Energy Efficient Scotland Phase 2 Pilots: Final Social Evaluation Report

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Energy Efficient Scotland Phase 2 Pilots: Final Social Evaluation Report

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Executive Summary

This report has presented a social evaluation of the Energy Efficient Scotland Phase 2 pilots, which took place between September 2017 and March 2019. The Phase 2 pilots form a part of the development of broader Energy Efficient Scotland programme; they focused on: hard-to-treat buildings; strategies for engaging the self-funded market; innovative technologies; and area-based approaches. This evaluation draws on evidence from interviews conducted with all of the teams taking part in the nine Phase 2 pilots. The interviews explored organisational aspects of the pilots, including: pilot content; partnership working and procurement; skills and resources for delivery; and perceptions of the broader Energy Efficient Scotland programme.

The Phase 2 pilots delivered positive outcomes, including: leveraging additional funding; providing foundations for further work; and there was anecdotal evidence of energy and cost savings. The pilots also allowed local authorities and project partners to begin exploring the extension of their existing roles, for example, as heat network owners and energy suppliers.

The pilots that sought to tackle hard-to-treat building and those with a combination of public and private sector occupants experienced significant delays and significant funding shortfalls. Multiple funding sources were used to complete the proposed works; however, securing match funding could contribute to significant project delays. In addition, distinct funding sources were needed for different aspects of the work; this resulted in complex project management and reporting requirements, and should be avoided to support future, holistic retrofitting. Working on whole-building retrofit where there are multiple owners and occupiers (for example, a tenement building), and multiple funding sources, was a highly complex and time consuming task. Engaging with private householders and businesses will require long-term, repeated interaction. There were more significant challenges in procuring contractors to complete capital works, these included: identifying contractors with suitable expertise for hard-to-treat buildings; a lack of capacity amongst smaller contractors to engage in the pilots at short notice; communication with new contractors.

Key Lessons:
- Longer timeframes and a clear long-term funding trajectory will be needed to support holistic retrofitting of complex hard-to-treat buildings
- Scottish Government need to explore how to streamline existing funding sources to support holistic, area-based retrofitting and heat decarbonisation.
- Local authorities will require further support if, through Energy Efficient Scotland, their roles extend as network owners and suppliers, for example in developing heat supply agreements
- Scottish Government must provide clarity and certainty in the funding and roll-out of Energy Efficient Scotland, to support readiness amongst supply chains.
- Energy Efficient Scotland funding needs to reflect the long-term interaction needed to support private householders and businesses, and support the development of skills for this.
- There needs to be a clear structure to support information sharing and subsequent capacity building amongst local authorities and project partners.

Contents

1. Introduction

The Phase 2 pilots, coordinated by Scottish Government, took place between September 2017 and March 2019. The pilots form a part of the development of broader Energy Efficient Scotland programme, following from the Phase 1 pilots, which have been evaluated separately[1]. The Phase 2 pilots included nine local authorities (see Table 1 and Figure 1) and sought to support further capacity building within local authorities, with a focus on[2]:

- The building blocks of programme delivery – *testing the entire process and individual components of delivering heat and energy efficiency projects*
- Heat decarbonisation – *provision of all forms of low carbon heat, with focus on area-based schemes; district heating*
- Hard-to-treat buildings – *including historical buildings and conservation areas*
- Sector specific projects – *projects which seek to engage with, for example, only the commercial sector, private sector landlords, or owner occupiers 'self-funding' works.*

Local Authority	Domestic or non-domestic	Project details
Aberdeenshire	Non-domestic	The proposed project included Loft Insulation, SWI, Under floor insulation, Solar PV battery storage, LED sensor lighting and a heating system upgrade for a sports and community trust
Argyll & Bute	Domestic & Non-domestic	Transforms building energy efficiency throughout the conservation area of an Island community, which includes much of the visitor accommodation, and a critical mass of businesses and public and community buildings, including school, surgery, library and very heavily used Village Hall
East Ayrshire	Non-domestic	A Community Hall will receive External Wall Insulation, window replacements, LED lighting and, once insulated, an ASHP heating system
	Domestic	Energy efficiency improvements to 4 properties yet to be treated in an area previously improved through EESSH.
Edinburgh	Non-domestic	A number of public buildings, including museums and a bus station have received the implementation of demand based control of plant and equipment, reducing and shifting load from peak periods and the application of Building Energy Management System analytics to determine and optimise performance of controls

