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Year three of the Innovative Housing Programme: lessons learnt

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Year Three of the Innovative Housing Programme: Lessons Learnt

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Glossary

Air-Source Heat Pumps (ASHP)

Low-carbon heating system that compresses outside air to a higher temperature to heat rooms via radiators or underfloor heating.

Barnhaus

Design approaches for homes that integrate traditional agricultural barns with modern functionality, typically through self-build or custom housebuilding.

Building Information Modelling (BIM)

A process that encourages collaborative working between all the disciplines involved in design, construction, maintenance, and use of buildings.

Cross Laminated Timber (CLT)

A product made up of small timber sections that can be formed into large structural panels, which are light, stable, and strong. It provides a sustainable resource as it is made out of a renewable material.

Composite Doors

Constructed from multiple materials and offering high durability, thermal insulation, and low maintenance.

Dwelling Emissions Rate (DER)

Actual CO2 emission rate of self-contained dwellings and individual flats.

Ground-Source Heat Pumps (GSHP)

A heating system that transfers energy from the natural heat stored in the earth to heat the home and domestic hot water. They can also be used to augment existing heating systems in the same way as solar panels.

Homes as Power Stations (HAPS)

Homes that combine renewable energy generation methods with battery storage.

Intermediate rent

Homes where rent levels are set above social rents and up to 80% of market rents.

Low embodied energy

Low levels of embodied energy, i.e., energy consumed in the production of material, in all materials used and/or running from raw material to installed component.

Microgeneration Certification Scheme (MCS)

The Microgeneration Certification Scheme is an industry-led scheme, developed in partnership with the government and designed to support the development of the microgeneration industry and to drive the quality and reliability of installations. The scheme includes clear standards to support the installation of wind turbines and air source heat pumps.

Meanwhile use

Temporary occupation of land designated for future development.

Mechanical Ventilation with Heat Recovery (MVHR)

Ventilation that supplies outdoor air to the inside of the dwelling and continuously extracts indoor air and discharges it to the outside.

Oriental Strand Boards (OSB)

Refers to Oriented Strand Board and is an engineered wood product made by sheets of timber strands, which are placed on top of each other at 90-degree rotations, and then attached with adhesives, before being bonded with heat and pressure.

Passivhaus

Quality-assured, performance-based set of design criteria and a methodology for very low energy buildings.

Photovoltaic Panels (PV)

Also referred to as solar panels, they are a renewable technology that utilises free energy from the sun to generate electricity. The electricity produced by Solar PV can be used to power anything from an appliance to a light bulb that is usually powered by the mains electrical supply.

ReSolve Framework

Developed by McKinsey and the Ellen MacArthur foundation, the framework provides six actions to transition to a circular economy, namely, Regenerate, Share, Optimise, Loop, Virtualise, and Exchange.

Social rent

Rents set for social housing that are capped annually by the Welsh Government.

Sustainable Drainage Systems (SuDS)

Water management techniques used to reduce the risk of flooding and pollution by mimicking natural drainage to enable the local management of stormwater.

Value Engineering

Systematic approach to providing necessary functions in a project at a lower cost.

Zero Carbon Homes

Zero net emissions from all energy

Zero Carbon Hwb

An all-Wales knowledge-sharing agency set up by the Welsh Government to help developers, residential social landlords, housing associations, and owners reduce the amount of energy and carbon in building and running homes.

1. Introduction

The Innovative Housing Programme, first launched in 2017, was a grant-funding programme to support the housing sector to 'test and learn' from innovations in housing construction and delivery. In total, there have been four iterations of the programme: Year One (calendar year 2017 to 2018), Year Two (calendar year 2018 to 2019), Year Three (calendar year 2019 to 2020), and Year Four (calendar year 2020 to 2021).

The Innovative Housing Programme was developed as part of the Welsh Government's commitment to addressing the housing supply shortage in Wales while also ensuring that the Welsh housing sector leads the way on quality, decarbonisation, and placemaking. The need for innovation in housing delivery to meet this ambition was outlined in Welsh Government-commissioned research, More | Better: an evaluation of the potential of alternative approaches to inform housing delivery in Wales (Green and Forster, 2017), which found that:

> "The Welsh construction industry has access to innovative alternative construction techniques. Alone, these techniques cannot 'solve' the affordable housing crisis. However, combined with similar innovation in housing delivery, they could produce more housing that meets the above aspirations, in terms of building sustainable communities and making better quality homes accessible to households that are currently excluded from them." (Green and Forster, 2017)

As a result, the Innovative Housing Programme was launched in 2017 by the Cabinet Secretary for Communities and Children, who stated in the Welsh Parliament, later that year:

> "I want to see a step change in how housing is delivered. I believe there is an opportunity to adopt a new approach to design and delivery. That's why I launched the […] Innovative Housing Programme to specifically support alternative and new approaches to building houses."

Since its launch, the Innovative Housing Programme has been at the core of the Welsh Government's efforts to support the housing sector in testing and learning which construction methods and designs are best suited to build high-quality, environmentally friendly homes at the scale needed to meet housing demand across Wales. It was also designed to inform the future of Welsh Government housing quality requirements, other grant-funding programmes such as the Social Housing Grant [footnote 1], and contribute to meeting the Welsh Government's housing building targets.

Footnotes

[1] The Social Housing Grant is a housing grant aimed at the development of affordable, low-carbon housing. The scheme is open to Local Authorities and Registered Social Landlords.

Year One (calendar year 2017 to 2018) of the Innovative Housing Programme was open to Registered Social Landlords and Local Housing Associations, including local authority-owned housing companies [footnote 2]. For Year Two (calendar year 2018 to 2019), the scope of the programme was extended to cover market housebuilders (including large housebuilders and small and medium sector enterprises) and other developers (e.g., charities, co-operatives, and individuals). Both iterations of the programme have been evaluated, and the reports have been published [footnote 3]; these reports have been reviewed for this research.

1.1. About the research

In December 2024, the Welsh Government commissioned Alma Economics to undertake research into the lessons emerging from the third year of the Innovative Housing Programme. The aim of this research was to understand the construction lessons learnt from the schemes supported by the third year of the Innovative Housing Programme. The methodological approach included a combination of qualitative interviews, focus groups, and desk-based research on the programme. The fieldwork took place with Registered Social Landlords, Local Housing Authorities, and contractors.

The research was guided by the following research questions:

- what are the construction lessons learnt for schemes in Year Three of the Innovative Housing Programme?
- how do the lessons learnt from Year Three compare to the current findings from Years One and Two?
- how does the development of homes as part of Year Three of the Innovative Housing Programme compare to traditional developments [footnote 4]?
- within Year Three, are there specific challenges or opportunities associated with:
    - methods of construction
    - different types of sites

Footnotes

[2] This first iteration was aligned with the Social Housing Grant, including its monitoring and evaluation requirements.

[3] Evaluation research for prior years, i.e., Year One and Year Two of the Innovative Housing Programme, took place in earlier years, titled ‘Innovative Housing Programme Year One: lessons learnt’ (Ambrose, Archer, and Bimpson, 2020) and ‘Innovative Housing Programme Year Two: lessons learnt’ (Industryline Research, 2025), respectively.

[4] Traditional housing is defined as housing that is made using bricks, and not with the use Modern Methods of Construction.

- are these continued from Year One and Year Three?
- are the projects delivering the outcomes and outputs proposed in the original bids?
- what impact, if any, has the COVID-19 pandemic had on the construction of innovative houses in Year Three?
- has, and if so, how, the increased cost of materials affected the construction of innovative houses in Year Three?
- has, and if so, how, the shortage of materials affected the construction of innovative houses in Year Three?

1.2. Contents and structure of this report

This report focuses on the lessons learnt from Year Three (calendar year 2019 to 2020) of the Innovative Housing Programme. Beginning with an introduction of Year Three of the Innovative Housing Programme, its timelines, eligibility, key innovation themes, and successful schemes (Sections 1.1-1.3), this research then explores key findings from the evaluation of previous iterations of the programme (Section 1.4). These key findings from previous years' research provided key themes for comparison through Year Three of the Innovative Housing Programme as well.

The methodology adopted for this research is then described in Section 2.

The report then covers the key findings of this research, with a focus on key construction findings (Section 3.1). A comparison of traditional and modern methods of construction was also conducted (Section 3.2), alongside an evaluation of wider findings from the research (Section 3.3). Construction findings have been supported by findings from the planning (Section 3.4) and application process (Section 3.5), including a discussion of the experiences of Registered Social Landlords who did not participate in Year 3 of the Innovative Housing Programme.

1.3. Year Three of the Innovative Housing Programme – contents and guidance

In Year Three of the Innovative Housing Programme (calendar year 2019 to 2020), the scope was amended from previous years to facilitate a higher level of innovation than was supported in the first two years of the programme. The programme was once again opened to Welsh Registered Social Landlords and Local Housing Authorities, including local authority-owned companies, and both private sector organisations and social landlords. Applicants were encouraged to submit applications linked to themes, which were linked to other Welsh Government priorities, such as Active Travel or Placemaking, which focused on the creation of active, social, vibrant places that enhance the wellbeing of residents and climate resilience, which focused on schemes being truly zero carbon.

This section expands on Year Three of Innovative Housing Programme, detailing the objectives, funding levels, timelines, and eligibility criterion, among other relevant details

(referenced from the publicly available Innovative Housing Programme – Year Three Guidance (pdf)).

1.3.1. Objectives of the Innovative Housing Programme

The aims and objectives of the Innovative Housing Programme remained similar over time, although they were adapted slightly each year to account for new and more specific policy objectives.[footnote 5] In Year Three, the Innovative Housing Programme's stated objectives were to:

- increase the supply of affordable housing
- align the design and delivery of affordable housing with the seven goals of the Well-being of Future Generations (Wales) Act, 2015
- address cost and value in new homes and develop housing that meets specific current and future housing needs
- provide support for those willing to innovate through the use of alternative approaches
- demonstrate benefits associated with alternative approaches, with a view to encouraging wider uptake
- harness opportunities to deliver jobs, skills training, and develop the local industry
- publicly disseminate key findings and maximise learning
- help to tackle poverty by providing homes that are more energy efficient and cheaper to run
- support wider regeneration and economic development

1.3.2. Eligibility and scheme requirements

As in Years One and Two of the Innovative Housing Programme, funding in Year Three of the Innovative Housing Programme was made available to Registered Social Landlords, Local Housing Authorities in Wales, and private sector developers if the development was located in Wales. Provision was also made for joint public-private bids.

Fundable schemes included new-build homes, conversion of non-residential buildings into housing, and 'meanwhile use' homes, such as repurposing containers. Refurbishment of

Footnotes

[5] Year One of the Innovative Housing Programme aimed to increase the supply of affordable housing and support innovative construction and delivery approaches aligned with the Well-being of Future Generations Act goals. Year Two continued these objectives with a focus on disseminating key lessons, supporting local jobs and skills, and encouraging wider adoption of innovative housing solutions across Wales.

existing homes was not included as part of the Innovative Housing Programme. All applicants had to commit to an open-book approach and participate in robust monitoring and evaluation.

1.3.3. Funding streams

Funding for Year Three of the Innovative Housing Programme was higher than that of Year Two of the Innovative Housing Programme and was provided under three new streams, with the intention to support conceptual ideas that had the potential to become mainstream. These streams were:

- Stream One: Revenue – which provided revenue funding to explore topics such as social innovations, new procurement models, and financial instruments to enable more homes to be built more quickly
- Stream Two: Capital (Themes) – which provided capital funding to support innovation that has not previously been supported by the Innovative Housing Programme. These innovation themes included:
    - tackling youth homelessness
    - innovations in quality design and place-making that incorporated active travel
    - demonstrable ability for innovation to inform the decarbonisation of existing homes [footnote 6], including through community engagement and simple design
    - low embodied energy/carbon [footnote 7] and circular economy
    - zero carbon homes [footnote 8], including accounting for National Grid electricity, having a variable carbon intensity
    - tackling the 'performance gap' between a home designed in theory and one that was constructed
    - improving the resilience and flexibility of homes, such as recovering from natural challenges (e.g., floods) and changing lifestyles (e.g., family size)

Footnotes

[6] Decarbonisation refers to the process of reducing carbon dioxide emissions by upgrading homes (Government of the UK, 2022).

[7] Low embodied energy/carbon refers to low levels of embodied energy, i.e., energy consumed in the production of material, in all materials used, and/or running from raw material to installed component (UK Building Council, 2024).

[8] Zero Carbon Homes are homes with zero net emissions from all energy (UK Government, 2022).

- Stream Three: Capital (Up-scaling) – which aimed to scale previously supported innovations to test their viability at volume, ready to inform the Social Housing Grant and Affordable Housing Grant

1.3.4. Assessment and selection

All applications for funding for Year Three of the Innovative Housing Programme were evaluated by an Independent Assessment Panel against a Technical Specification. The Independent Panel consisted of four experts in architecture and design and was chaired by the Design Commission of Wales. The independent panel scored each application based on its level of innovation and on the potential impact of these innovations on the wider sector. This sought a balance between supporting cutting-edge innovations and promoting innovations that have the potential for wider learning or upscaling across the delivery of housing in Wales.

