

Keepmoat

Gedling Green Interim Report

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**Centre for
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Executive Summary

The Future Homes Standard aims to ensure all new build homes are future-proofed for energy efficiency and low-carbon heating. This report outlines the valuable lessons learned from constructing and completing the UK's first open-market sale of a Future Homes development at Gedling Green in Nottinghamshire.

The insights from stakeholders involved in the project will interest all housebuilders, tradespeople, home-equipment suppliers, installers, and policymakers committed to the efficient and effective construction and operation of more affordable, greener homes.

Newly built homes will be required to produce 75-80% fewer emissions by 2050 to make them 'zero-carbon ready'. In theory this means that when the electricity grid has been decarbonised, they will become zero-carbon homes. The changes come about as part of a wider effort to reach net zero as a country by 2050.

It is important to gain a better understanding of the practical and financial implications of the transition to the Future Homes Standard and assess the impact that home occupiers are likely to have on overall outcomes.

The Gedling Green development by Keepmoat, provided an opportunity to build 33 homes to the Future Homes Standard for private occupation. The team from Birmingham City University's Centre for Future Homes oversaw and supported the entire project, including design, construction, commissioning, handover and the lived experience.

The development process involved working closely with the Keepmoat management team at a national and regional level as well as key subcontractors, manufacturers and specialist advisors.

The primary intention was to derive data and consumer insights and to analyse this intelligence to provide policymakers with the knowledge they need to make evidence-based decisions and avoid unintended consequences. This process, well in advance of the changes to regulation, allowed Keepmoat to better understand the risk and opportunities associated with the transition involved in building to the new Future Homes Standard and inform changes to standard types of houses.

The homes were constructed using local materials such as Plasmor concrete blocks and Ibstock and Wienerberger bricks. Sensors were built into the homes to collect house performance data over high-speed Wi-Fi, which was provided free of charge to residents for the first two years. Occupiers were asked to sign an agreement to allow access by arrangement to their homes and participate in regular interviews with the Centre for Future Homes research team to share their experience.

The construction of these homes has revealed valuable lessons across the entire process, from early planning decisions to post-occupancy. Particularly important is educating residents about the Future of Home Standard, helping them understand and embrace the concept of living to a Future Homes Standard. These homes are more complex than traditional housing and require different operation and maintenance to ensure optimum efficiency.

The unique data set provided by this project, along with the many visits policymakers have made to the site, has already helped significantly influence the creation of a Future Homes Standard. The project will help ensure a smooth and efficient transition to more carbon-efficient housing, which is safe and comfortable to live in with lower running costs.

This interim report is focused on the pre-occupation phase of this development, as market conditions delayed the sales and rental of these properties.

A final report, anticipated for publication in 2026, will complement prior research into social housing and will reflect any differences in operational performance from the owner-occupied and private-rented tenures.

This project was made possible because of the visionary financial support of Homes England, Lloyds Bank and Leeds Building Society. This vital research will help the whole industry avoid unintended consequences and provide the insights needed to scale up the construction of high-quality net-zero-ready homes



The Gedling Green Development: Why, how and its wider context

Place

Designing homes that are fit for future living is not just about the physical structure. Importantly, it is also about creating truly sustainable places where people want to live.

Gedling Green is part of a much wider development that Keepmoat is constructing on the site of a former colliery. This site has been reclaimed with the help of Gedling Borough Council and now forms part of a new and vibrant country park.

The site offers natural habitats and opportunities to enjoy exercise in the countryside while remaining well connected – just six miles from Nottingham city centre with excellent access to public transport and local services.

It is a perfect example of how former industrial locations can be transformed, providing people with a healthy environment in which to live. It highlights the importance of putting people at the heart of the change and harnessing the power of nature.

Planning

The government aims to build 1.5 million homes in the next five years, helped by planning reforms, the release of green belt land and the reintroduction of mandatory housing targets for local authorities.

The government has recognised the critical role planners play in providing new homes. The recent consultation on the UK government's National Planning Policy Framework shows a commitment to radically change the way we build the homes that we need.

This will include presumed rights and the further expansion of construction opportunities through the introduction of grey belt by reclassifying sites currently listed as green belt whose development would not pose a threat to our natural habitats.

The Ministry of Housing, Communities and Local Government, alongside other stakeholders in the planning sector have developed a new capacity and capability programme to help local authorities deliver an efficient planning service for all. They are also funding the recruitment of 350 new planners and expanding the pathways to planning graduate schemes.

The importance of good planning cannot be underestimated, and it is important that excellence is recognised and rewarded.

Design, specifications and SAPs

Making the right decisions at the start of any Future Homes Standard development is critical to achieving the intended outcome.



This includes adapting existing standard house types and making changes to accommodate an enhanced fabric performance and introducing electric heating and cooking systems for the provision of hot water storage, which had often been removed due to the use of combi boilers.

The Standard Assessment Procedure (SAP) calculation and in particular Psi values are now critical elements of achieving both Part L 2021 for the conservation of fuel and power and the proposed Future Homes Standard.

The 2021 update to Part L and the move towards the government's Future Homes Standard, have increased the focus on heat loss through thermal bridges in new homes.

The Future Homes Hub has reported that it is no longer possible to comply with Part L without the use of calculated Psi values.

Part L defines two methods to assess thermal bridges: individually modelled values or using a database of independently assessed details such as Recognised Construction Details (see www.recognisedconstructiondetails.co.uk).

The design of the Gedling Green development was driven by the Keepmoat in-house design team supported by AES Sustainability Consultants and REDD Design.

The Gedling Green development specification

- 50mm cavity mineral wool (0.19 W/m²K) – Plasmor blocks and Ibstock and Wienerberger Bricks
- Floor build-up (0.11 W/m²K) insulated block system
- High Performance Double Glazing (1.3 W/m²K)
- 450mm loft insulation (0.10 W/m²K)
- Focus on Thermal bridging details
- Thermally broken lintels
- Air tightness 4.0 (all plots to be tested)
- dMEV continuous running fans
- Dynamically modelled for overheating
- Panasonic Air Source Heat Pump
- WMS Underfloor Heating to Ground Floor
- All Electric Net Zero ready
- Efficient running costs
- Customer opportunity for Time of Use Tariffs
- Designed to prevent overheating and offer a healthy and comfortable home
- Comfortable UF heating
- EV Car charging as standard
- 1Gb broadband connectivity
- Easily controllable via App or thermostat
- Increase daylight from larger windows & Bifold doors
- Future proofed to avoid costly & disruptive retrofits



AES Sustainability Consultants

AES Sustainability Consultants were responsible for the design of the fabric, including the SAP calculations.

To improve insulation, Keepmoat adopted a 150mm cavity and installed mineral wool insulation on all its new housing. The installation was accredited through photographic evidence which was geotagged and stored using Novade software.

The procedure for accurately calculating the final SAPs required adopting values for the new equipment.

This was achieved in liaison with the equipment manufacturer who provided values produced by the BRE process. This was checked by the experienced SAP team at AES.

The team also calculated psi values for cold bridging, rather than using default values, to more accurately determine fabric heat loss.

The air leakage test used actual values to produce as-built SAPs. The project achieved actual leakage results of just over three, demonstrating Keepmoat's experience in undertaking fabric construction to the exacting Future Homes Standard.

The distributed ventilation Decentralised Mechanical Ventilation (DMV), was assessed as very suitable for these dwellings, giving an effective and easily understood ventilation arrangement.

The new overheating regulation (part O) has caused some developer problems with the adaptation of standard housing types. Houses at Gedling Green were rotated to achieve the optimum orientation.

REDD's heating and ventilation strategy

REDD Design supplied plumbing, heating and renewable energy design to the project.

The main changes at Gedling Green were the inclusion of heat pumps, a smart hot water cylinder, underfloor heating and photovoltaics. REDD were appointed to integrate these various systems and to provide an outline design.

Of particular importance is:

(i) Heat pump sizing. Heat pumps were chosen that could supply more heat than the total heat loss possible from the property. The design temperature inside the property is set at 21°C. The hot water heating is assumed to be provided by this capacity, as heat pumps either work in lower-flow-temperature space-heating

mode or higher-flow-temperature water-heating mode. In addition, it has been assumed that heat pumps are not switched off and on as this will have an adverse effect on performance.

(ii) Heat pump positioning. Heat pumps need a good flow of air through them and free space around them because of the impact of cold air, the impact of noise, the vulnerability of the equipment to activity, the need for maintenance and any danger of user ingress through the air grill. They need to be sited as short a distance as possible to minimise heat loss and vulnerability of pipework.

(iii) Pipe sizing. 28mm pipe is used between the heat pump and the cylinder cupboard. This is designed for a flow temperature of 45°C for space heating and a temperature drop of 5°C. Because of this flow temperature, the capacity of the water to provide for the heat load is reduced, and so a greater flow is required. Thus, most secondary pipework is at least 15mm with longer routes being 22mm. The overall water capacity of the system is important for reducing heat-up time.

