domestic dwellings were explored. This identified that the potential Home Energy Model, which is also dynamic, may also improve the UK’s approach to energy modelling of homes, when compared with the current Standard Assessment Procedure.
- The industry needs better data on product performance – for example window and doors had missing U-value calculations.
- Timber frame wall U-value calculations are sensitive to the amount of timber in the wall, or the timber fraction. The default assumption is 15%, but a plot specific timber fraction of 12% provided more accurate U-values. This is now being assessed in all Bellway homes for better accuracy of U-value calculations.
- Heating system data also represented a challenge. Sometime manufacturer’s data did not align

with real world use. This means better design information is needed to properly design systems.

The relationship between measured and modelled data, going beyond a simple view of the performance gap, is essential in evaluating designs and better understanding outcomes for occupants.

Customers and Occupants

Ultimately, the objective of the Future Homes project was to deliver better homes for customers and occupants. People need warm, safe, and healthy homes. Using experimental data to better understand how to deliver homes that perform.

One of the objectives of the project was to ensure we shared data and insights with industry, policy makers and the wider general public. We engaged with the public through the media, as well as opening our doors twice a year, so people could see what we do. We worked hard to take our findings and put them into a form that people could understand and use. Our work on air source heat pumps and building fabric were reported in the Times, while the research team regularly appeared on radio and TV media to discuss issues of energy efficiency and the wider findings of the project.

Project Impact in the Media	Total
Unique Headline	359
Countries Reached	41
Audience Value Equivalent (AVE)	£14,022,129
Total Reach	3,694,994,418
GM Regional Reach	65,628,680

While heating and energy efficiency are often top of people's lists when considering their homes, the research also explored emerging issues for consumers. Smart homes technology is an emerging issue, with multiple platforms and individual systems being installed in homes. One of the emerging findings was the requirement for this to be simplified for the consumer if they were to generate maximum value. Energy House Labs and Barratt Redrow have invested in a PhD to explore how smart home technology can bring value to their customers around issues such as energy flexibility, where homes may have solar panels, batteries and smart car chargers and need support to manage these assets in a way that is best for them.

Eco System Development and SME Support

One of the core objectives of the Innovate Innovation Accelerator programme was to create a research and innovation "eco-system", where business can more easily engage with the research base. This can be a challenge as there is often a lack of "front door" where people can engage with research or business support. Between 2023 and 2025 Energy House 2.0, and the associated facilities had more than 10,000 visitors, supported by a strong social and traditional media presence. The physical nature of the infrastructure and the constructed homes created a point where partners could physically engage with each other and the research.

With a large number of organisations coming through the door, it became easier to signpost potential partners to the support that suited their enquiry. The research team covered a wide range of disciplines; materials, acoustics, air quality, energy performance, and digital, meaning partners could be supported across the board. In addition, the support from the Energy Innovation Agency meant that SMEs were supported not only with technical questions but also with the development of their business and potential routes to market through their network of buyers. Smaller businesses often have limited research and development budgets, so a technical research programme allowed them access to facilities and expertise they would not otherwise be able to use, and buyer events enabled them to pitch and engage with buyers they would otherwise not have access to This support addressed not only technical advice but was also supported by detailed sectoral knowledge of the construction industry.

CASE STUDY

In September 2024, following testing at Energy House 1, Vacuum Glazing Network, an SME with an innovative vacuum glazing product, was introduced to a number of buyers through an Energy Innovation Agency meet-the-buyer event. One of the buyers, the Diocese of Salford, who manage approximately 1000 buildings and more than 150 schools in Greater Manchester, subsequently purchased more than £150K of vacuum glazing, and frames for one of their schools, St Winifreds, in Stockport, which was installed in April 2025.

The approach also allowed businesses to interact with one another. They could see how they connected within the wider housing "product" and the development of the demonstrators allowed us to break down traditional barriers between manufacturers and create opportunities for SMEs to see how their product might fit into the wider supply chain. This also extended outside the traditional construction supply chain. Warranty providers, insurers, mortgage providers, and investors had an opportunity to understands the nature of the Future Homes Standard and what this would mean for the homes being delivered in the next decade.

Skills, Productivity and Future Workforce

By building to the new standards, the team explored what this would mean for the future workforce. It is crucial that build, fit out and commissioning are properly undertaken and this may require different skills than are currently used. The use of modern methods of construction means that some traditional trades will have a reduce role, while skills around the delivery and installation of off-site elements will increase. The housebuilder partners have taken the lessons learned and are now applying them in the factory and on site.