Throughout this process, reviews by the Design Commission for Wales were made available to applicants at no cost. These sought to refine and improve the design and innovation of their proposals.

1.3.5. Level of funding

Grant levels varied depending on applicant type and tenure:

- Registered Social Landlords and Local Housing Authorities in receipt of no other grant funding could receive:
    - social rent – up to 58% of the costs of land and construction, plus up to 100% of the additional costs relating to innovation
    - intermediate rent – up to 25% of the cost of land and construction, plus up to 100% of the additional costs relating to innovation
    - meanwhile use – up to 58% of total costs, excluding land
- private housing developers could receive up to 100% of the additional costs relating to innovation (with the exact rate decided on a case-by-case basis), but no grant funding for land or base construction costs

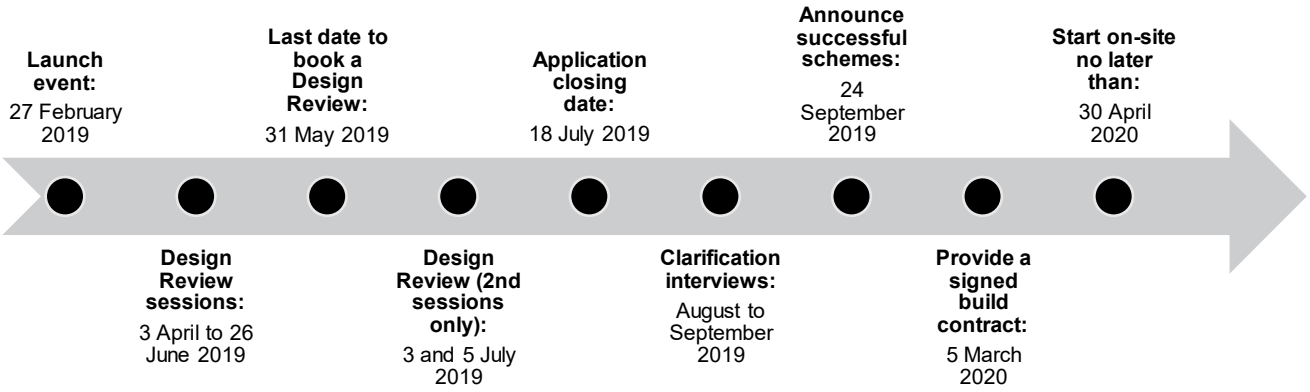
1.3.6. Timelines of the application process

The key timelines of the application process for Year Three of the Innovative Housing Programme funding were as follows:

- a launch event held in February 2019
- Design Review sessions could be booked until 31 May 2019
- Design Review sessions were held between April and July 2019
- the closing date for all applications was 18 July 2019

- clarification interviews for shortlisted schemes were held in August and September 2019
- the ministerial announcement of successful schemes was made in September 2019
- successful social landlords had to provide a signed build contract by 5 March 2020, containing a start on site date no later than 30 April 2020

Figure 1. Timelines of Year Three of the Innovative Housing Programme, February 2019 to April 2020



Summaries of the main types of innovations explored in Year Three of the Innovative Housing Programme are provided below.

1.3.7. Modern Methods of Construction

The Welsh and UK Governments use the definition framework for Modern Methods of Construction created by the Ministry of Housing, Communities and Local Government Joint Industry Working Group (Cast Consultancy, 2019). The framework involves 7 categories, with the first being fully volumetric modules (e.g., entire 'shells' of homes built in a factory and delivered by crane), the second being panelised systems, and categories 3-7 being non-structural elements. Year Three of the Innovative Housing Programme involved significant use of Category 2 of the Modern Methods of Construction – for example, producing timber panels in a factory, which were then transported and assembled on the construction site. This approach can be quicker, less labour-intensive, improve quality control, and cut down construction waste. As a result, Modern Methods of Construction is a central component of the Welsh Government's strategy to increase the supply of social housing and was the primary focus in Year Four of the Innovative Housing Programme (detailed in the Welsh Government Year Four guidance published in 2020).

1.3.8. Renewable energy generation

Many schemes utilised solar photovoltaic panels (also referred to as PVs or solar panels) on the roofs of homes, and some combined these with batteries to store electricity within the home and provide locally produced renewable energy throughout the day-night cycle. Some schemes that combine renewable energy generation methods with battery storage were referred to as 'Homes as Power Stations'.

1.3.9. Low-carbon heating and ventilation

Many schemes in Year Three of the Innovative Housing Programme used low-carbon heating solutions, such as air-source heat pumps, ground-source heat pumps, or wall-mounted electric radiators, to heat homes more efficiently. These were often combined with on-site renewable energy generation methods. Some schemes used Mechanical Ventilation with Heat Recovery systems, [footnote 9] which exchange stale air from within the home with fresh air from outside while minimising heat loss and filtering out pollutants, allergens, and dust particles.

1.3.10. Fabric-first approaches

Fabric-first approaches refer to ensuring the 'fabric' of a home, i.e., the walls, roof, floors, windows, doors, and insulation, is highly air-tight and well-insulated. This reduces the demand for heating systems and can significantly increase the efficiency of low-carbon heating systems [footnote 10]. Because of this, the Welsh Government is committed to a 'fabric-first approach', which means investing in the insulation and airtightness of homes as a precursor to installing renewable energy generation solutions. This principle underpins globally recognised standards like Passivhaus [footnote 11], which achieve near-zero heating demands through ultra-insulated, airtight envelopes.

1.3.11. Low embodied carbon

Low embodied carbon refers to prioritising materials that produce minimal carbon emissions during extraction, production, and transport, such as sustainably sourced timber (replacing carbon-intensive concrete and steel), and recycled or natural insulators, such as wood fibre and sheep's wool. This approach directly reduces upfront construction emissions while

Footnotes

[9] Mechanical Ventilation with Heat Recovery refers to mechanically-driven ventilation that both continuously supplies outdoor air to the inside of the dwelling and continuously extracts indoor air and discharges it to the outside (Government of the UK, 2022).

[10] This is because many low-carbon heating systems heat water (for radiators, underfloor heating, etc.) to a lower temperature than traditional high-carbon heating systems (air source heat pumps, for example, heat water to between 35°C and 55°C, while gas boilers heat water to around 70°C). If a home is well-insulated and air-tight, low-carbon systems can be very efficient; however, these systems may struggle to sufficiently heat poorly insulated and/or draughty homes (Welsh Government, 2023).

[11] Passivhaus is a quality-assured, performance-based set of design criteria and a methodology for very low-energy buildings. The aim is to eliminate the need for space heating and cooling, based on the principle that reducing heating loss to a minimum is the most cost-effective and robust way of achieving a low-carbon building. The key design features include a simple compact shape, optimisation of passive solar gain, super insulation and minimal thermal bridging, stringent levels of airtightness, and mechanical ventilation with heat recovery (Government of the UK, 2022).

tending to support efforts to reduce the carbon produced by those living in a home, the Dwelling Emissions Rate [footnote 12].

1.3.12. Innovative procurement methods

Innovative procurement methods refer to novel ways of procuring materials or construction teams for a development. For example, some projects successful in the Innovative Housing Programme were constructed by in-house teams within local authorities or Registered Social Landlords, enabling the upskilling of in-house workers in innovative methods [footnote 13]. An example is the project Hillview and Beaconsview (elaborated further in the following Section 1.3), where panels were produced in-house.

1.3.13. Placemaking and redevelopment

Placemaking focuses on creating vibrant, sustainable, and active communities by strategically enhancing green spaces, promoting walkability and other forms of active transport, and ensuring easy access to local amenities. Some schemes in Year Three of the Innovative Housing Programme focused on enhancing the wellbeing of its residents and fostering environmental sustainability.

Notably, all schemes under Year Three of the Innovative Housing Programme focused on more than one innovation and sought to integrate several innovations simultaneously. For example, many combined the use of Modern Methods of Construction with renewable energy generation, low-carbon heating, and fabric-first approaches to produce highly energy-efficient homes.

Footnotes

[12] Refers to the actual CO2 emission rate of self-contained dwellings and individual flats (Ashby, 2021).

[13] Typically, Registered Social Landlords and Local Housing Authorities work with external contractors to construct homes; however, some developments successful in Year Three of the Innovative Housing Programme employed in-house teams for construction.

1.4. Developments that received funding in Year Three of the Innovative Housing Programme

The innovations outlined in the previous sub-section were utilised in a series of innovative construction and design approaches. Eight developments across Wales received funding in Year Three of the Innovative Housing Programme [footnote 14]. In order to preserve the anonymity of research participants, only publicly available information included in the summary of funded schemes in Year Three of the Innovative Housing Programme is reproduced below – including summaries provided by developers in their applications:

Swansea Council - Hillview & Beaconsview

“The project will focus on 3 levels of innovation – firstly, developing a high energy-efficient Swansea Standard, which is adaptable and can be combined with renewable integrated or bolt technologies as part of the City Deal Homes as Power Stations project. Secondly, the projects will be delivered by innovative procurement methods, delivered in-house, promoting upskilling and creating local employment and training opportunities, and thirdly, the project will prove a test bed for growing the supply chain to provide innovative low-cost low-carbon homes at scale. Swansea Council has a strong commitment to low-carbon or zero-carbon homes, and with the development being built in one of the most deprived areas in Swansea, eliminating fuel poverty is a key driver for new housing developments.”

Flintshire council - Marleyfield House Expansion

"This development will support residents to live with access to state-of-the-art therapeutic support, with both social care and health service staff all working together. The innovative layout and spacing of the building will inform and support the innovative operational model.
An exemplar model of how GPs support residents in Care Homes will be developed, and Flintshire County Council are working alongside Betsi Cadwaladr University Health Board (BCUHB) to develop a solution that will ensure that residents receive timely and consistent care from all services. Having the entire cohort of newly discharged residents in a centralised is an innovation that will support both recovery and efficiency in service delivered. With access to outdoor space, the proposed designs encourage users to be in, and move around, the outdoor space. Internally, spaces support both operational delivery and resident usage. All rooms will have ample daylight and will not be overlooking by others."

Footnotes

[14] One other development was selected as an Innovative Housing Programme Year Three project, but this development was cancelled and funding not provided by the Welsh Government.

First Choice Housing Association - Health and Well Being Flexi Homes

"The proposed fabric-first construction programme/timescales provides a rapid response to housing need and the flexibility of providing accommodation tailored to the individual. Quick responses allow those with physical disabilities to remain in their homes and live in suitable accommodation when in need. The design offers both permanent and temporary solutions to existing and proposed developments and provides retrofit opportunities to meet the needs of the identified tenant. Panelised or modular units manufactured off-site can be easily transported for rapid erection, minimising any disruption to the existing property and its tenants. The design offers scalability in the form of multiple units being clustered together or stacked on top of each other dependant on Local Authority requirements. The revenue element of the bid provides a unique research and development programme that enables the project team, utilising BIM [Building information modelling] [footnote15], to develop standardised components with the flexibility to react to situational change."

Monmouthshire Housing Association - Bulwark

"Innovation is across a number of themes. The project transforms blighted places, enhancing the wellbeing of residents. Site selection and location promote active travel, and using courtyard principles enables these very constrained sites to be developed to a density of 30-40 dwellings per Hectare – commensurate with the principles of the original Bulwark Garden Village. The introduction of house types supporting different tenure types reinforces integration of different uses. Dwellings are designed to be 'long-life' in that they have the capacity and technology to absorb changes to household numbers with the easy addition of a second bedroom. The project will eliminate the use of fossil fuels through the use of a combination of air-source heat pumps and photovoltaics. This will be backed up by a robust long-life building envelope to Passivhaus standards of insulation. They will develop the circular economy by applying the ReSOLVE framework to promote the idea of a circular economy."

Cardiff Council, Wates Residential and Sero Energy - Eastern High School

"Using the same innovation as the Parc Eirin (Innovative Housing Programme 2018, £7.6m) project, but with new delivery and financial pathways to help transition to scale. The approach to low-carbon technology, customer experience, intelligence, and electricity network support is integral to this project. The core

Footnotes

[15] Building Information Modelling. Building Information Modelling is a process that encourages collaborative working between all the disciplines involved in design, construction, maintenance, and use of buildings (Construction Industry Training Board, n.d.).

innovation is structuring financial options that give residents and homebuyers the best chance of buying a home by educating the market on value, attracting and piloting new green finance initiatives, and offering alternative long-term funding routes.
A second innovation will demonstrate how higher-density buildings like flats and apartments can be designed and operated to provide greater energy benefits to residents. The homes on the project will resemble a microgrid in their operation, with the Distribution Network Operator taking responsibility for the network up to each home. Demonstrating a greater saving in energy will enable greater recovery of capital costs on future schemes."