(iv) Cylinder sizing and siting. A cylinder cupboard is required for heat pump installations. The difficulty is finding a suitable space, as it takes away usable floor area. Minimising this cylinder space is useful, but having too tight a cupboard prevents a tidy, quality mechanical installation and makes maintenance difficult. Cylinders were supplied with equipment and insulation attached, which made them larger than the airing cupboard used to house them. The door to the cupboard needs to accommodate the removal and replacement of the cylinder. The cylinders are sized specifically for the household occupancy in order to provide hot water for a set number of baths and showers without the cylinder having to be reheated. In addition, the cylinder stores heat produced using excess electricity from the photovoltaics installed in the houses.

(v) Radiator sizing. Underfloor heating is installed for the ground floor and radiators for the upper storeys. The radiators were sized for a flow temperature of 45°C. plus, higher flow rates.

(vi) External pipework. This is protected from freezing using antifreeze valves that drain the system if freezing temperatures occur.

(vii) Direct hot water (DHW cylinder) sterilisation. The system is sterilised by operating the heat pump at 60°C once a week.

There are few organisations like REDD who undertake system design for residential developments. This could limit the provision of future homes or lead to poorly performing systems.



Key to the success of this research is the effective deployment of Uhoo sensors in each house to measure a range of 14 parameters, including air quality and comfort. This allows performance to be compared with external conditions monitored by an external weather station installed on site.

Uhoo sensors were chosen due to the range of parameters and the high level of integrity of the data they provide in real time.

The decision was taken to offer the residents a free high-speed internet connection for two years, and Uhoo sensors added during the electrical second-fix installation.

The move away from gas to electric heating and cooking means it is important to understand how regulated and unregulated heating is being consumed.

The Emporia Energy measurement system was installed in the consumer unit to track and report electricity usage by appliance in the homes.

This data provides a rich source of information on how consumers operate their homes and the effect this may have on the overall outcomes.

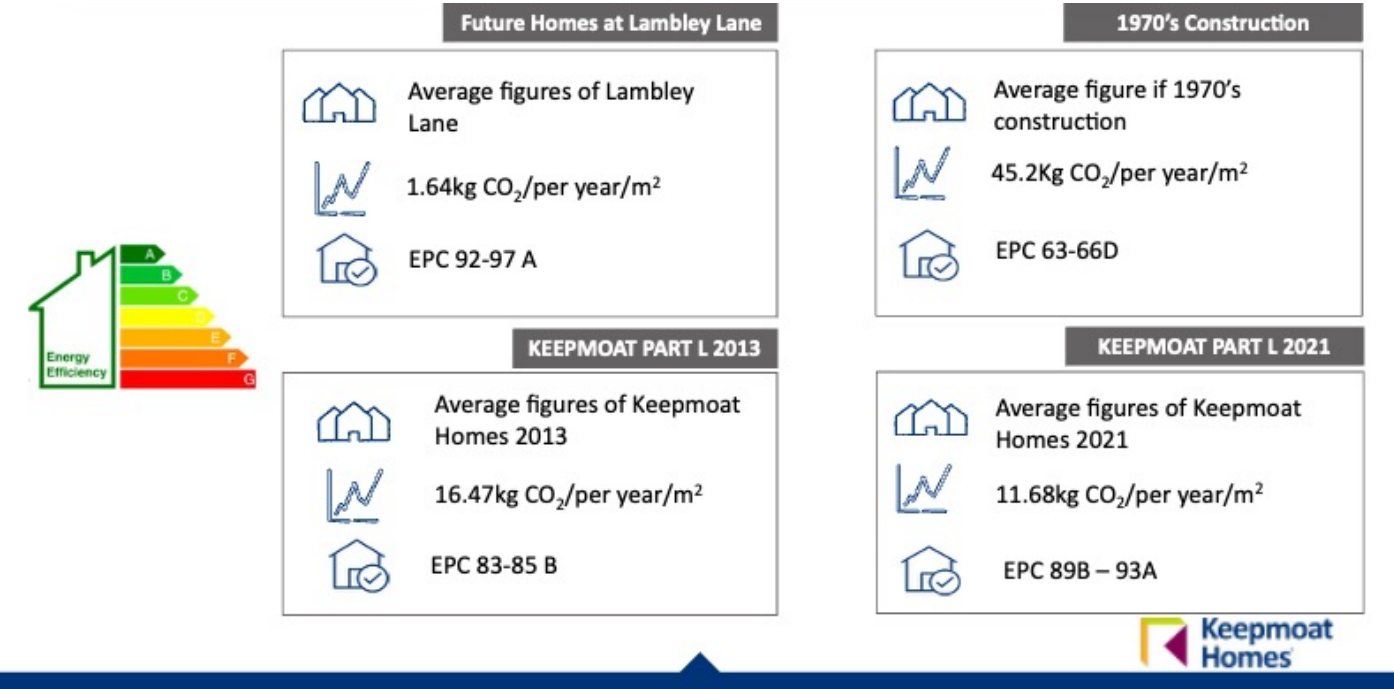
Further performance data is provided by outputs from the Panasonic Heat Pump, WMS Underfloor Heating and the Mixergy smart hot water storage installed in the homes.

Performance and running costs compared

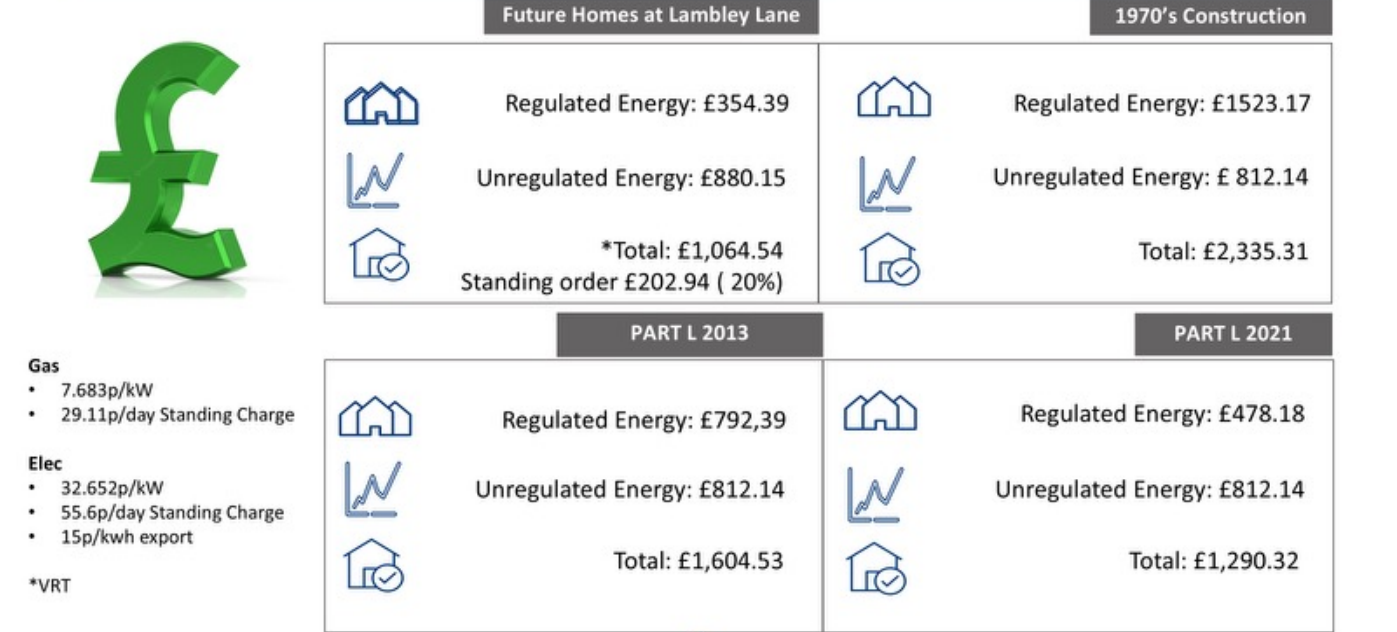
These figures show the improvements in energy performance, carbon footprints and running costs

achieved by Keepmoat's Gedling Green development compared to houses built to old construction and heat loss standards..