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[1] See: Bush, R., McCrone, D., Webb, J., Wakelin, J., Usmani, L & Sagar, D. 2018. Energy Efficienct Scotland – Phase 1 pilots evaluation final report. Available at: https://heatandthecity.org.uk/wp-content/uploads/2018/11/EES-Pilot-Evaluation-Phase-1-Final-Report1.pdf

[2] Scottish Government, Scotland's Energy Efficiency Programme: Pilot Projects Pathfinder Fund – Phase 2

	Domestic & Non-domestic	Energy retrofit and improvement works on a Category B listed building, to test approaches to energy efficiency in hard to treat, post war properties. This included one block of 12 flats and 2 commercial units.
	Non-domestic	An integrated programme of activity delivering energy efficiency improvements and a renewable heat supply within a listed, hard to treat property, for use by local community groups. The energy efficiency measures and renewable heat technology include the installation of an air source heat pump system combined with an LED lighting roll out, roof insulation and an innovative building energy management system
	Non-domestic	The new buildings on a redeveloped council-owned park and the existing winter gardens will have an integrated renewable energy solution for their heat, through the installation of ground and air source heat pumps.
Falkirk	Domestic	Extending the existing Local Authority-owned District Heating Network to 260 new properties predominantly occupied by over 50's in fuel poverty. Replacing a mixture of existing gas and electric heating with spare heat capacity from the existing Combined Heat & Power, and utilising available electricity generation to supply nearby electrically heated primary school – achieving a B Energy Performance Rating across the Estate.
	Non-domestic	Lighting improvements and connecting a private wire to supply CHP electricity, in 3 schools and a council office.
Glasgow	Non-domestic	The principle objective of this project is to improve the energy performance of 400 (small to medium) commercial business units across Glasgow. This work will reduce energy consumption, carbon emissions and operating costs for small to medium sized enterprises. The businesses vary in type from newsagents, hair salons, public houses, etc
	Domestic	Trial the installation of Building Management System controls and also Solar PV in a Social Landlord's head office in the centre of Glasgow City. The aim is that the building's energy plant and equipment ostensibly become 'smart enabled' appliances that can be controlled based on actual building demand rather than pre-set parameters. In addition, the installation of a 50KW Solar Photovoltaic array will generate energy that will be matched with the BMS systems to maximise the locally produce renewable component of energy demand within the property.
	Non-domestic	To reduce energy demand and promote decarbonisation within two locally run community centres by investing in the introduction of building fabric energy efficiency upgrades and installation of renewable energy technologies as well as implementing long-term behavioural change.

	Non-domestic	To develop and implement an innovative and systematic controls strategy to up to four Glasgow Life premises. This project spans 3 leisure Centres and Swimming Pools
Orkney	Non-domestic	The Council has an energy efficiency programme as part of its five-year cyclical maintenance programme to improve the energy efficiency of its non-domestic building stock. This Energy Efficient Scotland project aims to improve the efficiency of a school building with external wall insulation, roof insulation and others.
Scottish Borders	Domestic	Development of community hub to engage and support local residents in energy efficient retrofitting interventions.
	Non-domestic	Non-Domestic Energy Efficiency Measures in a local High School
South Ayrshire	Non-domestic	Improve the energy efficiency of Ayr High Street which is currently at the focal point of regeneration plans; this will be done through a combination of measures, low carbon technologies and education.
	Domestic	The objective is to improve the energy efficiency of households in rural South Ayrshire with high fuel bills that are not considered to be in fuel poor areas. Targeted properties would be EPC band E, F or G

Table 1: Description of the activities carried out for each of the Phase 2 pilots.