Pobl Group [footnote 16] - Gwynfaen

"Gwynfaen, an upscaling from earlier rounds of Innovative Housing Programme projects. 165 homes will provide local supply chain opportunities to achieve economies of scale for the materials and components necessary to achieve Zero Carbon homes. Whole Market Approach mixed-tenure development is an important innovation on-site, creating balanced communities. All homes are targeting same standards of SAP [Standard Assessment Procedure] 96+ and EPC [Energy Performance Certificate] Rating of 'A' [footnote 17], broadening the availability of Zero Carbon homes on the open market. This innovation will transform perceptions of customers, normalising the technology across all tenures. The superstructure of homes will use a Fabric-First panelised approach with integrated renewable technologies and battery storage. The use of natural materials will help us to reduce the carbon emissions associated with the construction phase of the home, which can amount to as much as 50% of the carbon emitted over the lifetime of the home."

Linc Cymru - The Cascade

"The development is a seven-storey main block and four storey secondary block featuring vertical sky gardens, vertical greening, bio-solar blue/green roof, and integrated SuDS [sustainable drainage system] [footnote 17] system using CLT [cross laminated timber] [footnote 18] to the main block and Cemfree piling. The project provides commercial retail space and 46-48 one-bedroomed flats. The entire block is constructed of CLT [cross laminated timber] with horizontal and

Footnotes

[16] Although Pobl Group and Coastal submitted a joint development bid for the Programme, this scheme was subsequently developed by Pobl Group.

[17] Sustainable Drainage System.

[18] Cross Laminated Timber. It is a product made up of small timber sections that can be formed into large structural panels, which are light, stable, and strong. It provides a sustainable resource as it is made out of a renewable material (Considerate Constructors Scheme Best Practice Hub, n.d.).

vertical greening; residents have access to tend these areas if desired, with three communal terraces, each of which has its own unique identity and use. The City Road entrance leads into a living passage, which links to a courtyard garden for the residents of the block to Vere Street and access to the ground floor flats. This will be the first CLT [cross laminated timber] tower in Wales and with vertical sky gardens and external greening in the UK."

Cartrefi Conwy - Glanrafon

"Cartrefi Conwy/Creating Enterprise have delivered an advanced manufacturing facility but want assistance to upscale and transition to a new purpose-built 1,500m2 production and training facility, which will be established, built to Beattie Passive's Passive Plus performance standard, using renewable energy to power not only the building but the production equipment. It will achieve agile manufacturing through an innovative blend of automation and human labour to produce a wide variety of new dwellings and retrofit packages using combinations of volumetric, panel, and frame components. Delivering high-performing, carbon-positive Beattie Passive homes at scale and pace. To create a replicable, active-learning-based innovative partnership venture model amongst multiple social housing providers with Beattie Passive, using local supply chains and providing accessible and sustainable job opportunities that stay ahead of the curve and deliver the best homes for Wales."

1.5. Previous research – lessons learnt from Year One (calendar year 2017 to 2018) and Year Two (calendar year 2018 to 2019) of the Innovative Housing Programme

As introduced in Section 1.1 above, evaluations were undertaken into lessons learnt from Year One and Year Two of the Innovative Housing Programme. This report will make comparisons to these findings. The key findings from each report have been summarised below.

1.5.1. Summary of findings from the lessons learnt from Year One report

The report on lessons learnt from Year One of the Innovative Housing Programme (calendar year 2017 to 2018) (Ambrose, Archer, and Bimpson, 2020) included in-depth interviews with representatives involved in 16 of the 18 projects funded in Year One of the Innovative Housing Programme. The report aimed to gain insight into the early construction messages emerging from the Innovative Housing Programme, covering aspects such as planning processes, construction challenges and benefits, costs, materials, as well as delivery timescales. Limitations of this research acknowledged by the authors include amendments to research methods due to challenges posed by coronavirus (COVID-19) and an inequitable distribution of interviews across successful schemes; these have been detailed in Section 2 of the Year One Report.

Key findings of this research included:

Planning

Innovative Housing Programme-funded schemes received some goodwill from planning committees, with local planning officials and committees broadly welcoming the underlying goals of the Innovative Housing Programme. The report highlighted challenges in gaining planning permission due to the unconventional appearance of some innovative schemes.

Supply chain

Developers faced supply-chain challenges that affected multiple schemes in Year One. This was due to a lack of experience engaging with these materials, which led to the identification of suitable partners requiring substantial work. Materials often travelled extensive distances. The research also found that developers recognised that, in hindsight, suitable contractors and supplies could be found in Wales with more preparation.

There was concern regarding a "performance gap", especially for Passivhaus homes, which may affect tenant satisfaction and incur higher longer-term costs for Registered Social Landlords and local authorities. This means that while construction partners were enthusiastic to continue delivering innovative schemes, the report found that developers leading these schemes felt that they were unlikely to repeat the more innovative construction approaches they had trialled and, therefore, placed fewer innovative bids for Year Two funding. However, modular methods were felt by interviewees to cause the fewest complications.

Economic challenges and financial considerations

It was widely reported that the Innovative Housing Programme schemes had cost more to build than traditional methods, with many also reporting that these costs were more unpredictable. Innovative Housing Programme funding was therefore crucial to supporting these innovative approaches.

Innovative Housing Programme schemes in Year One were beginning to change perceptions and ways of working, with evidence of developers readying themselves for the mainstreaming of approaches trialled through the Innovative Housing Programme.

Workforce

Developers strived to identify suitable contractors operating locally or at least within Wales, but time constraints limited efforts to find suitably skilled contractors locally. These difficulties were most pronounced in relation to the more specialist construction approaches, such as Barnhaus [footnote 19], Passivhaus, and the use of shipping containers.

Footnotes

[19] Barnhaus refers to design approaches for homes that integrate traditional agricultural barns with modern functionality, typically through self-build or custom housebuilding (Tallbox, n.d.).

Many of the workforce problems reported were not specific to the Innovative Housing Programme and relate to the need for the design and construction industries to rapidly upskill. However, the tight timescales associated with the Innovative Housing Programme in its first year reduced the amount of time available to identify suitable local partners.

1.5.2. Summary of findings from the lessons learnt from Year Two of the Innovative Housing Programme

The research on lessons learnt from Year Two of the Innovative Housing Programme (Industryline Research, 2025) included 33 in-depth interviews, spanning both individual and group sessions, with representatives from 23 funded schemes from Year Two of the Innovative Housing Programme. Findings from the interviews were triangulated with quantitative data analysis using monitoring data available for 13 schemes. Limitations of this research acknowledged by the authors include limited contractor engagement, gaps in monitoring data across all participating schemes, and the use of cost and monitoring data at early stages of the project, thereby impacting accuracy. These are detailed in Section 7 of the Year Two Report.

Key findings of the research included:

Planning

Local authority planners were generally receptive to innovative approaches proposed by developers, viewing them as integral to modernising the housing landscape. This acceptance was attributed to the alignment of the Innovative Housing Programme with broader policy goals aimed at enhancing housing quality and sustainability, supported by government initiatives promoting Modern Methods of Construction.

Specific regulatory challenges were more pronounced in rural areas with “stringent planning restrictions”. For example, some developments faced limitations in increasing property numbers due to existing settlement regulations. This highlighted the need for updates in planning guidelines to accommodate innovative designs.

Supply chain

Developers frequently encountered difficulties with supply chains for specialist materials. These difficulties posed risks to construction timelines and costs. The challenges were particularly pronounced in projects that adopted new construction methodologies like Passivhaus, for which materials often had to be sourced internationally, thereby increasing costs and complexity.

Economic challenges and financial considerations

The financial challenges of innovative developments were substantial, with higher initial costs and potential unexpected expenditures. Innovative Housing Programme funding was crucial to providing the necessary financial backing to bridge these gaps. Developers noted that Innovative Housing Programme funding enabled them to trial new methods and technologies that they would otherwise have avoided due to financial risks.

Workforce

There was a scarcity of skilled labour capable of installing and maintaining innovative technologies. This shortage necessitated training programmes to upskill the local workforce and internal maintenance teams. Developers had to invest in training to ensure that their teams could manage the new technologies effectively.

Partnerships with construction firms specialising in innovative builds were crucial to reducing workforce-related issues. These firms brought pre-established teams skilled in contemporary construction techniques, which facilitated the integration of innovative practices.

The subsequent sections of the report present findings from the present research into Year Three of the Innovative Housing Programme. To begin with, the research methodology for Year Three of the Innovative Housing Programme (Section 2) is detailed, followed by findings from the research (Section 3). Findings are organised according to the construction process (Section 3.1), comparison of traditional and innovative construction methods (Section 3.2), and other wider construction findings (Section 3.3). The construction findings are followed by findings from the planning process (Section 3.4) and application process (Section 3.5).

2. Methodology

This section focuses on the methodology undertaken to conduct research into the lessons learnt from Year Three of the Innovative Housing Programme. Alma Economics began research on Year Three of the Innovative Housing Programme in January 2025, concluding fieldwork in July 2025. The methodology followed was a combination of qualitative interviews, focus groups, and desk-based research on the programme. The research methodology was broken down into four stages:

- stage 1: scoping and review of documentation
- stage 2: fieldwork
- stage 3: thematic analysis
- stage 4: reporting

2.1. Stage 1: Scoping and review of documentation

Scoping discussions with four key stakeholders were conducted between January 2025 and March 2025 to provide a broader understanding of the context and implementation of the Innovative Housing Programme across all three years, as well as early insights into the challenges and successes of the programme in the third year. These discussions were useful for learning the strengths and limitations of available monitoring data.

These discussions were conducted with Welsh Government officials who were involved in the design and implementation of the Innovative Housing Programme, as well as the current Chair of the Design Commission for Wales.

2.1.1. Review of evidence

During the evidence review stage of the project, a desk-based review of relevant documentation and monitoring data was conducted. Documents reviewed included the Guidance for Year Three of the Innovative Housing Programme (pdf), policy documents, full bids of successful Year Three applicants, and monitoring data and reports. This also included a detailed review of the Year One (Ambrose, Archer, and Bimpson, 2020) and Year Two reports (Industryline Research, 2025).

While the guidance from Year Three of the Innovative Housing Programme helped construct the policy context for the scheme, a review of the previous ‘lessons learnt’ reports enabled an understanding of the development of the Innovative Housing Programme scheme over time and the experiences of participating developers. This further helped the development of initial themes and sub-themes, which underpinned the fieldwork tools. A review of successful bids led to a comprehensive understanding of each of the developments funded under Year Three of the Innovative Housing Programme, which assisted in the development of the research sampling frame and fed into the recruitment strategy for the fieldwork.

2.2. Stage 2: Fieldwork

During this stage, a total of 16 interviews and one focus group were conducted. Developers and contractors of all 8 developments that received funding in Year Three of the Innovative Housing Programme were engaged through the fieldwork for insights on their experience with various aspects of the Innovative Housing Programme Year Three, including planning, application processes, and construction findings. Registered Social Landlords who were unsuccessful for Year Three of the Innovative Housing Programme (calendar year 2019 to 2020) but participated in the subsequent Year Four (calendar year 2020 to 2021) of the Innovative Housing Programme were also engaged during this stage. They provided insights on barriers faced in their application process for Year Three of the Innovative Housing Programme.

2.2.1. Preparation of fieldwork tools

Fieldwork tools were developed for use in Stage 2, including bilingual discussion guides for interviews and the focus group, privacy notices, and terms of participation. Details are included in Section 6: Annex.

2.2.2. Stage 2a: Interviews with developers and contractors

Requests for interviews were sent out to 18 developers and contractors [footnote 20] who had received grant funding via Year Three of the Innovative Housing Programme. This recruitment was conducted in phases, with invitations being sent out to developers of the various projects funded under Year Three of the Innovative Housing Programme. Following this outreach, invitations were extended to contractors. In cases where there were delays or challenges in recruiting contractors, interviews were snowballed through the initial engagement with developers and with outreach support from the Welsh Government team. Participation invites were sent to more than one representative per funded project to collect comprehensive insights and feedback for each development.

A total of 14 interviews with developers and contractors across all 8 projects that received funding through Year Three of the Innovative Housing Programme were conducted. A total of 3 interviews were conducted with developers and contractors of Eastern High School, and The Cascade, and 2 interviews were conducted with developers and contractors of Gwynfaen farm and Glanrafon. All other projects were engaged through one interview each, and these were conducted with developers of the respective projects.

Footnotes

[20] Representatives of the Registered Social Landlords, Local Housing Associations, and contractor organisations who were engaged during the research typically held roles such as project manager, development officer, and planning and development officer, and were well-versed with the projects.

2.2.3. Stage 2b: Focus group with repeat developers

One focus group was conducted with repeat Innovative Housing Programme participants, i.e., developers who received programme grant funding for more than one year of the Innovative Housing Programme. The focus group aimed to test findings from the previous stages of the research, seeking areas of commonality and differences. This enabled the collection of insights on lessons across multiple years of the Innovative Housing Programme, allowing us to identify and validate cross-cutting themes.

The focus group was held in June 2025 with developers. Participation invites were sent to 7 organisations, with at least 5 confirmed to attend. However, due to last-minute dropouts and scheduling conflicts, only 3 repeat Innovative Housing Programme funding recipients attended the focus group.

2.2.4. Stage 2c: Interviews with developers who did not participate in Year Three

In Stage 2c of the research, interviews were conducted with developers who did not participate in Year Three of the Innovative Housing Programme, to explore barriers that may have prevented developers from participating and insights on how these barriers could be overcome.