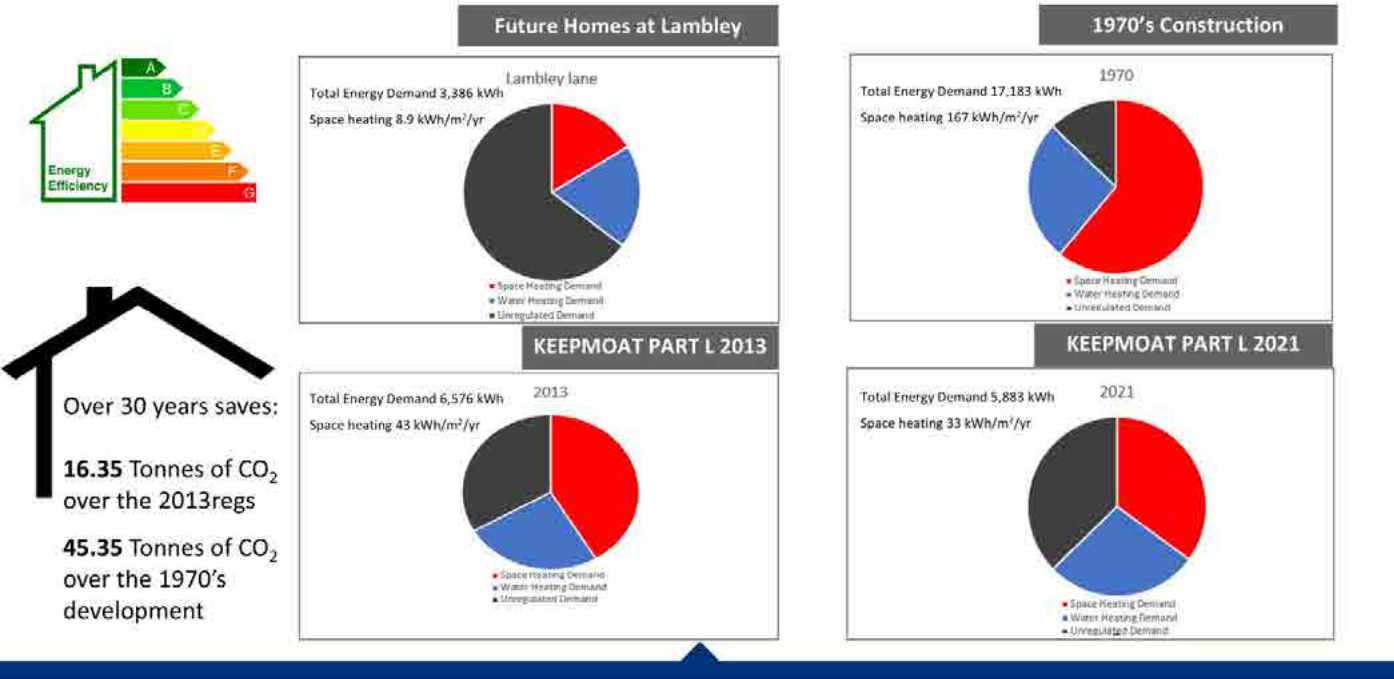
Lambley Lane Gedling - Future Homes



Lambley Lane Gedling - Future Homes



Note on final figure
The actual costs will be measured by the analysis of energy bills and will include an understanding of how behaviours and specific technology can positively or negatively impact on the running costs of these homes. This data will be provided as part of the final report in 2026.



Supply chain and planning meetings

Involving supply chain partners early during the development was an important factor in the successful delivery of the Gedling Green development on time.

Manufacturers have a wealth of knowledge about the way to optimise the performance of their products. By immersing them in the process and encouraging them to interact with other suppliers, the design and construction was fine tuned.

A key supplier briefing meeting was convened well in advance of the project commencing. This was followed up by regular forums and site visits during the construction phase.

This proved to be particularly important to the heating and ventilation strategy which is the most critical change in meeting the Future Homes Standard.

Site management and building control

First-class site management and attention to detail were hallmarks of this development. The original site manager, Aron Millergill, is singled out for praise. This was his first opportunity to manage his own site, and he delivered this Future Homes Standard development to a very high standard.

Building Control was provided by NHBC who also carried out an independent Construction Quality Review (CQR) of the construction. Conducted by one of our experts, a CQR can be tailored to meet specific needs – whether it's a comprehensive review of up to 38 build stages or a focused assessment of specific areas.

Each review results in a detailed report highlighting strengths, pinpointing weaknesses and uncovering their root causes, all backed by photos and scoring. The analysis compiles all CQR results to give a comprehensive view of a company's construction quality. The results are benchmarked against national and regional standards.

Subcontractor structure and experience

The critical role of the subcontractors cannot be underestimated, as they are responsible for the completion of the packages to deliver new homes.

Prior to starting on site, meetings were convened bringing together the subcontractors where their respective packages overlap and where there is a potential to miss the opportunity to create integrated systems and common consumer interfaces.

The need for greater integration has been evidenced in the delivery of the heating system for Gedling Green. Each system is made up of:

- Panasonic air source heat pump
- WMS underfloor heating system
- Mixergy smart hot water storage and photovoltaic diverter

Photovoltaics

This system was installed by no fewer than four subcontractors. There was a risk of disconnect and lack of understanding about the potential for one subcontractor’s work having a detrimental effect on another and issues arising at the commissioning stage, which becomes even more vital. These are major risks for rolling out the Future Homes Standard at scale.

Such an outcome was prevented at Gedling Green by the exceptional level of collaboration achieved throughout this development.

The research team at Birmingham City University organised a STEAM challenge in 2025 to better understand how to inform and integrate subcontractors and achieve better outcomes as we begin building at scale to the Future Homes Standard.

Further engagement with subcontractors is vital. The Centre for Future Homes will organise a further science, technology, engineering, arts and mathematics (STEAM) challenge and support NHBC to help prepare subcontractors to navigate an effective transition.

Commissioning, apps and controls

Building the Gedling Green homes to the Future Homes Standard required the use of more technology, which increased the complexity of the project. To ensure optimum efficiency was achieved, a robust commissioning process was required.

Of note is the different software used by the technology which had no common interface. It proved difficult to get the different technologies to talk to each other. The overall thermostat has proved complex to operate.

Additionally, each of the heating technologies had their own app, which further highlights the lack of integration and risk of consumer confusion.

This is a real concern as the failure of different systems to integrate may lead to customer complaints. With no clear line of responsibility, there is a risk of blame being transferred between suppliers.

Prior research has suggested that providing home occupiers with simple and highly understandable information is the most likely way to offer the nudges that help residents optimally use their properties, resulting in lower operational carbon emissions and reduced energy bills.

Sales and customer service training

The sales proposition for Gedling Green was focused on attracting early adopters who understand the benefits of purchasing a future-proofed home.

In a competitive market, the primary benefit of being an early adopter of the Future Homes Standard is the opportunity to future-proof, reduce energy bills over the long term, and avoid the future cost and disruption as gas boilers are phased out.

The homes were offered at a 15% discount compared to the same house type nearby as the market conditions were depressed by high interest rates, a cost-of-living crisis and the recent withdrawal of the Help to Buy Scheme that had been a primary driver of demand for first-time buyers.

It was recognised that the sales team needed to understand and be able to explain to customers all elements, features and benefits of a Future Homes Standard home. This represents a step change from the ways most new homes are currently sold, which is often through third-party staff who have limited knowledge about the technical specifications of the properties they are marketing.

It was also recognised that the Customer Care Team would need similar knowledge to ensure they can properly respond to customer queries and complaints.

Comprehensive training was provided by Birmingham City University to fulfil these requirements.

Valuers

Loan-to-value (LTV) ratio is a very important factor that lenders consider when they decide whether to approve you for a mortgage or not. This is because loans with a higher LTV are a bigger risk for the lender. If owners can’t make repayments, the lender will make back less money by reselling the house.

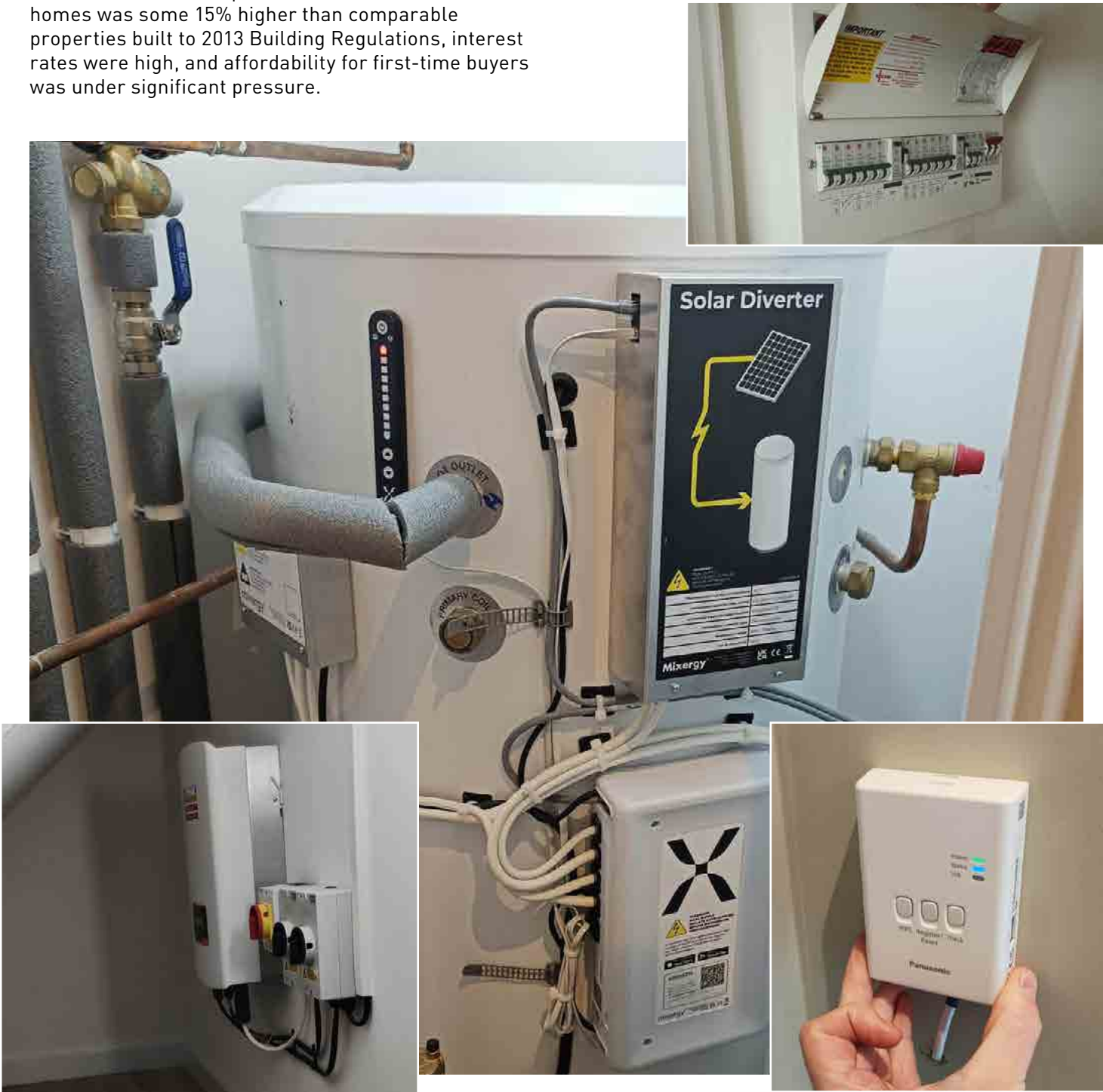
Care was taken to ensure that the valuers fully understood the added value associated with a Future Homes Standard home. It was hoped that valuers would reflect the potential for lower running and future renovation costs in their valuations.