The move away from gas sees a greater reliance on air source heap pumps and other forms of electrical heating. The research around the performance of electrical heating systems identified a requirement for improve specification, installation and commissioning skills to improve comfort and reduce energy bills.

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We aim to enhance our academic credentials and strengthen local business-research relations across the north of England. While we struggle to get appropriate funding and support, projects like this will hopefully improve our chances going forward.

Fibre Extrusion Technology Ltd

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Moving Forward

The Future Homes Innovation Accelerator provided a strong basis to accelerate built environment research in Greater Manchester, whilst creating national and international impact. Energy House 2.0 was launched in 2023, and the Future Homes Project represented the first major use of the facility.

The facility and Future Homes experimental demonstrators allowed us to create a partnership that covered a wide range of academic disciplines, an industry network that reached across the supply chain, and a direct link to policy makers who could engage with real data. We will look to extend this approach to better understand our homes and buildings and deliver a high-performing built environment. Some of the key questions we would like to address in the future are:

- Retrofit remains the major issue for the housing stock. Energy House Labs is starting to build two older style homes to work alongside Energy House 1 to answer key questions for the existing stock.
- Research and innovation on heat pumps should be expanded. There needs to be further exploration into system design and commissioning, as well as the exploration of innovations that could improve performance and usability.
- Energy flexibility and an understanding of storage, renewable and consumption control is an emerging topic area. Understanding what this means for the consumer in a range of heating, cooling, and travel scenarios has the potential to improve flexibility service design for consumers, housebuilders, energy companies, and network operators.
- There are further opportunities for calibrated modelling of energy performance, ventilation and acoustic performance that could provide tools for the industry to more accurately assess building performance and inform future standards and regulation.
- Climate change adaptation is a major issue. We recently upgraded Energy House 2.0 to operate at over 50°C and we are exploring the development of a high-quality solar rig. We are seeing warmer summers in the UK, and globally, and building this capability will give us a unique opportunity to explore how the built environment performs under these conditions. What are the potential cooling strategies that might need to be employed?

- Understanding the trade-offs between ventilation, energy performance and noise of ventilation systems needs to be better understood in the context of more airtight homes. Air quality research should explore how overheating, window-opening behaviours and emerging cooling strategies interact with pollutant concentrations, ventilation effectiveness and overall occupant exposure.
- Lighter weight construction methods and the use of new materials create a new context for structure-borne noise, which needs to be better understood.

- Heat pump noise remains an issue for further exploration. The development of further work in multi-occupancy properties and ongoing support for policy makers will support heat pump roll out.
- Bellway intend to construct 10 homes featuring the lessons learned within the EH2 lab. After the homes have passed re occupation fabric and heating tests the operational / in use energy consumption will be measured. Bellway intend to gather a better understanding of living habits (how hot & how long) impact running costs and to gain customer feedback on their living experience with low temperature heating.
- With Awaab's Law forcing landlords to address damp and mould within defined timeframes, there is an urgent need for robust, evidence-based air quality assessment protocols that explicitly link moisture, temperatures and ventilation performance so that effective mitigation strategies can be fully developed.
- We now know that indoor pollutants can influence outdoor levels and atmospheric chemistry at local scales considerably, so deriving robust residential emission factors is essential to understand how homes contribute to wider urban air quality and chemical transformation processes. Using the test houses within the controlled environmental chamber, we can measure whole-house emission rates of volatile chemical products under repeatable conditions.
- Future work should move beyond cooking and occupancy to better quantify emissions from building materials, furnishings, personal care, and cleaning products, while also advancing understanding of how pollutants chemically transform indoors and influence exposure and toxicity.

The Innovation Accelerator has started to build a network of academic, businesses and policy makers that can engage in further developing the agenda to deliver high-quality, healthy and comfortable homes, as well as a products and processes that shape them. The Future Homes Project has been a unique collaboration that will continue through further projects.

Locally-led Innovation Accelerators delivered in partnership with DSIT, Innovate UK and City Regions

Department for Science, Innovation & Technology

Innovate UK

GMCA GREATER MANCHESTER COMBINED AUTHORITY

Led by Innovate UK on behalf of UK Research and Innovation, the pilot Innovation Accelerators programme invested £100m in 26 transformative R&D projects between 2022-25 to accelerate the growth of three high-potential innovation ecosystems – Glasgow City Region, Greater Manchester and West Midlands. The programme was boosted by an additional £30m of public funding for 2025/26 spread equally across the regions. Innovation Accelerators is piloting a new model of R&D decision making that empowers local partnerships to harness innovation to drive regional economic growth, attract private investment, and develop future technologies.

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