Invitations to participate were sent to the following types of organisations: (i) developers who received funding in Year One and/or Two of the Innovative Housing Programme but were not successful for Year Three funding, and ii) developers and Registered Social Landlords who develop housing but have not bid for Innovative Housing Programme funding across any of the four years.

Interviews were conducted in June and July 2025 with 2 developers who did not receive funding in Year Three of the Innovative Housing Programme. Both developers have been successful in Year Four of the Innovative Housing Programme.

Limitations of this research

Limitations of fieldwork include the following:

Only 2 interviews were conducted with Registered Social Landlords who did not participate in Year Three of the Innovative Housing Programme. Accordingly, given the limited sample size of the participants for this, findings from engaging this group (primarily related to their experiences detailed in Section 3.6) may be less comprehensive than others and should be treated as anecdotal

Similarly, there was no engagement with some authorities involved in some of the schemes of Year Three of the Innovative Housing Programme, such as the Local Highways Authority. However, it is to be noted that the authorities that were not engaged were only involved in a minority number of applications, with their involvement being discussed by participants during the fieldwork

2.3. Stage 3: Thematic analysis

The project team systematically analysed the fieldwork findings, synthesising findings from all the stages of research.

The fieldwork was analysed inductively, with a pre-determined set of themes being identified before analysis began. These themes were then revised at later stages to update with unexpected themes that arose during the rest of the fieldwork. Thematic analysis was also based upon the themes identified in the previous reports for Year One and Year Two of the Innovative Housing Programme, the wider literature reviewed during Stage 1, and from focus group findings.

The analysis enabled in-depth and detailed comparisons to be made between the experiences of developers over a range of aspects, including by method (e.g., Modern Methods of Construction or traditional methods), innovative gaps and themes (e.g., placemaking, net-zero homes, etc.), respondent type, and developments in rural or urban areas. This also permitted comparisons across the different years of the programme.

2.4. Stage 4: Reporting

The English and Welsh versions of the report include the results of our fieldwork and analysis, which are described in detail in subsequent sections.

3. Findings

Findings relate to a range of aspects, including those from the construction process, planning process, and application process. Specifically, this section includes findings that can be categorised as follows:

- key findings from the construction process
  Section 3.1 details six key construction findings raised by participants of this research and relate to their experiences with construction under Year Three of the Innovative Housing Programme

- comparison of traditional and innovative methods of construction
  Section 3.2 includes an analysis of interviewees' experiences of how innovative methods compared with traditional methods, in relation to speed of construction, overall cost, ease of accessing materials, waste produced, and local or community perceptions

- other wider findings
  Section 3.3 details a range of wider findings from interviews, including findings around the potential for mainstreaming innovative methods, impacts of the COVID-19 pandemic, and insights from formal evaluations conducted by participants of Year Three of the Innovative Housing Programme. In this section, insights from participants on their experiences in the absence of the Innovative Housing

Programme Grant have also been detailed. Participants in their experience in the absence of the Innovative Housing Programme Grant have also been detailed

- the planning process
  Section 3.4 examines lessons learnt from navigating the planning system

- the application process
  Section 3.5 details the experiences of Registered Social Landlords in bidding for Year Three of the Innovative Housing Programme. In this section, the experiences of Registered Social Landlords that did not receive funding in Year Three of the Innovative Housing Programme have also been discussed

Each sub-section has been organised by findings that were commonly or frequently raised by research participants, and in cases where views were raised by a minority set of participants, this has been specified. Findings have also been classified by type of research participant (i.e., developers and contractors) to detail nuanced experiences among the developers and contractors that took part in Year Three of the Innovative Housing Programme.

3.1. Key findings from the construction process

This section focuses on the experiences of developers and construction partners during the construction process of their innovative development. The main findings from the construction of schemes within Year Three of the Innovative Housing Programme funding have been identified. These findings related to the relationship between developers and contractors (section 3.1.1), challenges around the construction skills deficit (section 3.1.2), the timelines of modern methods of construction (section 3.1.3), access to innovative materials and technologies (section 3.1.4), engagement with relevant authorities (section 3.1.5), and trialling innovative methods (section 3.1.6).

3.1.1. Relationship between developers and contractors

Throughout this research, both the serious construction challenges and examples of best practice raised by interviewees were directly related to the effectiveness of relationships between developers and their main contractors and subcontractors. The relationship between contractors and developers is important for housing developments that use contracting, but many interviewees suggested it can be especially important for innovative developments for the following reasons:

- unexpected design challenges are more likely to arise when trialling an innovative technique for the first time, and dealing with these can test – or strengthen – the relationship between construction partners

- implementing innovations requires developers to look further afield for contractors with the right experience and skills.

    - this can require building new, trustworthy, and collaborative relationships with contractors over larger geographical distances

- innovations require multiple contractors when previously one was sufficient, for example, requiring one contractor to install a roof and another to install solar panels.
    - this can lead to more relationships to manage and the risk of delays in one contractor's work impacting others ('programming challenges')

Pillars of successful partnerships between developers and contractors

On majority, the examples of successful partnerships raised by participants emphasised the importance of longer-running relationships between a main contractor and a local housing authority or housing association. Some of the Innovative Housing Programme applications were co-produced by developers and their main contractors, with the contractor already identified in the Innovative Housing Programme Year Three funding application.

> "We'd already appointed a construction partner, architect, and internal teams with skills and knowledge. So, it was a team effort to pull all the information together. […] Both the construction partner and the architect themselves were part of the project team from the beginning." (Developer, Interview)

> "The bid was a collaborative bid with [main contractor]. So, it was very much put together as a partnership arrangement with [main contractor] and a lot of input from the architects." (Developer, Interview)

Across all types of developer-contractor relationships, but especially in new relationships between developers and new contractors, representatives of Registered Social Landlords and Local Housing Authorities spoke of contractors who worked proactively to build trust. The importance of a "can-do attitude" (developer) was also raised by some interviewees.

In some schemes, developers highlighted the specific expertise their main contractor possessed in a particular innovation as a key factor behind the success of their development. Developers felt that by partnering with a knowledgeable and experienced contractor, they were able to learn from the scheme and upskill their organisation. Relatedly, some developers also highlighted the strong supply chains available to experienced contractors and the strength of contractors with in-house capabilities, which allowed projects to be delivered on time in the challenging circumstances of the COVID-19 pandemic and inflation and supply chain disruption following the Russian invasion of Ukraine.

Challenges caused by less effective partnerships between contractors and developers

As discussed above, some developers felt the need to identify and work with contractors whom they had not worked with previously, due to the lack of experience and expertise to deliver innovations within their usual pool of contractors. While working with new contractors created new and strong partnerships that continue into future work (and interviewees provided examples of this), these new and untested partnerships can also cause challenges.

> “To be open with you, [the innovation] was probably the key factor [behind challenging relationships with the main contractor]. We had such a limited field to begin with. We didn’t know them [main contractor] and they didn’t know us.” (Developer, Interview)

Participants from Registered Social Landlords and Local Housing Authorities raised the challenge of working with contractors who did not understand that all innovations were an essential and uncompromisable part of the design. These contractors were described as somewhat dismissive of design consultants or of trying to take shortcuts. As the delivery innovations were central to continue receiving funding in Year Three of the Innovative Housing Programme, the programme was occasionally used as a tool to ensure construction partners remained committed to delivering the high levels of innovation that were committed to in the application. As noted by an interviewee:

> “We took what could be called a 'nuclear' option by terminating the then [sub-contractor] and engaging with another who we knew had the right attitude.” (Contractor, Interview)

There was general agreement among participants that innovative developments can require the involvement of more subcontractors than traditional developments. For example, the installation of a ground-source heat pump [footnote 21] requires specialist drilling or groundworks subcontractors to bore deep vertical holes, potentially other contractors to lay extensive horizontal pipe networks underground, and another contractor to install the heat pump itself. Alternatively, while installing a traditional roof may be done by one contractor, installing a roof that incorporates solar photovoltaic panels may require a second contractor to be involved. These added roles increase coordination complexity, especially in tightly scheduled projects, and therefore require experienced project managers and detailed programming plans to avoid delays. A longer-term solution identified by interviewees is for contractors to offer integrated ‘whole-package’ services, such as a single contractor able to conduct both roof installation and the fitting of solar photovoltaic panels [footnote 22]. They felt this approach reduces the need for multiple subcontractors and streamlines project delivery. According to interviewees, such bundled offerings are becoming increasingly common across the industry and are significantly more accessible at the time of writing than when Innovative Housing Programme construction began in 2020.

Footnotes

[21] Ground-source heat pumps transfer energy from the natural heat stored in the earth to heat the home and domestic hot water. They can also be used to augment existing heating systems in the same way as solar panels (HMRC, April 2016).

[22] A solar photovoltaic system is a renewable technology that utilises free energy from the sun to generate electricity. The electricity produced by a solar PV can be used to power anything from an appliance to a light bulb that is usually powered by the mains electrical supply (Monmouthshire Housing, n.d.).

> "The solar panel install is under the same contract as the roof because we are using the [business name] system, and they only allow their registered installers to install it [a roof with solar panels]. I think, in a new build circumstance, it's a brilliant way of doing it because you put the two of them in together – your roofing contract is then also your PV installer." (Developer)

Some interviewees also noted that involving a greater number of subcontractors can make it more difficult to resolve issues identified after project completion. In particular, a few interviewees cited instances of misalignment in relation to problems with heating systems. In these cases, separate contractors were responsible for different elements, such as the renewable heating technology, pipework, plumbing, and electrical systems, and each reported that their own installation was functioning correctly, making it difficult to identify the root cause of the problem. This issue was seen by some interviewees as more pronounced in housing developments compared to apartment blocks. In flats, building services are often designed and overseen by a specialist mechanical and electrical engineer, who ensures better integration and coordination across systems. These interviewees felt that the presence of a dedicated engineer provided clearer accountability and system oversight, reducing the likelihood of fragmented responsibility and facilitating quicker resolution of post-occupancy issues.

Finally, although largely unrelated to Year Three of the Innovative Housing Programme, the financial pressures of COVID-19 and the subsequent inflation spike led some contractors to face insolvency. While the vast majority of contractors were supported by the Welsh Government, the main contractors of 2 developments under Year Three of the Innovative Housing Programme became insolvent, resulting in on-site delays and challenges in ensuring that subcontractors were paid on time.

Approaches taken to effectively procure and manage contractors

Interviewees highlighted a series of steps they had taken to procure and manage contractors in more effective ways, which included:

- using experienced project managers for innovative developments.
    - it was stated that experienced project managers can anticipate and mitigate programme challenges related to having multiple contractors or new subcontractors
- working with contractors from an early stage (even pre-application) to ensure buy-in to the innovations proposed and a more effective design stage
- making use of the detailed data collection systems, which were required for Year Three of the Innovative Housing Programme, to determine the cause of 'performance gaps' or poorly performing systems

3.1.2. Challenges around the construction skills deficit

The sector-wide shortage of skilled construction workers, especially workers with net-zero construction skills (a key lesson learnt over the previous iterations of the Innovative Housing

Programme), impacted some developments in Year Three of the Innovative Housing Programme. However, interviewees who raised this issue also identified positive developments on this topic, due to workers and businesses investing in net-zero skills, such as training on installing heat pumps [footnote 23].

> "You may have plumbers who know how to install gas boilers inside out who are starting to dip their toes in the renewable installation waters. So, we needed Air Source Heat Pumps on the site. They'd go on a training course to learn how to do it, but it was their first time [when delivering the Year Three of the Innovative Housing Programme scheme], and maybe they learned a few things along the way. Maybe they were pulled up in areas because something wasn't quite right. But by the next scheme, they will be that much better. We've all got to start somewhere, but we're seeing those new people coming into the market now." (Developer, Interview)

Some developers were more concerned about the shortage of training and accreditation among some installers of renewable energy technologies.

> "We ended up with a Ground Source Heat Pump installer who won the tender – who won the tender in a fair tender process. I wasn't part of the tender process at the time. He was potentially qualified, and passed whatever the quality questions were, but the people he had on-site were certainly not." (Developer, Interview)

One developer argued that further efforts should be made to ensure that workers within organisations are trained and accredited to install renewable energy technologies, thus going beyond the organisation-level accreditation currently offered by the Microgeneration Certification Scheme [footnote 24].

> "Originally, you didn't have anything for gas [accreditation], and then the CORGI [Council for Registered Gas Installers] register [footnote 25] came in. So, all your installers were registered with CORGI and they were tested and they were examined – and it was very similar with electricals through the EIC [Electrical

Footnotes

[23] While funded schemes in Year Three acknowledged the sector-wide shortage of skilled labour – a key area of focus for the previous years of the Innovative Housing Programme – by Year Three the sector seems to have developed more confidence in the sector's ability to upskill.

[24] The Microgeneration Certification Scheme is an industry-led scheme, developed in partnership with the government and designed to support the development of the microgeneration industry and to drive the quality and reliability of installations. The scheme includes clear standards to support the installation of wind turbines and air-source heat pumps (Planning Portal, n.d.).