This was of critical importance as the cost of these homes was some 15% higher than comparable properties built to 2013 Building Regulations, interest rates were high, and affordability for first-time buyers was under significant pressure.

It was disappointing that the higher valuations failed to materialise as the valuers stuck to the standard formulas, choosing not to build in the added value provided by houses built to the Future Homes Standard.

Due to poor market conditions and low valuations, the decision was taken to sell all but six of the properties to private rental operator Lloyds Citra Living.

This is a significant concern for the eventual rollout of the Future Homes Standard. SME builders are likely to be first to market and unable to secure a premium to cover the costs associated with delivery of the standard, while first-time buyers will likely prove unable to secure the required level of mortgage due to the valuation.



Key stakeholder insights and lessons learned

This project is an exemplar for collaboration. Several key organisations made the project possible through their financial and intellectual support. Each of the stakeholders had clear objectives as to the outcomes they were looking for from this research.

Interviews were conducted with key individuals and partner organisations involved in the Gedling Green development. These discussions captured perspectives from the design phase throughout construction and into early occupancy. Stakeholders included internal teams, external advisors to the construction industry, financial institutions, and project coordinators such as site managers. The aim was to gather insights on technical delivery, compliance challenges, and lessons learned from implementing Future Homes Standard principles. A central theme throughout the project was the emphasis on early contractor involvement and maintaining open, transparent communication among all parties to ensure successful outcomes.

Over the following pages, many of the suppliers and skilled professionals who made this project possible reflect on the lessons learned and the risks and opportunities of building cleaner homes at scale. Their insights will interest and help inform those looking to efficiently and effectively build houses to the Future Homes Standard.

Trudie McCormick – Keepmoat Technical Director

Keepmoat decided to upgrade their company fabric standards to the 2022 requirements early. Much design work was undertaken with energy consultants to test different options, including looking at embodied carbon and buildability with objectives of achieving safe, scalable and cost-effective solutions. A reliable specification was chosen of a 150mm cavity with light-weight blocks and non-combustible insulation, giving a U-value of 0.19.

The construction detailing was also reviewed to achieve tighter air permeability, and this was coordinated with a ventilation strategy. The Gedling Green development is in a semi-rural location sited on a former colliery, and so it is possible to open the windows because there's limited noise pollution or air pollution. It's also assumed that the windows could open at nighttime, and there is sufficient openable area not to need any additional purge ventilation.

These 2022 regulations also required a review of overheating. This is very individual to the location, local fenestration requirements and orientation of houses. The Gedling Green future homes scheme had larger glazed areas to meet contemporary design. They also

had larger opening areas, which meant that they did require raising transom levels to 1100mm for safety.

The use of heat pumps for heating was relatively new, and so it was ensured that the manufacturer was 100% on board to support the development.

The use of the Mixergy cylinder was driven by the awareness that in future homes water heating was becoming a major user of energy and something was needed to make this more efficient.

Underfloor heating at ground floor level provided an added benefit. The difficulties with the TOG rating of floor coverings was a learning aspect as conductivity of heat is a key issue.

The photovoltaics were introduced to offset energy costs with electrical heating. The roofs of standard house types offered restricted opportunities to maximise the use of photovoltaics. In future type design this will be explored to make larger areas possible, but the difficulties with planning in some locations will require a flexible approach.

As regards future delivery of future homes schemes, there is a capacity issue with mechanical and electrical (M&E) designers and with experienced installers who fully understand the attention to detail that is required. Keepmoat understand that they are Principal Designers and so need to take responsibility for overall design and performance. This aspect needs to be developed with insurance and warranty providers. This increase in M&E will drive a greater standardisation of approach to enable installers to undertake high-quality work that meets performance measures. It is probable that service ducts will become standard. There is a danger that there will be early failures as we scale up, which will be reported and push back acceptance and market development.

The research needs to be set against a backdrop of the urgent need to address the challenges of climate change, whilst ensuring building safety and the resilience that our homes will need to deal with the extreme weather events and overheating that are anticipated in the future.

This is all in the context of an overall housing shortage. The development opened the sales centre at a time when the housing market was particularly depressed. Affordability for first-time buyers in the UK is slowly improving but remains stretched. The average home still costs around 7.7–8.3 times median earnings, meaning ownership is out of reach for most without family support or special schemes. As a result, the overall housing starts and completions in England are well down, as is the planning application pipeline.



It is important for those developing and financing the housing sector to understand the cumulative costs of transitioning to the Future Homes Standard at the same time as addressing other key issues, including biodiversity and nutrient neutrality.

Given that our housing stock is one of the UK's most important assets, we need to understand whether the introduction of the Future Homes Standard will eventually have an impact on the value of homes that do not perform to this level in terms of energy efficiency.

The research carried out by the Centre for Future Homes will therefore have real impact as to determining future strategy from policymakers and lenders.

Site management

The site management team was central to delivering the Gedling Green development to the standards required for a Future Homes pilot. Their responsibilities included ensuring technical compliance, sequencing complex installations, and supporting residents as they moved into homes that operated very differently from traditional gas-heated properties. These homes incorporated air source heat pumps, Mixergy smart cylinders, and photovoltaic systems, creating a level of complexity that demanded careful coordination and homeowner education.

Early signs of success were clear from occupant feedback with winter electricity bills consistently reported as under £50 per month. This confirmed that the integrated systems were performing as intended. However, the site manager highlighted that these results were only possible because of dedicated aftercare during early occupancy.

Residents needed practical guidance on how to use heat pumps efficiently and understand hot water storage behaviour. Written manuals were not sufficient for such technical systems. The manager suggested short instructional videos, explaining that homeowners are more likely to watch a series of brief clips than a single long guide. This approach would reduce pressure on site teams and prevent residents from feeling uncomfortable about asking for help.

Delivering homes ready for compliance with the Future Homes Standard required significant adjustments to

programme structures. The site manager advised developers to allow at least three extra weeks for compliance activities, particularly those related to Parts L, S and O of the building regulations. Certification became a critical path activity because photovoltaics had to be installed and commissioned before SAP calculations could be completed. Any delay in documentation directly affected NHBC's approval for mortgage release. This demonstrated the need to manage compliance as a continuous process rather than leaving it until the final stages.

The introduction of multiple new technologies increased coordination demands among specialist subcontractors. Weekly site meetings, annotated drawings, and photographic records were essential for resolving issues quickly. One example involved challenging non-compliant cable routing by a photovoltaics installer and escalating it to an electrical specialist, showing the leadership role site managers played in maintaining safety and compliance. Quality assurance was handled rigorously, with each trade required to provide pre- and post-installation certification. Close monitoring of cavity insulation during brickwork lifts supported airtightness targets, which achieved results just above 3 m³/h/m², a strong performance aligned with Future Homes readiness.

The site manager recommended allocating extra build time for the first plots, particularly show homes, to trial new technologies before full rollout. Additional management capacity, such as assistant site managers or finishing foremen, was also advised to handle the intensive coordination required during commissioning and handover.

Broader lessons included the importance of consistent specification updates, structured communication channels, and digital learning tools for both residents and subcontractors. These measures will be essential as Future Homes compliance becomes standard practice.

Overall, Gedling Green demonstrated that successful delivery of low-carbon housing depends on proactive planning, collaborative problem-solving, and rigorous compliance oversight. While the project achieved excellent performance and occupant satisfaction, this was underpinned by extended programmes, strong technical coordination, and enhanced homeowner guidance. These lessons provide a clear roadmap for scaling Future Homes delivery across the sector.

Commercial management

The commercial manager’s reflections show how critical early contractor engagement, supply chain collaboration and structured communication were in delivering a project aligned with the Future Homes Standard. He explained that Keepmoat approached Gedling Green as both a learning exercise and a benchmark-setting opportunity, recognising that the introduction of new technologies required an informed and coordinated design phase.