[25] The CORGI register was the official registration body for gas installers in the UK from 1991 to 2009. It was then replaced by the Gas Safe Register.

> Installation Certificate]. With the renewable side of things, you've got the MCS [Microgeneration Certification Scheme] Accreditation – but the company can be MCS Accredited, there's nothing to say the installer is. There's no qualification for that installer to have to say: 'Yes, I can fit an air-source heat pump, and if it isn't fitted correctly, I can tell you why and what we need to change and how to change it.' That's what I think personally is still lacking." (Developer, Interview)

Another solution suggested by participants (across participant types, i.e., including both developers and contractors) to the construction skills shortage is to raise the productivity of the housebuilding sector, so that the same workforce can deliver homes at a greater scale and pace. Some participants suggested that Modern Methods of Construction could deliver more homes, more quickly, and to a higher quality, without increasing labour demands. On the other hand, it was also noted that when first working with such methods, some workers, including Quality Assurers, will require new training. One developer explained that they had produced a training package available to all social landlords on the Zero Carbon Hwb [footnote 26] Modern Methods of Construction.

> "MMC is one of the ways of counteracting the 'performance gap' so you don't get mistakes on-site. But it's also a method of construction which counteracts another phenomenon, which is the shortage of skilled labour. Since Brexit, Covid (COVID-19), and some of the other things that have hit us since 2020, [a lack of] skilled labour has become a greater problem than the increasing cost of materials…Having 65% of the build happening in a factory, which can be done in two shifts with no impact from wind and weather and with really good health and safety, waste minimised, and performance maximised … it really does help counteract that shortage of skilled labour." (Developer, Interview)

3.1.3. The timelines of Modern Methods of Construction

Modern Methods of Construction were seen as delivering noticeably faster build-out times than traditional methods, which is advantageous for all projects, with specific advantages in social care and urban settings.

Five of the 8 schemes that received funding in Year Three of the Innovative Housing Programme used Modern Methods of Construction, with a significant emphasis on Category 2 [footnote 27]. Methods used included off-site production of timber panels, cross-laminated timber panels, and roofing components.
While Modern Methods of Construction can carry a cost premium (reflected in the 10% uplift for such projects within the Welsh Government's Social Housing Grant), developers and

Footnotes

[26] An all-Wales knowledge-sharing agency set up by the Welsh Government to help developers, residential social landlords, housing associations, and owners reduce the amount of energy and carbon in building and running homes (Zero Carbon Hwb, n.d.).

[27] Category 2 Modern Methods of Construction refers to panelised systems, i.e., panels of a home being built in a factory and assembled on-site (Government of the UK, 2019).

contractors felt that it was much faster to install on-site and was becoming increasingly cost-effective. A more focused discussion on the cost-effectiveness of Modern Methods of Construction can be found in Section 3.2.2.

Participants were generally positive about the on-site completion times of all products compliant with Modern Methods of Construction. Developers stated that off-site manufactured timber products were no more susceptible to adverse weather conditions than traditional materials (steel, concrete, and bricks), and their quick on-site completion meant that houses became rainproof more quickly. This was said to be particularly important in Wales, where rainfall and winds exceed the UK average.

> "Scaffolding was up incredibly quickly to the point where they [houses] are wind and weatherproof within six days. That is a massive improvement on traditional, conventional construction methods." (Developer, Interview)

> "With MMC [Modern Methods of Construction], you're able to crane your walls and your roof on and get the building water-tight within a couple of days." (Developer, Interview)

Participants highlighted that the faster pace of on-site Modern Methods of Construction also boosted predictability in phase completion schedules. By moving critical work into controlled factory environments, projects became less vulnerable to common on-site disruptions, such as delays due to weather, unexpected labour issues, or health emergencies like the self-isolation requirements of the COVID-19 pandemic. This increased predictability simplified project programming, leading to reductions in wasted time and associated costs.

> "It was like a military operation. The [panels] were coming in every two weeks, a lorry-load, and then craned off and erected on the day it arrived. That went extremely well." (Developer, Interview)

> "Things arrive just in time. A building like that goes up in 14 weeks. If that was a concrete-frame building, the programme would be two times longer at least, and you'd have a lot more concrete lorries turning up and lots more milling around the site. We had 4 or 5 installers on-site, so we minimised disruption from a noise point of view. Very quiet, very efficient, very effective […] and your follow-on trades are in there quick-sticks. Again, inner-city site – you don't want it hanging around for too long." (Contractor, Interview)

As implied in the quote above, interviewees suggested that local communities appreciated the speed of developments using Modern Methods of Construction. Further, the reduced noise and disruption associated with off-site manufacture and on-site assembly were also praised.

> "One of the reasons why MMC [Modern Methods of Construction] was originally thought of for this project was because of the speed of it. It would be less disruptive [for neighbours], with things being brought in on a lorry and craned on the site and frame going up in a couple of days rather than having, you know,

> weeks and weeks of brick layers and disc cutters and the dust that creates." (Developer, Interview)

A specific benefit of Modern Methods of Construction, suggested by interviewees, was its application to expanding existing settings, especially those with vulnerable residents. One developer from Year Three of the Innovative Housing Programme expanded an existing social care setting, and, partly due to the COVID-19 pandemic, felt the need to "decant" the residents of the setting to a bungalow during the build process. The speed of such construction allowed these residents to return to the care setting in which they felt most comfortable and had the most suitable provision of care, more quickly than had traditional construction methods been used.

> "We managed to complete that entire build in something like 14 weeks from start to finish. It's effectively a new dwelling in 14 weeks. We've never done anything traditional that quickly. […] So, the speed of construction with MMC [Modern Methods of Construction] was a massive benefit, especially when we were working with an existing building which was occupied." (Developer, Interview)

3.1.4. Access to innovative materials and technologies

Most participants reported having no or very minor delays when accessing innovative materials or technologies. When delays did occur, they were closely linked to the COVID-19 pandemic, with a minority set of interviewees stating that they experienced delays to batteries and heat pumps.

> "There were definitely challenges with the heat pumps at times. We experienced a global chip shortage post-COVID, so heat pumps were on quite long lead times. I'm not sure if that ever affected a handover, but it caused pressure." (Contractor, Interview)

> "There was an issue with lead times for the battery. The build was handed over without the [battery] installed because there was just a shortage of them. So, that was fitted about eight weeks after the handover. That was one of the only items where there was an issue with materials or components." (Developer, Interview)

In some cases, developers highlighted materials or technologies that were known to have shortages and delays, but explained that their contractors or in-house teams had capabilities or supply chain networks to circumvent these delays.

> "Materials were managed really well by [the main contractor]. They have their own timber frame company, which is a bit of a godsend, really. They manufactured, I think, from memory, their own windows and door sets as well. One of the items people were really struggling with at the time was uPVC and

> Composite [footnote 28] door sets with huge, huge lead times - which was still delaying projects for a couple of years afterwards. But, with them being manufactured locally [by the contractor], we didn't have any issues with that." (Developer, Interview)

Similarly, one contractor highlighted how their involvement in a framework helped mitigate the risks of delays to a project following Modern Methods of Construction (MMC).

> "OSB board (Oriented Strand Board) [footnote 29] prices went up dramatically, but being part of the All-Wales [Supplier Name] framework helped to stabilise costs." (Contractor, Interview)

Others focused on the importance of early preparation to minimise delays in accessing materials. Furthermore, some schemes that were delayed by factors unrelated to materials were able to use this time to plan supply chains in detail.

> "We encountered some availability issues with specialist material required as a result of building with timber. For example, acoustic membranes had to be sourced from Germany. So, planned procurement was key to ensuring the material was available when we needed it to install on site." (Contractor, Interview)

> "The project was on hold […] whilst we tried to find another property for the [neighbouring] tenants to move to. So, [the main contractor] were quite lucky in that they were able to order materials in and already had orders ready to go. So, there were no issues with that." (Developer, Interview)

When compared with Year One and Year Two of the Innovative Housing Programme, these findings suggest a growing readiness within the sector in developing resilient supply chain networks and adapting to mitigate supply chain challenges.

3.1.5. Engagement with relevant authorities

Interviewees noted that innovation can run up against embedded practices and risk management and, therefore, requires early engagement with authorities and stakeholders to address concerns.

Footnotes

[28] uPVC door sets are made up of unplasticised polyvinyl chloride, and are typically rigid, affordable and offer higher energy efficiency. Composite door sets are constructed from multiple materials and offer high durability, thermal insulation, and low maintenance.

[29] During the interview, the acronym OSB was used. OSB refers to Oriented Strand Board and is an engineered wood product made by sheets of timber strands, which are placed on top of each other at 90-degree rotations, and then attached with adhesives, before being bonded with heat and pressure. (Building Materials, n.d.).

Three developments that received funding in Year Three of the Innovative Housing Programme reported more significant challenges gaining approval for roads from their Local Highways Authority than for other projects. In one example, an interviewee stated that a Local Highways Authority expressed concerns regarding their placemaking innovations (such as shared streets), even though these were embraced by the Local Planning Authority, the planning committee, the Innovative Housing Programme Independent Assessment Panel, and the Design Commission for Wales. This, they stated, led to delays of over 18 months in the development and, therefore, increased costs significantly. In another example, a developer explained that the Local Highways Authority expressed concerns about utilities running underneath adopted highways, e.g., heat networks underneath adopted highways or fire sprinkler pipes underneath roads, despite these being part of the innovation.

Another example of innovative approaches being met with caution was identified by a developer who argued that the use of innovative materials, such as recycled glass or sheep's wool, triggered greater scrutiny and required justification by warranty providers and mortgage lenders, even if these innovations are appropriate or widely used in other European countries. This type of challenge was felt as more likely to be faced by developers of Year Three of the Innovative Housing Programme, who sought to sell some homes on the open market, rather than for social rent.

Similarly, one developer highlighted how their project's use of renewable technologies and lack of connection to the gas grid triggered unexpectedly expensive electrical infrastructure costs. The scheme required major electrical infrastructure work, including rerouting major cables and upgrading electrical substations. However, the energy providers' "inherent conservatism in their loading calculations" initially demanded four substations, which were later negotiated down to three. The developer stated that this conservatism in calculations risks being a systemic bias that penalises developments that avoid using gas for heating.

Across all of these examples, interviewees consistently emphasised that engaging these key authorities and organisations (referring to relevant authorities, such as planning authorities, local housing authorities, the Welsh Government, and as illustrated below, on occasion, other relevant organisations, such as mortgage providers) early is critical because this gives developers the opportunity and time to persuade stakeholders of an innovation's viability. Further, if they continue to face scepticism, it allows time to adapt designs before changing them becomes prohibitively expensive.

> "If we were to repeat it again, we would need to make sure we had buy-in from more people. The amount of people you need to get buy-in from is incredible. You think it's just the planning department, but it's also the rest of the council, Welsh Government, the Sustainable Urban Drainage team, the warranty providers, and the mortgage companies – all of whom have to be in agreement. And you're trying to innovate and do something really special, […] it imposed on us extreme challenges which we've overcome." (Developer, Interview)

3.1.6. Trialling innovative methods

An overarching finding from Year Three of the Innovative Housing Programme is that trialling and experimenting in innovative methods, especially those related to new renewable energy technologies or ambitious building standards such as Passivhaus, is highly important for developers and contractors to gain confidence in new approaches before delivering at scale.

Some of the innovations achieved through Year Three of the Innovative Housing Programme have become a 'new normal' for organisations. For example, one developer's scheme involved the regeneration of a brownfield site with significant costs from "abnormals" [footnote 30]. This was a key part of their innovation under Year Three of the Innovative Housing Programme. The developer has since developed near-identical schemes within the usual Social Housing Grant. Similarly, other developers stated that they now regularly achieve levels of airtightness and Energy Performance Certificate ratings that were considered very ambitious during Year Three of the Innovative Housing Programme.

Developers who took part in Year Three of the Innovative Housing Programme gained many specific lessons, which they can now apply to their future developments, whether these are design changes or learnings on how to apply renewable technologies.

For example, one interviewee described the amount of space that air-source heat pumps and batteries require within homes to be "a bit of an eye opener" (Developer). This developer now knows to adapt future developments and retrofitting proposals to account for this additional space requirement. Another developer stated that they had learnt lessons about the difference that having solar panels facing the sun can make to the energy generated. They stated:

> "This was one of the earliest applications of solar PV and those technologies in our new-build housing stock. […] I think we've learned a lot through that process as well, such as that it doesn't necessarily translate to successful installation of solar panels on housing developments when they're all pointing in different directions and you don't end up with the most available roof area pointing towards the sun." (Developer, Interview)

Other developers felt that while the construction of Passivhaus-style schemes through the Innovative Housing Programme has been technically successful, they have not been embraced by social housing tenants. They have moved, therefore, from Passivhaus principles towards other models that are more familiar to tenants. More specifically, the idea of including radiators in future developments was raised by 2 developers who received funding in Year Three of the Innovative Housing Programme.

Footnotes

[30] Abnormal costs are those that the developer may not have foreseen at the start of the project. In this particular scenario, the developer had to account for multiple other cost factors, including diversion of a sewer and paying for additional security.

> "We've scaled back the complexity while trying to keep most of the benefits. So, what we're delivering […] is a less complex system, but maybe we had reached too far ahead of what our tenancy cohort were ready to embrace. […] So, we're now moving from being completely Passivhaus – we've scaled back to highly-efficient timber frames with air-source heat pumps and solar panels. It's more of a 'traditional offer', so having more radiators [rather than more ambient heating models]." (Developer, Interview)

> "Some [especially older] residents can't get the building as hot as they would like because we've gone for a ground-source heat pump, and that runs on a lower flow temperature of water going through that pipework to heat the space. They might like to live in an environment which is 27-28°C because they really don't feel warm unless the numbers are up in that range, but the underfloor heating doesn't necessarily allow us to get that high – it might max out at 25-26°C. […] That learning feeds into other schemes we're going to build. We still feel that underfloor heating in a building like that with a really robust building fabric […] is still the right approach. But, it's whether the underfloor heating is the right type of system for older people – you could have the same system but with wall-mounted radiators […] that tenants can feel heat coming off." (Developer, Interview)

Finally, some interviewees also highlighted the need for more intensive (and expensive) maintenance of certain low-carbon systems, particularly those involving mechanical ventilation with heat recovery systems. The maintenance was recognised as something that needs to be considered by social landlords before the widespread adoption of innovative technologies.

> "This renewable technology is introducing additional products which need annual maintenance, and sometimes that annual maintenance becomes maybe quarterly or half-yearly filter replacements as well. I'm thinking particularly of the MVHR units there. […] I think it's adding quite a lot of costs to us as a social landlord because we've got so many properties that we have to do those jobs for." (Developer, Interview)

> "The MVHR system was actually costing more to run than we were getting benefit from because the filters hadn't been cleaned. […] The post-occupancy survey found that the filters hadn't been cleaned, so they weren't performing. So, there's a lesson there, which is […] if you're relying on your occupants to do that and they don't do it, it's not going to perform as it was designed to." (Developer, Interview)

Having discussed the key construction findings from the research, the subsequent section of the report presents findings on comparisons between innovative construction methods adopted during Year Three of the Innovative Housing Programme and more traditional construction methods.

3.2. Comparison of innovative and traditional construction methods

This research aimed to examine lessons from Year Three of the Innovative Housing Programme around how innovative and traditional construction methods compare. Participants were asked to reflect on how their innovative construction methods compared to more traditional housebuilding methods and technologies. They were asked to make comparisons with regard to speed of construction, overall cost, ease of accessing materials, waste produced, and local or community perceptions.

3.2.1. Speed

As described in Section 3.1.3 above, all interviewees using Modern Methods of Construction, including timber panels and cross-laminated timber, reported relatively faster construction times. These were often described as double the on-site completion speeds of traditional methods. In addition, such builds were described as being weatherproof within a matter of days. This speed was said to have knock-on benefits for cost, which are described below.

Turning to another key innovation, interviewees using renewable technologies – such as heat pumps, Mechanical Ventilation with Heat Recovery units, and underfloor heating – reported slower installations than traditional heating (e.g., gas boilers), but generally stated that these challenges with speed were not onerous, especially if programmed and planned effectively.

3.2.2. Cost

Most interviewees reported that innovative methods carried an up-front cost premium in current market conditions. However, they also expressed optimism that this would improve over time as economies of scale develop and the technology improves. Some noted that there are potential long-term savings (e.g., reduced bills, light foundations due to timber) and indirect savings (e.g., time, labour), which should also be considered.

3.2.3. Materials

Some innovative materials required bespoke suppliers, which risked creating bottlenecks and higher costs. Some minor examples of these are discussed in Section 3.1.4, which identifies some challenges related to batteries and air-source heat pumps. In relation to the quality of materials, it was often argued by interviewees that off-site manufactured products reduced the ‘performance gap’ that exists between the theoretical air-tightness at the design stage and the thermal performance of a building in reality upon completion. However, some materials were found to be too expensive relative to their impact. These included ground-source heat pumps (although others argued their lower long-term running cost made them viable) and some low-embodied carbon items.

3.2.4. Waste

Interviewees using Modern Methods of Construction reported reduced on-site waste and stated that overall waste was lowered, as factories can control and recycle waste more effectively. Timber-frame developments that did not use modern methods also reported some reduced waste. Many interviewees reported visible reductions in the number of skips required on-site.

3.2.5. Local perceptions

While most interviewees stated that the public did not particularly care whether schemes were innovative or not, some interviewees felt that local perceptions towards Modern Methods of Construction and, to a lesser extent, timber frame buildings were more positive than they would otherwise have been for more traditional developments. This, they argued, was due to the reduction in dust, waste, and noise, as well as the faster on-site build times. In one example, interviewees working on a redevelopment of brownfield sites argued that the use of innovations and the funding from Year Three of the Innovative Housing Programme supported their narrative to local communities and tenants of replacing old, outdated stock with innovative, green homes that would create a sense of community.

3.3. Other wider findings from Year Three of the Innovative Housing Programme

In addition to the construction findings above, research with developers and contractors involved in Year Three of the Innovative Housing Programme provided myriad smaller insights. These types of findings focus on the repeatability of schemes without Innovative Housing Programme funding, explore the impact of the COVID-19 pandemic, or are part of technical evaluations and research into the performance of Innovative Housing Programme-funded properties.

3.3.1. Potential for mainstreaming

When asked if they have repeated innovations explored in Year Three of the Innovative Housing Programme in future developments or if they would consider doing so, interviewees generally gave two types of responses.

Approximately half stated that they have begun ‘mainstreaming’ innovations into their regular developments. In these cases, innovations, such as regularly using solar photovoltaic panels, Modern Methods of Construction, and Mechanical Ventilation with Heat Recovery units, were highlighted, as were consistently achieving the ambitious airtightness and energy performance standards of Year Three of the Innovative Housing Programme. Some interviewees argued that their experience of innovating through Year Three of the

Innovative Housing Programme helped to inform the All-Wales Pattern Book, 'Tai ar y Cyd' [footnote 31] (the written statement on Welsh Government, 2025 contains more information).

> "It has [shown] us that timber frame can be done affordably, with a higher U-value, and quicker. It's opened our eyes to the potential of timber frame – now, we have almost all our units using timber frame. At the end of the day, Innovative Housing Programme showed its potential." (Developer, Interview)

> "We don't do any 'traditional' builds anymore." (Developer, Interview)

The other half of the interviewees argued that while Year Three of the Innovative Housing Programme provided learnings on mainstreaming that they will benefit from in the future, the costs of innovative materials or approaches remain prohibitive without a grant programme like the Innovative Housing Programme.

> "Our windows were made of aluminium, rather than PVC. We wouldn't build with these materials again unless they were again 100% funded by the Welsh Government." (Developer)

3.3.2. Impact of COVID-19 and changes to the design

COVID-19 caused significant delays and disruptions to some of the schemes from Year Three of the Innovative Housing Programme. While all schemes were impacted to some extent, the pandemic only had major impacts on a minority of the schemes.

In most cases, the COVID-19 pandemic led to delays in getting on-site, slight increases in the cost of accessing materials, and some use of the Material Cost Increases grant provided by the Welsh Government [footnote 32]. Some schemes faced more significant challenges, especially with self-isolation and staff shortages, and concerns over contractual obligations at the start of the COVID-19 pandemic, which, the interviewee stated, were exacerbated by the rigidity of the Innovative Housing Programme deadlines.

Participants were also asked if the pandemic had led to any benefits for the construction of Innovative Housing Programme developments, with participants generally stating that there were no benefits. However, one developer noted that quieter roads made deliveries and logistics slightly easier.

> "The single most tense moment of the project was the point in late March 2020, where we had to sign a contract by the 31st of March 2020. I can't remember a more tense moment in my career, with emails being submitted at midnight –

Footnotes

[31] The All-Wales Pattern Book 'Tai ar y Cyd' was developed in collaboration with 23 social landlords across Wales and provides a framework for producing cost-effective ultra-low carbon housing at scale (Welsh Government, 2025).

[32] The Material Cost Increases grant was provided by the Welsh Government in 2021/22 and 2022/23 to help address cost rises within the life of a home building project.

> hundreds and hundreds of emails. […] The Innovative Housing Programme, let's face it, imposed time pressure – fixed dates. All your efforts and the money you spent would be to no avail unless you get into contract and own the land by a fixed date." (Developer, Interview)
>
> "We had an immediate post-COVID-19 price spike, but that very quickly regulated itself because the supply end became a bit more competitive with more factories opening. So, again, what presented itself as a spiked price in timber very quickly regulated itself just in time for the project." (Contractor, Interview)

When asked if their development design had changed from that described in their application for Year Three of the Innovative Housing Programme, developers tended to state that very few changes were needed. When changes were required, these tended to be related to regulatory compliance (especially fire safety regulations), with some developers required to take additional measures to ensure adequate fire protection, such as adding plasterboard as well as timber. In some cases, materials were swapped for more suitable alternatives – for example, one development described substituting stainless-steel cladding with corrugated metal (to reduce the risk of rusting) and moderating landscaping to reduce fire and irrigation risks.

3.3.3. Wider real-time learning

Participants reported that construction sites from Year Three of the Innovative Housing Programme served as 'live demonstrations' of innovative developments, which accelerated sector-wide learning across Wales. Some of the sites became popular destinations for site visits by other contractors, developers, councils, architects, students, civil servants, and Welsh Government ministers. One interviewee who utilised Modern Methods of Construction reported over 20 site visits during the construction phase of Year Three of the Innovative Housing Programme.

3.3.4. Formal evaluations and collecting the experience of residents

In addition to this research, many developers have conducted post-occupancy surveys to gather residents' experiences, and some are undertaking formal evaluations. Post-occupancy surveys were described as very positive, but some challenges were highlighted regarding maintenance of innovative technologies (especially units with mechanical ventilation with heat recovery), tenant expectations of their heating systems (such as challenges with more 'ambient' heating systems and challenges with bills being higher than anticipated, also explored in section 3.1.6). This was due to a variety of factors, but was mainly linked to:

- the costs of electricity increasing significantly in 2022
- variable generation of electricity by solar panels – with residents who moved in in the winter months disappointed by the lack of energy generation in their first few months
- teething problems with intelligent energy management systems

Providing an example of teething problems, one interviewee noted that a scheme under Year Three of the Innovative Housing Programme developed an apartment block with an unusual type of communal electricity supply, which had the unexpected and unintended consequence of some residents not getting their Winter Fuel Allowance [footnote 33].

Some formal evaluations of schemes under Year Three of the Innovative Housing Programme have been conducted or commissioned. These were not shared as part of this research, mainly because they have not yet been published. Nonetheless, at the time of writing, many of these evaluations are to be presented to the wider social housing sector in Wales in the coming months – including research by the Welsh School of Architecture.

3.3.5. What if funding for Year Three of the Innovative Housing Programme had not been made available?

Funding through the Innovative Housing Programme had varied impacts across schemes. In some cases, it allowed developers to accelerate their existing innovation plans, while in others, it encouraged developers to utilise innovative solutions in their future ambitions. Thus, interviewees suggested that, in the absence of Innovative Housing Programme funding, schemes would have been delivered but with fewer or no innovations, or at different timelines. One developer stated that, without the uplift of Innovative Housing Programme funding, they would have had to "value-engineer" the development to add more units at the expense of placemaking and quality of life [footnote 34].

One interviewee stated that their scheme would not have gone ahead without Innovative Housing Programme funding, due to the high costs of abnormalities and the importance of redevelopment and placemaking to their scheme. However, another interviewee stated that their scheme would have gone ahead with all innovations without Innovative Housing Programme funding, as the development was aligned so thoroughly with their organisational strategy.

3.4. The planning process

Most interviewees felt that their experiences navigating the planning system during applications for Year Three of the Innovative Housing Programme were no different from normal. They reported facing challenges typical of the Welsh housing system. Interviewees noted that there were no additional delays or challenges due to their innovations, nor was

Footnotes

[33] The Winter Fuel Allowance is a UK government benefit that provides eligible households an allowance to account for higher fuel bills in the winter months. Very often, this is budgeted into residents' expenditures and thus, ineligibility under it can cause residents to potentially pay more out-of-pocket.

[34] Value engineering is a systematic approach to providing necessary functions in a project at a lower cost (Horst Construction, 2025).

there any expedition of planning processes due to innovations or having taken part in the Innovative Housing Programme.

Some interviewees identified areas where they needed more support during their planning application. For instance, an interviewee noted that the involvement of architects helped their planning application, including landscape applications. Similarly, another interviewee acknowledged that their planning application could have been improved if they had enough time to incorporate aspects from their bid into their application, but also caveated, from experiences on other net-zero planning applications, that the existence of innovations would not necessarily impact the planning timeline.