By bringing key contractors and manufacturers into the process early, Keepmoat aimed to identify potential gaps in knowledge, address technical uncertainties and ensure that all partners shared a clear understanding of the project’s sustainability objectives.

Engaging with trusted subcontractors was a deliberate strategy. The commercial manager noted that plumbing, heating and electrical contractors had previously delivered air source heat pump systems on other developments, allowing Keepmoat to draw upon existing expertise. This familiarity reduced risk and supported a smoother transition to low-carbon construction. However, the project also required collaboration with new suppliers, particularly for the photovoltaics. As this was one of Keepmoat’s first large-scale photovoltaic installations, the team had to build relationships from scratch, learn the capabilities of different providers and understand the emerging supply chain associated with Part L 2021 standards. Over time, these suppliers became known and integrated into Keepmoat’s developing Future Homes approach.

Innovation was a major theme in the commercial manager’s account. He emphasised that some technologies, such as the Mixergy smart cylinder, were not required to meet the Future Homes Standard but were introduced deliberately to test how they could enhance performance.

The underfloor heating system was another example of innovation achieved through collaborative working. The commercial manager explained that successful delivery depended on close coordination between the

underfloor heating company, plumbing and heating teams and electricians. Without the early, joined-up engagement across trades, these installations could easily have created sequencing challenges or compatibility issues.

Another significant focus was the role of structured communication. The commercial manager described project meetings that began in pre-development and continued throughout construction, involving internal stakeholders and subcontractors. This encouraged open communication across functions rather than siloed working. Issues were consistently “flushed out” early, supporting proactive rather than reactive problem-solving. This culture of openness was also reflected in Keepmoat’s approach to subcontractor performance. Rather than removing underperforming contractors, the developer used structured processes to investigate root causes and put support measures in place. This approach enhanced long-term supply chain resilience.

Performance monitoring was a further area where Keepmoat applied strong oversight. The commercial manager noted that the East Midlands region undertook an annual review of subcontractor performance, drawing on feedback from site, commercial, construction and customer care teams. This multidimensional assessment informed procurement decisions, supported continuous improvement and ensured that subcontractors delivering Gedling Green could meet the required standards. Data from these reviews helped Keepmoat plan for coming Future Homes projects by identifying strengths and gaps in the supply chain.

Reflecting on wider industry challenges, the commercial manager identified skills and training as the most significant risk to delivering houses built to the Future Homes Standard. As new technologies become widespread, subcontractors need deeper understanding and competence to meet regulatory and performance expectations. He highlighted that regulatory change is already complex, and without investment in skills at all levels, the industry will struggle to deliver low-carbon homes at scale. From

Keepmoat’s perspective, formalising successful processes, strengthening supply chain capability and embedding sustainability into everyday working practices are essential next steps as the sector transitions towards the Future Homes Standard.

Groundworkers

Ground workers described their role in the Gedling Green development as both foundational and highly dependent on early clarity from the wider project team. As the first trade on site, they recognised that any inaccuracies in their work could create systemic issues throughout the build. For this reason, they emphasised the importance of receiving accurate information at the tender stage, explaining that they had been provided with detailed drawings that set out the requirements of the Future Homes Standard. These drawings included additional specifications that differed from typical developments, enabling the team to anticipate challenges before work began. They stated that this early contractor engagement helped them understand the nature of the site and the adjustments required, particularly regarding new block types and foundation arrangements.

The ground workers reported that supply chains functioned smoothly throughout the project. Their main builders’ merchant was informed early that the development required different materials and adapted readily to the new specifications. As the site was not especially large, deliveries were manageable and they did not experience shortages or delays.

This reliability supported efficient progress and reduced operational risk. They described the project as one of the better organised sites they had worked on, crediting the site manager and the wider team for maintaining consistent communication and positive working relationships. They explained that everyone on site understood the project goals and contributed to a supportive environment that facilitated smooth delivery.

When asked about technical challenges, the ground workers noted that the transition to Future Homes Standard requirements did not fundamentally alter their core activities. Most groundworks processes remained familiar.

The absence of traditional gas installations simplified certain aspects, reducing the complexity of service trenches and eliminating some historical coordination issues. They acknowledged that occasional issues arose, such as unforeseen obstructions in the ground, but these were typical of any development and were resolved quickly. They reported no major structural or specification-related problems during their phase of work.

A recurring theme in their reflections was the importance of precision. The team stressed that accurate placement of blocks and drainage components at the outset determined the ease and quality of subsequent work by other trades. They described their role as crucial in setting the project up for success, explaining that if the initial layout were even slightly misaligned, problems would cascade through the build. They believed this responsibility would become even more significant as the industry moves further into energy-efficient construction, where tighter tolerances and higher standards are expected.

Looking ahead, the ground workers felt confident that the sector’s shift towards Future Homes Standards would not present major obstacles for their discipline. They reiterated that strong communication and clear design information would continue to be the main determinants of success. Their experience at Gedling Green reinforced their view that early engagement, well prepared design documentation and collaborative site culture were essential in delivering high-quality homes. They also noted that with effective leadership and reliable supply chains, groundworks can support the industry’s transition to low-carbon development without significant disruption.



Bricklayers – Barnes and West

The bricklayers described their experience on the Gedling Green development as positive and technically manageable, despite the higher standards required by the Future Homes Standard. They had worked with the developer on previous sites and were already familiar with the expected quality levels, which helped them adapt quickly to the enhanced specification.

The most notable change was the introduction of wider 150mm cavities designed to improve thermal performance by accommodating increased insulation. They explained that this was not a challenge because the requirement had been identified early in the tender stage and costed appropriately. Longer wall ties and minor adjustments to working methods were factored into the pricing and preparation, allowing the team to approach the build with clarity and confidence.

The bricklayers emphasised that success on a Future Homes Standard project relied heavily on understanding the drawings and specifications from the outset. They stated that diligence at this early stage prevented errors and rework, enabling all trades to deliver a final product that met the intended performance.

Their experience demonstrated that wider cavities and improved insulation strategies could be incorporated smoothly when communicated effectively and planned early. Based on what they had seen at Gedling Green, they recommended that 150mm cavities should become standard across future developments because of the clear energy efficiency benefits and the minimal disruption required to integrate them into standard building processes.

A strong theme in their reflections was the importance of communication and support from site management. They described the site manager as highly competent and responsive, noting that he understood their needs and provided the information required to deliver work to the highest standard. This support was

especially important given the increased performance expectations associated with the project. The bricklayers highlighted that close coordination with site management ensured insulation was placed correctly during each lift of brickwork, which contributed to meeting stringent airtightness and thermal performance requirements. The team took pride in their contribution to delivering homes that performed significantly better than standard builds.

They also found the working atmosphere on site to be collaborative and well organised. The combination of early contractor engagement, timely communication and clear expectations helped create a positive environment where each trade knew their responsibilities. The bricklayers believed that this culture was essential for delivering Future Homes Standard projects, where precision and consistency directly influence overall energy performance.

From a wider industry perspective, the bricklayers recognised that homes built to the new standards would become increasingly common. They believed that bricklaying methods were already largely compatible with these requirements and that the main shift would be ensuring all subcontractors were fully briefed by main contractors on any design differences before starting work. They argued that such preparation not only supported quality but also reduced the risk of delays or misunderstandings on site.

Overall, the bricklayers viewed their involvement in the project as a valuable learning experience and felt confident that their trade could meet the requirements of future low-carbon homes. Their reflections underscored the importance of early planning, clear communication and careful interpretation of drawings as the foundation for successful delivery of developments aligned with the Future Homes Standard.

Electricians – MA Broughton

The electricians involved in the Gedling Green development viewed the project as a natural progression in their long working relationship with the developer, although they recognised that the Future Homes Standard introduced new levels of technical complexity. While the tendering process felt broadly like previous projects, the integration of additional equipment such as air source heat pumps, photovoltaic systems and smart hot water cylinders required closer coordination and more detailed planning than traditional electrical installations. Their early involvement in pre-tender discussions was critical, as it allowed them to advise on the selection of components and flag potential constraints before work began.

One of the main challenges highlighted by the electricians was space. Standard house types were never designed to accommodate the volume of equipment required for low-carbon homes. They described the difficulty of positioning consumer units, photovoltaic isolators, heat pump controls, cylinder wiring and associated cabling in confined areas such as under-stair cupboards. Coordination with plumbers, heating engineers and other trades became essential to avoid clashes, damage to equipment or unsafe working conditions.

The electricians explained that successful delivery depended on open communication with other subcontractors and clear sequencing to ensure that each trade understood how their work would affect others.

Despite the additional complexity, the electricians felt that major problems were avoided due to the experience of their staff and the strong collaborative culture on site. They noted that early contractor involvement enabled them to identify risks that could have escalated later in the build, such as insufficient space for equipment or the use of inappropriate materials. However, they stressed that in future projects, house designs should be revised to

incorporate adequate mechanical and electrical zones. They argued that without design changes, industry scaling of Future Homes Standard construction would face unnecessary delays and inefficiencies.