> “I don’t think any stamp [of approval from Welsh Government] gets anything through planning quicker.” (Developer, Interview)

Some developers were more positive, stating that the Local Planning Authority was supportive of what they were trying to achieve through their Year Three application. These applicants noted that, for instance:

> “The local planning authority had really done their homework and they pitched and sold the scheme [to the planning committee] as ‘this is the kind of scheme that we want to be doing in [area].’” (Developer, Interview)

> “The Innovative Housing Programme assisted in the story of what we were doing: taking this not-fit-for-purpose housing stock and replacing it with highly energy efficient homes there for future generations.” (Developer, Interview)

A small set of interviewees highlighted some challenges between receiving planning approvals and those of other authorities whose approvals were required to progress their applications. For instance, one developer highlighted challenges in getting approval from the Local Highways Authorities for the Innovative Housing Programme application, despite having already received planning approvals. This developer reported that they faced significant challenges and delays with getting approvals from the Local Highways Authorities on the adoption of roads, with disagreements between the two organisations over the best ways forward, including the levels of innovation that were desirable.

Other smaller challenges faced included delayed planning approvals due to many of the schemes under Year Three of the Innovative Housing Programme being among the first to go through the Sustainable Urban Drainage process [footnote 35]. However, these were not described as too significant and were attributable to early-stage problems under the Sustainable Urban Drainage process.

Footnotes

[35] SuDS process refers to water management techniques used to reduce the risk of flooding and pollution by mimicking natural drainage to enable the local management of stormwater (Local Government Association, 2024).

3.5. The application process

This section focuses on the perceptions of interviewees towards the application process for funding under Year Three of the Innovative Housing Programme. The timelines and guidance for this application process are provided in Section 1.1.

3.5.1. Alignment with existing development plans

In interviews with developers, many stated that they had pre-existing trajectories toward innovative solutions. These usually centred around exploring or upscaling Modern Methods of Construction or delivering low-carbon heating solutions. This meant that Year Three of the Innovative Housing Programme dovetailed with those strategies and accelerated plans or ambitions that were already underway.

On the other hand, some organisations had pre-existing plans for specific land, but added innovative elements to their schemes to receive Innovative Housing Programme funding.

The key difference between this and previous years of the Innovative Housing Programme is that by Year Three of the Innovative Housing Programme, developers seemed to have had sufficient time to plan and prepare sites and ideas for innovative developments, with the expectation of bidding for its funding. This, among other factors [footnote 36], helps explain the increased volume of some developments, with interviewees involved in larger sites suggesting that planning for these began seriously in 2017 and that Innovative Housing Programme funding was always viewed as central to their viability.

3.5.2. Experience of preparing the application

Developers were also asked to share any challenges they faced when preparing their application for the Innovative Housing Programme Year Three. A majority of participants stated that the experience was straightforward, with one stating that it was similar to the application process for the Social Housing Grant and therefore familiar to them as a social landlord.

> "It wasn't an overly challenging application process. By Year Three, we'd done it a couple of times and were building on previous applications. We had very good relationships with WG [Welsh Government] officials, only a phone call away and very engaged." (Developer, Interview)

Footnotes

[36] An underlying policy that is likely to have resulted in the Innovative Housing Programme Year Three being described as an accelerator is the Welsh Government's push for mainstreaming and scaling of innovations by Year Three of the Innovative Housing Programme. By Year Three, applicants were prompted to submit larger-scale applications, leading to schemes delivering innovations for an average of 57 homes per funded scheme. This approach enabled the sector to deliver innovations at scale and pace and is likely to have led to it being understood as an accelerator.

However, another argued that the application process had become more complicated by Year Three of the Innovative Housing Programme, noting:

> "I was involved at the time, and we had been successful with four other Innovative Housing Programme bids, so were quite au fait (familiar) with the process. It was initially quite simple, but the forms did get more complicated by Year Three, with more information required, and it felt more like the SHG (Social Housing Grant Application) [footnote 37] process." (Developer, Interview)

When asked about the level of support they received from the Welsh Government and Design Commission for Wales, all interviewees stated that they had sufficient and strong support from the Welsh Government. Regarding the Design Commission for Wales, experiences were also broadly positive, with some stating that the Commission's recommendations had improved the design of their development. However, there was a general feeling that the experience was rushed, especially for developers who had two or more meetings with the Commission.

One interviewee explained the impact of this rushed experience as resulting in them having to submit a bid without a favourable Design Review report:

> "In order to apply for the Innovative Housing Programme, we went to the Design Commission for Wales for two sessions, one in May and one in late June. And at this point, it all became really high pressure and a real rush because we knew the application deadline was the end of July, but we needed to go through discussions with the Design Commission for Wales to refine and test our ideas so that […] we were able to submit with our application a favourable Design Review report." (Developer, Interview)

Another interviewee highlighted the importance of having the Design Commission for Wales's input at the concept stage, such that applicants can have the opportunity to incorporate any feedback for change given by the Design Commission for Wales.

> "It'd be great if you did this right at the beginning and they fed in at concept stage. Sometimes, you take something you don't have much scope to change to the Design Commission for Wales." [footnote 38] (Developer, Interview)

Footnotes

[37] During the interview, the participant used an acronym of the Social Housing Grant, i.e., "SHG", to refer to the grant. This acronym has been expanded in the transcript of the quote for clarity.

[38] During the interview, the participant used the abbreviation of the Design Commission for Wales, i.e., "Design Commission", to refer to it. This has been expanded in the transcript of the quote for clarity.

A minority set of interviewees were also asked if they required the support of specialists or expert consultants when preparing bids [footnote 39]. Most of those who were asked stated that they did not require additional support, although one stated that they consulted with an academic partner, and some collaborated closely with main contractors and architects throughout their application process. Finally, no developers stated that they had challenges obtaining confirmations of local authority support for their scheme.

Differences with Year One and Year Two of the Innovative Housing Programme

Many organisations explained that their experience of bidding for the Innovative Housing Programme had improved over time, as they increasingly became familiar with the requirements of the Innovative Housing Programme.

> "By Year Three, we'd done it a couple of times and were building on previous applications. [We had] growing familiarity with the forms, so [it] became easier over time." (Developer, Interview)

> "We had more experience and understanding, the first one was a stab in the dark and not really understanding what was being asked for. But, as you become more knowledgeable you become more confident." (Developer, Interview)

While it is positive that some developers perceive the Innovative Housing Programme application process as having become simpler, it raises the prospect of a growing barrier to entry for new developers. Given findings around the gradual ease of bidding for the Innovative Housing Programme over time, it is possible that developers with no prior background or expertise in the Innovative Housing Programme would find it challenging to apply for the Innovative Housing Programme.

The risk of this barrier is a key reason why interviews with non-participating developers were conducted, and these are available in the following Section 3.6.

3.6. Experience of non-participating social landlords

To gain further insights on potential barriers to entry for social housing developers, 2 interviews were conducted with Registered Social Landlords in Wales. These are referred to as Phase 2c in the Methodology (Section 2). Given the limited sample size of the participants for this phase of the research, findings in this section may be less comprehensive than others and should be treated as anecdotal.

3.6.1. Barriers faced by non-participating social landlords

A key barrier faced by both interviewees was the lengthy timeline between submission of the application and receipt of the decision. In both cases, this timeline impacted their ability to apply for other funding grants. One interviewee noted that they were placed on a reserve

Footnotes

[39] Due to time pressures in interviews, only a few interviewees were asked this question.

list as an outcome of their Innovative Housing Programme application, following which they were informed that they had been unsuccessful. Although the total time between being placed on the reserve list and receiving a final decision was approximately only a month, the final decision was communicated to them toward the end of the year. As such, they did not have enough time to act on the feedback accompanying the decision and update their application for other relevant grant funding. This interviewee noted that it would have been useful to receive a decision about having been unsuccessful earlier in the application timeline, rather than being placed on a reserve list, which made them "falsely hopeful" about a positive outcome, while also delaying efforts toward other grant funding. The other interviewee noted along similar lines that the time taken between submitting an expression of interest for participation in the programme and receiving the outcome decision was lengthy, impacting the Registered Social Landlords' ability to apply for other funding.

Another barrier identified by interviewees was the perceived lack of clarity around feedback provided. Interviewees noted that while the feedback provided was detailed, there was often less clarity around how to action this feedback. For instance, often Welsh Government feedback asked applicants to provide more detail around certain aspects of the application, but there was less clarity on what detailing was required. This lack of clarity, in combination with the above-mentioned limited available timelines to action feedback, created challenges for these applicants.

Importantly, both interviewees engaged during this stage of the fieldwork were successful in Year Four of the Innovative Housing Programme, which ran between calendar year 2020 and 2021. As such, despite outlining some barriers, these interviewees both acknowledged that feedback accompanying their respective application outcomes was useful in drafting their applications for other grant funding, such as the Social Housing Grant and the succeeding iterations of the Innovative Housing Programme.

3.6.2. What worked and should be continued?

Both interviewees praised the feedback and knowledge-sharing sessions conducted by the Welsh Government in relation to the Innovative Housing Programme application process and experience. The sharing of lessons, experiences, and best practice was found to be highly useful for their applications. Illustrating the usefulness of some of this collaboration, one interviewee noted that they learnt the importance (both from a cost and logistics perspective) of engagement with experts such as the principal contractor and designer, early on in the procurement process.

> "What I did appreciate was the feedback sessions and [that it was] clearly designed that if you were successful, you'd have to share that information and that learning…which I think we don't do enough of. Why reinvent the wheel when someone's got a great system and design?" (Developer, Interview)

Similarly, when asked about elements of the Innovative Housing Programme that they would like to see in future funding grants, it was stressed that the flexibility and fluidity embedded in the Innovative Housing Programme in terms of cost accommodations were highly useful, given the often-unexpected cost increases faced by developers. These

interviewees noted that it would be preferable to have similar flexibility across funding streams currently operating in the sector.

3.6.3. Benefits of the Innovative Housing Programme: increased intelligence around innovative approaches

Given their experience with more than one iteration of the Innovative Housing Programme, these interviewees were able to identify some longer-term positive impacts in the Welsh housing sector due to the Innovative Housing Programme. Interviewees noted that the Innovative Housing Programme application experience resulted in useful data and intelligence around cost levels, levels of innovation, and how these innovations were best applied within the sector.

> "Innovative Housing Programme was great for data collection around new innovations trialled in these applications…I think it definitely gave us some really good data […] particularly in terms of costs, how technology performs within properties, and then how we need to educate tenants in terms of using that technology effectively." (Developer, Interview)

Other benefits identified by these interviewees included stronger labour and supply chains accessible to source. They also observed that the Welsh Housing Sector has become more comfortable with various innovations and is open to mainstreaming innovative techniques as a result of the Innovative Housing Programme.

> "Many innovative aspects, such as renewable heating technologies and PV, are now business as usual for us and probably something we wouldn't have done as quickly if it wasn't done under the Innovative Housing Programme" (Developer, Interview)

It is worth noting that these findings on positives (what worked) and benefits are relevant to the entirety of the Innovative Housing Programme, with positives relating to how the programme grew and developed over time, rather than Year Three of the Innovative Housing Programme in particular.

4. Conclusion: Summary of findings from Year Three of the Innovative Housing Programme

This research on Year Three of the Innovative Housing Programme engaged all eight participating housing schemes. The key findings from this research relate to experiences of participants from the construction process, planning process, and application process of Year Three of the Innovative Housing Programme, and have been summarised below.

4.1. Construction process

This research found that strong relationships between developers and contractors were seen by participants as critical for the construction process. The hiring of experienced project managers for innovative developments and working with data collection mechanisms were primarily highlighted as steps taken to strengthen relationships.

Participants also reported progress in bridging the construction skills deficit, showing an improvement in the context of the workforce challenges identified in previous years. While some participating projects in Year Three of the Innovative Housing Programme were impacted by a shortage of workers with net-zero construction skills, participants raising this issue highlighted positive developments undertaken to address the shortage, such as businesses investing in net-zero skills development and training.

A majority of projects using Modern Methods of Construction reported faster construction timelines. While Modern Methods of Construction were acknowledged by participants to carry a cost premium, participants felt that these methods were becoming increasingly cost-effective and faster to install on-site. Similarly, participants reported higher costs for innovative methods, driven in part by bespoke suppliers needed for some materials. While these findings on costs are largely consistent with findings from previous iterations of the Innovative Housing Programme (see Section 1.4), participants of this research expressed optimism around the stabilisation of costs following the development of technologies over time and economies of scale.

Similarly, access to innovative technologies and methods was reported to have caused little to no delays to participating projects in Year Three of the Innovative Housing Programme. Delays faced were primarily attributed by participants to the COVID-19 pandemic, with a minority set of projects experiencing delays in accessing batteries and heat pumps. When compared with the previous iterations of the Innovative Housing Programme, these findings suggest improvements within the sector in adapting to mitigate supply chain challenges. Aside from the supply chain impacts noted above, this research also explored the overall impact of COVID-19 on Year Three of the Innovative Housing Programme, and found that while all schemes were impacted by COVID-19 to some extent, it was seen by participants to have severely impacted only a few participating schemes.

The need for early engagement with relevant authorities was highlighted as critical in persuading relevant local authorities and stakeholders of the viability of an innovation. Some

developers highlighted the need for this by citing examples of challenges faced in gaining approvals for roads from their Local Highways Authority.

Trialling and experimenting in innovative methods, especially those related to new renewable energy technologies or ambitious building standards such as Passivhaus, was seen as important for developers and contractors to gain confidence in new, innovative approaches before delivering at scale. On a related note, this research also found that construction sites from Year Three of the Innovative Housing Programme served as real-time learning for the sector on innovative methods and approaches.

This research also explored how innovative construction methods compared to more traditional housebuilding methods and technologies. Whilst findings on cost and access to materials have been discussed above, overall, participants reported that the use of Modern Methods of Construction yielded faster construction timelines and reduced waste. Local perceptions around innovative methods, such as Modern Methods of Construction and timber-frame developments, were also seen to have been more positive than for more traditional developments. These positive perceptions were attributable to faster construction timelines and a reduction in dust and noise for developments with these innovations.

Approximately half of the participants noted that innovative methods and approaches are being mainstreamed into regular developments, with some participants reporting that innovations achieved through Year Three of the Innovative Housing Programme have become a “new normal” for them. These participants reported they gained many specific lessons, relating to aspects such as design changes and renewable technologies, that they can apply to their future developments.

4.2. Planning process

The planning process in Year Three of the Innovative Housing Programme was found to be no different to normal, with a majority of participants noting that any challenges or delays faced were typical of the Welsh housing system and were not specific to Year Three of the Innovative Housing Programme. This is consistent with findings from previous iterations of the Innovative Housing Programme.

Aside from the overall planning process being reported as similar to normal, participants reported that Local Planning Authorities were supportive of their aims under Year Three of the Innovative Housing Programme. Where challenges were found, these were isolated to a few participating projects who reported challenges receiving approvals from other authorities, such as the Local Highways Authority, after having already received planning approvals.

4.3. Application process

Overall, participating developers reported that the application process for Year Three of the Innovative Housing Programme was straightforward, with bidding experiences reportedly getting easier over time. Many participants appreciated the support provided by the Welsh Government in navigating the application process.

Interviews with Registered Social Landlords who did not participate in Year Three of the Innovative Housing Programme highlighted key barriers faced by them. Key barriers outlined included lengthy relative outcome timelines and limited clarity of feedback. While reporting these issues, these interviewees felt that the regular and timely feedback and knowledge-sharing sessions conducted by the Welsh Government had been useful for them and should be continued. They also felt that the Innovative Housing Programme's flexibility around costs was useful and noted that this is missing from other grant funding schemes.

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6. Annex: Topic guides for primary research

This Annex includes the following documents:

- the guide used for interviews with developers and contractors
- the guide used for the focus group with repeat developers
- the guide used for interviews with non-participating Registered Social Landlords (RSLs)

6.1. Interview guide: Phase 2a – Interviews with developers and contractors

Warm-up

Could you tell me a bit about your organisation and your role within it?

Application process [Developers only]

1. How did the Innovative Housing Programme Year Three work alongside existing development plans within your organisation?

   [Prompt] Do you believe you would have developed a similar project had the Innovative Housing Programme Year Three not existed?

2. Did you face any challenges while preparing the proposal or application for your scheme? If yes, what were they?

   [Prompt] Did you face specific challenges while preparing the bid for the Innovative Housing Programme Year Three funding?
   [Prompt] Are you aware of the purpose of the three funding streams, and know which one(s) to apply for?
   [Prompt] Did you feel there was sufficient support available under the scheme in terms of preparing and refining your proposal? For example, this could include support from the Welsh Government or the Design Commission for Wales.
   [Prompt] Did you face challenges accessing specialist knowledge when preparing your proposal – e.g., experts in specific innovations, architects?

3. [If repeat applicant] In what ways was your experience different from when you applied in Year One and/or Year Two?

4. Overall, what was your experience applying for the Innovative Housing Programme Year Three programme?

   [Prompt – RSLs only] What was your experience working with your local authorities for their confirmation of support? Were there any specific challenges that you would like to share?
   [Prompt] Did you have to use any alternative funding to deliver the scheme – including additional funding through Welsh Government?

5. How was your experience navigating the planning system for this scheme?

    [Prompt] Do you think being selected as an IHP3 development affected the timescales of your planning application approval?
    [Prompt] Were there any specific issues raised at planning? For example, parking requirements, adopted roads, and phosphates.
    [Prompt] Were there any concerns within local communities regarding the scheme?

Construction lessons learnt

Note: The interviewer may introduce more specific questions as a result of reviewing documentation regarding the specific scheme.

6. Did you face any challenges in the construction of your project or scheme? [Note to interviewer: review innovation's primary risks of not succeeding (in Application) to refine prompts]

    [Prompt – note if raised organically or after prompting] Did you face this as a challenge:
    - accessing materials, for example high costs of materials?
    - accessing the workforce needed – including specialists?
    - knowledge of how to deliver innovation – for example, a lack of case studies?
    - severe weather conditions?
    - [developers only] identifying and partnering with suitable contractors?

    [Prompt – Repeat for each challenge] Was this specific to your innovative development or something experienced across all developments during this period?
    [Prompt – Repeat for each challenge] How did you overcome these challenges?

7. In what ways did the COVID-19 pandemic impact your scheme?

    [Prompt] What were the specific pandemic-related challenges?
    [Prompt] Were there any pandemic-induced benefits? If yes, what were they?

8. [If previous applicant] Were these challenges similar to your experiences in the previous Years One and Two? If not, what has changed?

    [Prompt] Are there any challenges that you experienced in previous years that you did not experience in Year Three of the Innovative Housing Programme?

9. In what ways did the Innovative Housing Programme Year Three programme work well for you? What were the key benefits?

    [If previous applicant] Are there any positives in the Year Three programme that you did not experience previously?

10. To what extent has your development differed from, or stayed the same, as the proposal in the application?

    [Prompt] What were the reasons behind this difference?

11. In what ways does your Innovative Housing Programme project differ from other more traditional projects you delivered in the same period?

    [Prompt] Was it more or less costly to develop? What were the drivers of this?
    [Prompt] Were materials harder to come across or more costly?
    [Prompt] Was there more or less waste generated during construction?
    [Prompt] Was it slower or quicker to complete the development – from the start of the site to completion?
    [Prompt] Were perceptions of local communities different from those towards traditional builds?

12. Have you conducted an evaluation of the scheme delivered under the Innovative Housing Programme Year Three, or monitoring of its costs and benefits?

    [Prompt] Do you have any resources, documents, or data which could be shared to inform this evaluation of the Innovative Housing Programme Year Three's construction lessons learnt?
    [Prompt – if relevant] Have you collected opinions of those living in these homes?

13. How have the lessons you've learnt internally about delivering this project impacted other developments of yours?

    [Prompt] Have best practices from this project informed your plans for future developments?
    [Prompt] Will you 'mainstream' this innovation going forward? What would the opportunities and challenges be in mainstreaming this innovation?
    [Prompt] Have other developers learnt lessons from your scheme – whether this be learning from challenges or successes?

Debrief

14. Is there anything else that we haven't touched upon already that you think would be useful for us to discuss?

15. [Developer only] We are also hoping to interview [major contractor] as part of this project. Would it be possible for you to share their contact information with us as part of this evaluation?

6.2. Focus group guide: Phase 2b – Focus group with repeat developers

Warm-up

1. Could you tell me a bit about your respective organisations and your roles?

Application process

2. From your perspective, how has the Innovative Housing Programme changed (if at all) since Year One?

[Prompt] Have these changes been informed by your experiences in Years One, Two, and Three?

[Prompt] Have these changes been called for by the sector, for example in Community of Practice events?

[Prompt] Are there changes which you have called for which have not been implemented yet?

3. How has the Innovative Housing Programme worked alongside existing development plans within your organisation?

    [Prompt] Do you believe you would have developed similar or different projects had the Innovative Housing Programme not existed?

4. Did you face any challenges while preparing proposal or applications for your scheme? How did this vary between Innovative Housing Programme Year One, Year Two, and Year Three?

    [Prompt] Did you face specific challenges while preparing the bid for the Innovative Housing Programme Year Three funding that you did not face in Year One or Two?

    [Prompt] Were there challenges which you faced when preparing your application in Year One or Two which you did not face in Year Three?

    [Prompt] Did you feel there was sufficient support available under the scheme in terms of preparing and refining your proposal? For example, this could include support from the Welsh Government or the Design Commission for Wales.

5. How was your experience navigating the planning system for Innovative Housing Programme schemes?

    [Prompt] Did delivering more innovative developments make it more challenging for your proposals to receive planning permission than for a ‘traditional’ development?

    [Prompt] Did delivering more innovative developments make it more challenging for your proposals to get approval from Local Highways Authorities than for a ‘traditional’ development?

    [Prompt] What impact, if any, did receiving Innovative Housing Programme funding and approval have upon your experience of the planning or highways adoption process? Did this change at all between Innovative Housing Programme Year One, Year Two, and Year Three?

Construction lessons learnt

6. Did you face any shared construction challenges across all of your Innovative Housing Programme schemes?

[Prompt] For example, workforce shortages? Significant cost increases? Difficulty accessing materials? COVID-19? Identifying suitable contractors?
[Prompt – Repeat for each challenge] Was this specific to your innovative developments or something experienced across all developments during this period?
[Prompt – Repeat for each challenge] How did you overcome these challenges?

7. Did you face any construction-related challenges in Year One or Year Two of the Innovative Housing Programme which did not occur in Year Three of the Innovative Housing Programme?
    - [Prompt] For example, workforce shortages? Significant cost increases? Difficulty accessing materials? COVID-19? Identifying suitable contractors?

[Prompt – Repeat for each challenge] Was this specific to your innovative developments or something experienced across all developments during this period?
[Prompt – Repeat for each challenge] How was this challenge resolved? Was it a change in the design of the Innovative Housing Programme or a change within your RSL?

8. Did you face any construction-related challenges in Year Three of the Innovative Housing Programme which did not occur in Year One or Two of the Innovative Housing Programme?
9. On the whole, what were the biggest benefits of the Innovative Housing Programme for your RSL?
   [Prompt] Are there any positives in the Innovative Housing Programme Year Three programme that you did not experience previously in Innovative Housing Programme Year One or Year Two?
10. How have the lessons you've learnt internally about delivering Innovative Housing Programme projects impacted other developments of yours? Were some Innovative Housing Programme projects more impactful upon your internal learnings than others?

[Prompt] What impact, if any, did the Innovative Housing Programme have upon your ability to deliver homes to the updated Welsh Development Quality Requirements (WDQR) 2021?

[Prompt] What types of supply chains and contractors, if any, has the Innovative Housing Programme connected you to new supply chains and contractors?
[Prompt] Will you 'mainstream' this innovation going forward? What would the opportunities and challenges be in mainstreaming this innovation?

11. Have other developers learnt lessons from your schemes – whether this be learning from challenges or successes?

[Prompt] Which Innovative Housing Programme Year had the biggest impact on the sector?

Debrief

12. Is there anything else that we haven't touched upon already that you think would be useful for us to discuss?

6.3. Interview guide: Phase 2c – Interviews with non-participating social housing developers

Warm-up

1. Could you tell me about your organisation and your role within it?

Awareness

2. To what extent were you aware of the Innovative Housing Programme when it was launched in 2017?
3. Had this level of awareness changed by the time of Year Three of the Innovative Housing Programme in 2019-2020?
4. [If low] Could additional provision of information have improved your awareness of the Innovative Housing Programme?

    [Prompt] Would this have increased your organisation's likelihood of submitting an application for Innovative Housing Programme funding?

Barriers

5. Were there any barriers relating to the Innovative Housing Programme application process that made your RSL choose not to apply for Innovative Housing Programme funding?

[Prompt] Timelines?
[Prompt] Details required?
[Prompt] Guidance?
[Prompt] Level of funding?

6. Were there any barriers relating to the feasibility of delivering innovations that made your RSL choose not to construct an innovative scheme, rather than any barriers related to the structure of the Innovative Housing Programme?

[Prompt] Accessing contractors?
[Prompt] Accessing materials?
[Prompt] Knowledge of how to deliver innovations – for example, a lack of case studies?
[Prompt] Uncertainty regarding final costs?

7. Did you develop similarly innovative schemes without Innovative Housing Programme funding? For example, making use of MMC in schemes that began in 2017-2020? For example, SAP 92+ in 2017-2020? Innovative placemaking?
   [Prompt] If so, what were the reasons that prevented you from seeking Innovative Housing Programme funding for these schemes?
8. Have you learnt lessons from Innovative Housing Programme-funded RSLs and local authorities on how to construct innovative developments?
   [Prompt] For example, through site visits or community of practice events?

[Prompt] Did these have an impact on your organisation's ability to build to WDQR standards?

Overcoming barriers

9. What could have been done differently to make you more likely to apply for Innovative Housing Programme funding?
   [Prompt] Changes to the application process?
   [Prompt] Changes to the structure of the scheme?
   [Sub-prompt] More support from the Welsh Government with identifying contractors? An opt-in stock-based formula?
   [Prompt] More funding being available through the Innovative Housing Programme?

Debrief

Is there anything else that we haven't touched upon already that you think would be useful for us to discuss?