The electricians also reflected on broader industry issues related to new technologies. They believed that designers sometimes overcomplicate systems by specifying equipment that requires multiple apps or interfaces, which can confuse homeowners and increase demand for aftercare support. They recommended that developers prioritise simpler, integrated solutions that are easier to install and more intuitive for residents to use. This would also reduce the likelihood of homeowners using systems incorrectly and losing out on energy efficiency benefits.

Skills and training were another key concern. The electricians observed that the Future Homes Standard will require significant upskilling across the industry, not only for operatives on site but also for office staff who handle design, compliance and procurement. They advised that companies should invest early in training to ensure that teams understand the performance requirements of heat pumps, photovoltaics and battery storage systems. They also emphasised the need for consistent use of high-quality electrical components. Cheaper alternatives, particularly for photovoltaic technology, often have shorter lifespans and can cause dissatisfaction among homeowners if replacements are needed prematurely.

Looking ahead, the electricians encouraged other subcontractors to prepare strategically by building experienced teams and adopting a culture of continuous learning. They viewed the Gedling Green development as evidence that electrical installation for low-carbon homes is entirely achievable with the right preparation, communication and commitment to quality. Their reflections provide important insight into how Future Homes Standard delivery can be improved through design adaptation, workforce training and collaborative site practices.



Heat pump – Panasonic

Panasonic’s role in Gedling Green was pivotal in meeting Future Homes Standard requirements for heating efficiency and system integration. From the outset, the manufacturer recognised that this pilot project demanded top-tier performance and close collaboration with all stakeholders. Their approach began with early engagement during the design phase, producing detailed heat load calculations and system layouts to ensure compliance and optimise energy performance. These designs were shared with the developer for approval, creating transparency and reducing the risk of late-stage changes.

Heat pump sizing was based on total property heat loss, with units selected to exceed calculated demand and maintain a design temperature of 21°C. Panasonic incorporated operational strategies such as setback and optimum start features to avoid inefficient on-off cycling. The system was configured for dual operating modes: low-flow temperature for space heating and higher-flow temperature for domestic hot water. Weekly sterilisation cycles at 60°C were included to meet hygiene standards. Installation presented practical challenges, particularly around space constraints in standard house types.

Cylinder cupboards were often undersized, limiting access for pipework and maintenance. Panasonic worked with site teams to adjust layouts and ensure adequate clearance, emphasising that overly tight spaces compromise quality and serviceability. Pipework was specified for 45°C flow temperatures, with primary circuits in 28mm pipe to accommodate increased flow rates and secondary routes sized at 15mm or 22mm depending on length. External pipework was protected against freezing with antifreeze valves, and system design accounted for efficient heat transfer while minimising vulnerability to heat loss.

Panasonic highlighted the importance of continuous dialogue throughout installation and commissioning. Issues such as radiator sizing and cylinder capacity were resolved collaboratively, often requiring on-site adjustments to maintain performance targets. The manufacturer also stressed that monitoring does not end at handover. Live data from installed units was collected to verify that real-world operation matched factory and independent test results. This enabled proactive troubleshooting and informed future design refinements.

Lessons learned from Gedling Green underline the need for integrated system design and industry-wide collaboration. Panasonic advocated for interoperability between heat pumps, cylinders and control systems, noting that fragmented solutions increase complexity and reduce efficiency. They also identified skills and training as critical risks to scaling Future Homes delivery. Installers must understand low-temperature heating principles, hydraulic balancing and smart control integration to achieve optimal outcomes. Without this expertise, even high-performance equipment can underdeliver.

The project demonstrated that heat pumps can meet stringent efficiency standards when supported by robust design, careful installation and ongoing performance monitoring. However, success depends on early engagement, realistic space planning and coordinated sequencing with other technologies such as photovoltaics and smart cylinders. Panasonic’s experience at Gedling Green provides a clear message: Future Homes compliance is not just about equipment specification but about holistic design, collaborative delivery and continuous improvement.

Smart hot water tank – Mixergy

Mixergy’s smart hot water cylinder was a key innovation at Gedling Green, designed to complement heat pumps and photovoltaic systems in delivering Future Homes

Standard compliance. Unlike conventional cylinders that heat the entire tank volume, Mixergy uses volumetric heating to warm only the water required at any given time. This approach significantly reduces energy consumption, lowers bills and optimises carbon performance, particularly in all-electric homes where efficiency gains are critical.

The tank also plays an active role in energy management by storing surplus electricity generated by photovoltaics. For example, if a home produces three kilowatts of solar energy but only consumes one, the remaining two kilowatts can be diverted to heat water rather than exported back to the grid. This functionality maximises self-consumption and enhances the value of renewable generation, aligning with demand-side response strategies and supporting grid stability.

Pre-construction collaboration was essential to integrate the Mixergy system effectively. The manufacturer worked closely with developers and other technology providers to ensure compatibility and efficient operation. Design reviews addressed practical challenges such as cylinder sizing and cupboard space, which often proved restrictive in standard house types. Adequate clearance was prioritised to allow tidy installation and future maintenance, avoiding the compromises that can occur when equipment is forced into undersized spaces.

Remote monitoring was another defining feature of Mixergy’s approach. Each tank records and transmits live performance data, enabling fine-tuning of settings and early identification of issues. During the project, some configurations required adjustment to optimise efficiency, and these were resolved quickly through remote diagnostics. This capability reduces reliance on site visits and ensures systems continue to operate as intended long after handover.

The manufacturer emphasised that achieving net zero targets requires a holistic approach rather than isolated solutions. While individual technologies such as heat pumps, photovoltaics and smart cylinders deliver benefits, their combined performance depends on seamless integration.

Mixergy advocates for interoperable systems where components communicate effectively, creating a unified energy strategy for the home. This vision extends to tariff optimisation, with time-of-use pricing and demand-side response mechanisms offering further opportunities to reduce costs and carbon emissions.

Lessons learned from Gedling Green highlight the importance of early engagement, clear specification and user education. Homeowners must understand how to operate smart cylinders to realise efficiency gains, and digital guidance tools such as short videos or QR-linked resources were recommended to supplement written manuals. The project also reinforced the need for industry-wide training to equip installers with the skills required for advanced systems.

In summary, Mixergy’s contribution demonstrates how intelligent hot water storage can transform energy management in low-carbon homes. By combining volumetric heating, renewable integration and remote monitoring, the system delivers tangible benefits in efficiency and cost savings. Success at Gedling Green depended on collaborative design, proactive commissioning and continuous performance oversight, providing a blueprint for scaling smart thermal storage across future housing developments.



Photovoltaics supply and fix – Eco2 Solar

The photovoltaics installation at Gedling Green was a critical component of achieving Future Homes Standard compliance and reducing operational carbon. The provider brought prior experience from low-carbon projects, including modular developments, but acknowledged that this scheme introduced new challenges in scale and integration. Their approach centred on direct engagement with the developer from the earliest design stages, ensuring that roof layouts, orientation and shading were assessed to optimise energy yield.

They emphasised that photovoltaic design cannot be treated as an afterthought; panel positioning and system sizing must be aligned with site-specific constraints and energy performance targets.

One of the key lessons from Gedling Green was the importance of forward visibility on regulatory requirements. The provider noted that ambiguity around Part L implementation created uncertainty across the supply chain, making it difficult to forecast volumes and plan resources. They stressed that clear, timely guidance from regulators is essential to avoid delays and inefficiencies. This lack of clarity also affected procurement, as developers and installers had to make assumptions about compliance thresholds, which could lead to over- or under-specification.

Technical considerations extended beyond panel installation. The provider highlighted the need to balance energy output targets with practical constraints such as roof space and orientation. In some cases, panels were distributed across multiple elevations to maximise generation, but they cautioned against placing panels on north-facing roofs, which compromises performance and cost-effectiveness. They also raised concerns about future integration of battery storage, noting that safety and quality standards for batteries must be robust to prevent risks associated with thermal runaway and long-term degradation.

Quality assurance was a defining feature of their delivery model. The provider conducts a 100% audit of installations, supported by photographic evidence and geotagging, to maintain accountability and benchmark performance. They also advocated for digital solutions to improve homeowner engagement, such as QR codes on inverters and panels linking to instructional content. While remote diagnostics were not implemented on this project, the provider sees this as a future requirement to enable proactive maintenance and fault detection.

Collaboration with other trades was essential to avoid conflicts during installation. The photovoltaics provider recognised that Future Homes projects involve multiple technologies, including heat pumps, smart cylinders, and advanced ventilation, and that sequencing must be carefully managed to prevent delays. They called for integrated design reviews and shared digital platforms to coordinate activities and reduce on-site clashes.

Looking ahead, the provider warned that scaling Future Homes delivery will require significant investment in skills and capacity across the industry. The complexity of compliance, combined with the technical demands of integrated systems, means that training for installers and site managers is critical. They also urged regulators to provide clearer timelines and specifications to support long-term planning. Gedling Green demonstrated that photovoltaic systems can deliver strong performance when integrated early, audited rigorously and supported by collaborative practices. The experience reinforces the need for clarity, coordination and continuous innovation to ensure photovoltaic technology fulfils its role in achieving net zero housing.

Lending Institutions - Lloyds Bank and Leeds Building Society

The financiers involved in the Gedling Green project offered a perspective that connected technical housing performance with market behaviour, mortgage affordability and long-term lending risk. Their contribution made clear that the transition to the Future Homes Standard is not only a construction or

regulatory challenge but also a financial one, with implications for how lenders assess value, risk and borrower capability.

The representative from Leeds Building Society explained that the organisation has positioned itself as an early adopter of green affordability principles, recognising that homes built to higher energy performance standards may offer long-term financial advantages for homeowners through reduced running costs. However, he also acknowledged that these homes typically involve increased build costs, which need to be managed carefully to avoid pricing buyers out of the market.

Lloyds Banking Group representative stated that they position housing investment as their top strategic priority, and they are actively driving the transition to low-carbon homes hence their involvement in this project. They added that the organisation’s engagement with Gedling Green’s Future Homes Standard development reflects the commitment to understanding real-world delivery and customer experience, particularly through a fabric-first approach and regeneration-led design. In addition, granular insights into design, construction, cost structures, sales performance, and lived-in outcomes such as air quality, user comfort, and operational economics will be used to inform lending policy and product innovation (e.g., Eco Home Reward). One critical barrier identified is valuation methodology, which struggles to capture future-proofing and cost uplifts, thereby impacting affordability.

The lenders estimated that developers are likely to face around a 15% increase in build costs to meet the Future Homes Standard. While this uplift is substantial, Leeds Building Society believes that it can be absorbed within an affordability model that reflects lifetime savings rather than only upfront price. He warned against developers using the transition as an opportunity to inflate margins, referencing examples where zero-bill homes had been marketed with excessive mark-ups that were not reflective of actual construction costs. Such practices risk undermining public confidence in sustainable housing and could distort the mortgage market if lenders perceive these homes as overvalued.

A major theme for lenders was the need for consumer education. He argued that advanced technologies such as heat pumps, photovoltaic systems and smart cylinders will only deliver the intended performance if homeowners understand how to use them effectively. Negative press and misconceptions about energy-efficient homes can easily deter potential buyers, especially if residents do not have access to clear and reliable information. He suggested that developers and financial institutions should invest in awareness and myth-busting campaigns to build trust and improve understanding of low-carbon homes. For lenders, better-informed homeowners reduce the risk of dissatisfaction or unexpected running costs, which can influence long-term financial behaviour and mortgage security.

They also highlighted demographic differences in how future buyers might respond to the new standard. While first-time buyers often focus on initial cost, older buyers who are downsizing tend to value homes that are future-proofed and unlikely to require disruptive retrofits. This group is more receptive to the argument that paying slightly more at the outset protects them from future regulatory changes, such as the phase-out of gas boilers. Understanding these behavioural patterns is important for lenders when designing mortgage products that support the transition to low-carbon homes.

Finally, the financier raised concerns about overheating, which is becoming a significant issue under Part O requirements. He cautioned that if homeowners resort to mechanical cooling, energy demand could increase and create inequality between those who can afford cooling solutions and those who cannot. This reinforces the importance of thoughtful design and thermal modelling to ensure that homes are both comfortable and affordable to run.

Overall, all of the financiers viewed the Future Homes Standard as a positive and necessary step, if affordability, consumer awareness and responsible pricing remain central to its implementation.



Sales team

The sales team involved in the Gedling Green development provided insight into how the Future Homes Standard affects pricing strategy, customer communication and the broader market for new homes. They explained that the industry is still in an early stage of understanding how to value homes built to higher energy performance standards and that this uncertainty creates challenges for both developers and buyers.

The sales team acknowledged that because Gedling Green was a pilot development, customers required detailed explanations about the objectives behind the design, particularly the emphasis on net zero performance. Many prospective buyers were unfamiliar with technologies such as heat pumps, smart cylinders and photovoltaic systems, and this meant that sales staff had to invest more time in explaining how these systems work and how they contribute to lower running costs. They highlighted that customers were receptive once they understood the long-term financial benefits, but that the learning curve remains steep, especially for buyers encountering these technologies for the first time.

Training was therefore considered essential. Sales and aftercare teams both received technical briefings on how the homes operate, enabling them to support customers effectively. The sales team noted that this collaboration with aftercare was important because early residents tended to have questions once they moved in, particularly about managing heating and hot water systems. Although site managers and subcontractors continued working on adjacent phases and were able to assist informally, sales teams recognised that future developments would need more structured approaches to customer handover to ensure a smooth transition into low-carbon living.

The sales team also highlighted the importance of setting realistic expectations. Because these homes are different from conventional gas-heated properties, customers sometimes required reassurance about performance, especially around heating behaviour and energy use. Sales staff emphasised the value of providing clear and transparent information so that customers understood what they were buying and how to operate their systems effectively. They suggested that the industry could improve this process through simple communication tools such as short videos, interactive guides or onsite demonstrations



during handover. Affordability remained a key theme throughout their reflections.

The team acknowledged that increased build costs associated with Future Homes Standard properties can make pricing complex, but they believed that transparency is critical to maintaining trust. They stressed that any discussions about pricing alignment across the industry must be handled responsibly to avoid the perception of coordinated pricing, which could be unethical or illegal if not approached correctly. Instead, they advocated for open dialogue about how to price new housing types fairly, ensuring that costs reflect genuine technical requirements rather than speculative increases.

Overall, the sales team viewed Gedling Green as a positive learning experience that demonstrated the importance of cross-team communication, transparent

pricing practices and customer education. They felt confident that as the industry becomes more familiar with Future Homes Standard requirements, both buyers and developers will benefit from clearer expectations and improved understanding of the value of low-carbon homes.

Homes England

Homes England's involvement in Gedling Green reflects its role as a central technical authority driving innovation and compliance under the Future Homes Standard. Positioned between government and the private sector, the organisation's remit is to accelerate housing delivery while embedding energy performance and sustainability into mainstream practice. Gedling Green formed part of a wider programme trialling Future Homes principles across six development sites,

each partnered with academic institutions to evaluate feasibility and performance outcomes.

The technical focus extended beyond regulatory compliance to include research on thermal comfort, energy efficiency and quality assurance. Homes England emphasised that the transition to low-carbon housing requires more than incremental design changes. It demands integrated solutions combining fabric performance with advanced technologies such as heat pumps, smart cylinders and photovoltaic systems. These trials provided critical data on how such systems interact within standard house types and highlighted the need for early design adaptation to accommodate equipment without compromising usability or aesthetics.

Engagement with delivery partners was structured to ensure clarity on specification and compliance pathways. Homes England advocated for prescriptive standards to replace the ambiguity that has characterised previous regulatory frameworks. This approach aims to reduce interpretation risk and ensure consistency across developers, mitigating delays caused by late-stage compliance checks. The organisation also stressed the importance of aligning technical requirements with practical buildability, recognising that overly complex solutions can create inefficiencies and increase costs without delivering proportional benefits.

Social value formed a parallel priority. Homes England is developing frameworks to measure community impact alongside technical performance, embedding sustainability within a broader context of affordability

and wellbeing. This includes gathering end-user feedback on thermal comfort and operational experience, acknowledging that technology alone does not guarantee efficiency. Occupants must understand how to operate systems effectively, and Homes England supports initiatives such as digital guidance tools and myth-busting campaigns to improve consumer confidence.

Lessons learned from Gedling Green underscore the need for collaborative delivery models. Early contractor involvement and structured communication channels were identified as critical for resolving design conflicts and sequencing installations. Homes England views these practices as essential for scaling Future Homes compliance across the sector, particularly as regulatory complexity increases under Parts L, S and O. The organisation also recognises the skills gap as a major risk to successful implementation. Upskilling subcontractors and site teams is considered a national priority, requiring coordinated investment from industry and government.

In summary, Homes England's contribution to Gedling Green demonstrates a commitment to combining technical rigour with social responsibility. By championing prescriptive standards, integrated design solutions and proactive engagement, the organisation is shaping a roadmap for mainstream adoption of low-carbon housing. Its emphasis on research, skills development and occupant education positions Future Homes not as a regulatory burden but as a strategic opportunity to deliver resilient, affordable, sustainable communities that add social and economic impact and value.



Insights on handover and occupancy

Handover and customer journey – Owner occupiers

The research has confirmed the need for Future Homes Standard properties to be properly handed over to the occupier to give them a full understanding of the new technology and how to derive the best possible performance and lower running costs.

The move away from gas heating and the introduction of air source heat pumps, underfloor heating to the ground floor, a smart hot water storage system and photovoltaics made this very important to the overall outcomes for Gedling Green.

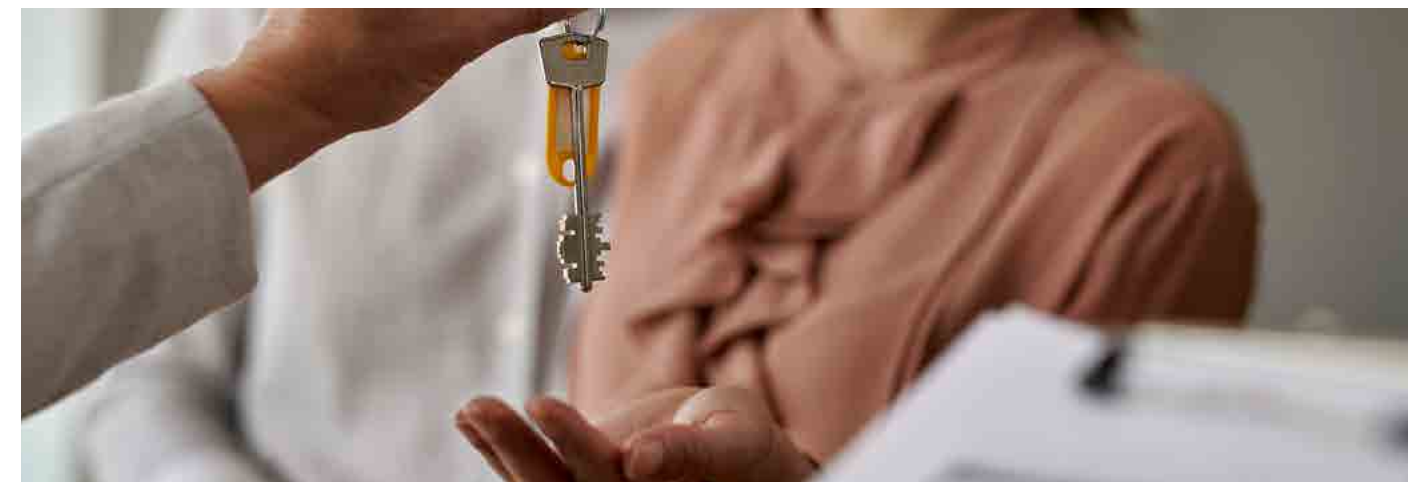
The Site Manager took on this responsibility for the six properties sold to owner-occupiers and provided an in-depth home induction and follow-up sessions as required.

It should be noted that there is a lot to understand, and occupants may have other priorities, so a one-off session is unlikely to be effective.

Handover and customer journey – Private Rented Sector operators

The process for homes sold in bulk to private rented sector (PRS) operators is very different as the home builder is selling stock rather than homes. The PRS operator then rents what are in effect second-hand homes to tenants.

The research identified that the PRS provider did not seek a premium for these Future Homes Standard properties but simply applied the formula for local market rent. Furthermore, they did not see the need to handover the properties any differently from their standard stock.



This highlights a major concern, as unless occupiers fully understand how to operate a Future Homes Standard property, we are unlikely to see the desired outcomes and could even see poor customer satisfaction, higher operating costs and bad press coverage.

This is further compounded by the likelihood of short tenancies as properties are likely to change hands frequently with the probability of poor or no effective handover. The average tenancy period in the UK private rented sector is now around 1,085 days, which is just under three years. This is a sharp increase compared to four years ago, when the average was closer to two years.

On the advice of Birmingham City University, Keepmoat agreed to fund a video featuring the Site Manager showing the tenants around the home. This can be used in perpetuity to induct new tenants to PRS homes.

The handover and management of PRS homes at scale is a major issue which must be addressed if we are to avoid unintended consequences.

Maintenance

The increased use of technology and the end of gas in new homes presents a real challenge as without regular maintenance the efficiency and safety of technology is likely to deteriorate.

There remains a lack of externally linked predictive diagnostics to prevent breakdowns and there is no requirement for annual servicing.

The Centre for Future Homes advocates building in sensors to every home and having a dashboard and an annual maintenance contract for all new homes.



Insights on environment and infrastructure

Operational carbon

Heating and powering buildings accounts for 30% of the UK's total energy usage, so homes will play a vital role in the UK's efforts to reach net zero carbon emissions. When compliance with the Future Homes Standard becomes mandatory, its aim is to ensure that new homes built from 2025 will produce 75-80% less carbon emissions than homes built under the current Building Regulations.

The Gedling Green development delivered a 91% reduction in operational carbon.

Embodied carbon

Embodied carbon is not included in the proposed Future Homes Standard due in part to the need to ensure the full data of complicated supply chains from source to end of life. The Environmental Product Declaration (EPD) process also requires further attention and has the potential for standardisation.

Birmingham City University's Centre for Future Homes is committed to working with industry to deliver 'action PHD research' to help accelerate the process of ensuring we have the evidence to make qualitative decisions taking full account of the resilience we will need in an uncertain world.

Energy capacity and substations

As Gedling Green was part of a much larger Keepmoat development, there was adequate electric power supply available, negating the need for a substation.

The shift from gas to electric heating systems will place further demands on the National Grid. As the number of homes relying on electricity for heating grows, the grid's capacity and resilience must be enhanced to prevent potential disruptions. This transition requires substantial investment in infrastructure and coordinated efforts between government agencies, energy providers and the construction industry.

The introduction of the Future Homes Standard may be frustrated in some locations by Distribution Network Operators (DNOs) being unable to connect new homes to the National Grid, long delays and additional costs which impact on land acquisition and viability.

To address this concern, research carried out by the Centre for Future Homes confirms that homes fitted with heat pumps and photovoltaics are using dramatically less electricity than expected.

The homes recorded annual energy use between 40% and 67% lower than the UK average, with peak demand also coming in far below predicted levels.

Researchers say the findings challenge long-standing concerns that heat pumps would overwhelm the grid as Britain phases out gas boilers.

Insights on social value and financials

Social Value

Social value is the benefit to society that arises from investment in housing and regeneration, covering economic, social and environmental outcomes.

The Gelding Green development delivered significant social value, making best use of UK manufacturers where possible and local labour.

Graduates employed by Homes England recently attended a workshop facilitated by the Centre for Future Homes. They will now work together to investigate and evaluate the social value impact and the value created by the Gedling Green development.

Gedling Green has transformed a former colliery into the homes for the future. The graduates will consider the whole journey, including planning, design, and the use of local manufacturers and skilled workers. In addition, they will investigate the social economic benefits to the wider community, including education, health care, retail and hospitality.

The measurement and demonstration of social value is of critical importance as we seek to build community support for future development and will encourage the use of local manufacturers and skilled labour to improve the economic, social and environmental wellbeing of an area.

Their findings will be published as part of the final report in 2026.



Financials

The uplift to foundation and superstructure build cost, was 16% to deliver the Future Homes specification, extra over to Part L 2013.

This includes the choice to upgrade the windows and install underfloor heating and smart hot water which aesthetic value, efficiency and comfort, but is not expected to be requirement of the Future Homes Standard.

It is anticipated that costs will vary depending on specification, regional labour costs and whether there is sufficient power available without the need for a substation as was the case at Gedling Green.

Insights on skills

Growth is forecast to be modest and there is a need for an extra 251,500 construction workers by 2028 to meet work arising from the transition to the Future Homes Standard and retrofit and maintenance of the existing housing stock.

The transition to non-gas heating systems presents substantial challenges, particularly concerning supply chain capabilities and infrastructure readiness. A primary concern is whether the existing supply chain for heat pumps and other alternatives can meet the anticipated demand for installation in new homes and existing stock in addition to maintenance.

Currently, the UK installs approximately 35,000 heat pumps annually, a figure that must increase dramatically to meet the government's targets. There is the necessity for a significant scale-up in production and installation capabilities. Economic resilience is a further consideration, with support needed to encourage the manufacture of heat pumps in the UK.

Research commissioned by Baxi suggests that 9,062 individuals completed a recognised heat pump qualification, but some have yet to complete their first installation, which illustrates the need to create consistent strong demand.

The Centre for Future Homes has supported Stratford College to deliver a purpose-built Heating and Ventilation Academy. Featuring heating and ventilation systems from leading manufacturers, the academy will deliver flexible learning opportunities, including night school. This is essential given the urgent need to attract new entrants and encourage a largely self-employed cohort of engineers to upskill.

The importance of increasing capacity and skills in ventilation should be fully recognised to ensure comfort and indoor air quality as we transition to low-carbon homes.



Key lessons learned

The Gedling Green development has provided data and insights that will help policy makers shape and deliver the Future Homes Standard. These include the importance of:

- Planning considerations including heat pump locations.
- Collaboration and attention to detail.
- Stakeholder planning meetings.
- The costs of change and the influence of valuers.
- Interdependencies between space heating, hot water, ventilation and water usage.
- Key supplier and sub-contractor training.
- Trainings impact to the supply chain including designers, regulators, sales and customer care staff.
- Impacts to design and space, including the need to adapt standard house types.
- Challenges around maintenance.
- Handover information.
- The impact of operational behaviours.
- Integrated consumer controls and information.
- Grid capacity.
- Customer engagement and support.
- Challenges around PRS housing.
- Investing in new entrants and upskilling the workforce.
- Understanding social impact and value.

The consultation on the Future Homes Standard proposes that significant post-occupancy testing is needed to measure the outcomes of delivering more complex high-performing homes.

The Centre for Future Homes has extensive experience of collecting analysis of data triangulated with home occupier interviews.

To discuss new research opportunities, please contact: info@centreforfuturehomes.org





Centre for Future Homes

Birmingham City University's Centre for Future Homes helps organisations explore robust, scalable and sustainable solutions to meet the challenges of the housing industry using academic research based on data and customer insights. By using evaluating models and design tools, the Centre provides sustainable and cost-effective solutions.

www.centreforfuturehomes.org

For more information: info@centreforfuturehomes.org

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