2. Method

The University of Edinburgh was appointed to carry out an independent evaluation of the Energy Efficient Scotland Phase 2 pilots. This builds on earlier evaluations of the Phase 1 pilots[3] and Local Heat and Energy Efficiency Strategy (LHEES)[4] pilots. The current report seeks to identify lessons from this round of 9 pilot projects to inform the future development of this programme, for Scottish Government, local authorities, and project partners.

This evaluation focuses on the organisational and social aspects of the pilots. It primarily draws on in-depth semi-structured interviews conducted with each of the pilot teams at the beginning (June 2018) and towards the end (October 2019) of the pilot projects. These included representatives from each local authority and their project partners.

The interviews were with between 1 and 6 people, depending on the preference of the project team and individuals who were involved in the delivery of the pilot. These interviews considered:

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[3] Bush R, McCrone D, Webb J, Wakelin J, Usmani L & Sagar D. 2018. Energy Efficient Scotland – Phase 1 pilots evaluation final report. Available at: https://heatandthecity.org.uk/wp-content/uploads/2018/11/EES-Pilot-Evaluation-Phase-1-Final-Report1.pdf

[4] Bush R and Webb J, 2018. LHEES pilots evaluation – interim report. Available at: https://heatandthecity.org.uk/resource/local-heat-and-energy-efficiency-strategy-lhees-pilots-evaluation-interim-report/

Wade F, Webb J & Creamer E, 2019. Local Heat and Energy Efficiency Strategies: Phase 1 Pilots – Social Evaluation Report. Available at: https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-phase-1-pilots-social-evaluation/

- Content of the pilot
- Partnership working and procurement for pilot delivery
- Skills and resources required to deliver the pilot
- Perceptions of the Energy Efficient Scotland programme, including available funding, timeframe and scope and specification of the pilots

All of the interviews lasted between 60 and 90 minutes and they were normally conducted in the local authority's offices or nearby. Some interviews (for example, with authorities in remote regions) were conducted via telephone or Skype due to time and resource limitations. The interviews were audio recorded and transcribed verbatim. The first and second round of interviews have been analysed together for this report. Interview data has been analysed according to themes emerging, including: pilot outcomes; the delivery process; finance and funding; engagement with building occupants and owners; and lessons for future funding rounds.

Phase 2
9 Local Authorities
Sept 2017 – Dec 2018

Figure 1: Map illustrating the local authorities included in the Phase 2 pilots.

3. Results

3.1.   Selection of projects

> **Key points:**
> - Local authorities were able to identify projects to fit with the scope of Scottish Government's call. This included:
>   - Hard-to-treat buildings
>   - Implementing innovative technologies (e.g. Building Management Systems)
>   - Taking an area-based approach
>   - Piloting strategies for engaging private householders
> - Early engagement in the pilots is helpful; however, prior pilot work could lead local authorities to specify more straightforward projects
> - Work taking place under other council initiatives (e.g. SEAP, LHEES, EESSH) shaped the identification of pilot projects.

3.1.1. Fit within scope of the call and earlier Energy Efficient Scotland work

Several project teams emphasised that they selected and developed project proposals on the basis of the specification set out in the call. This allowed authorities to identify new projects that they would not necessarily have focused on without the Energy Efficient Scotland pilot funding. **This included several hard-to-treat buildings**. One of these was a large hard-to-treat community building that had been languishing in the council's portfolio because of the cost of retrofitting it. Through the Energy Efficient Scotland pilot, this building was retrofitted and would subsequently be gifted to the local community to act as a hub for meetings. The project **included innovative elements**, such as an advanced Building Management System (BMS), to fit the funding call. Similarly, local authorities identified hard-to-treat school buildings that had been signposted for improvement works for some time:

> *"…one of the aspects it was looking at that resonated with me was …hard to treat properties, so we do have some older buildings at the schools that are quite challenging in terms of energy efficiency so it kind of went along with that theme quite well."*

Other local authorities focused on the **area-based approach** encouraged by Scottish Government, for example targeting a whole high street or town (two projects). Additional projects included the **piloting of strategies for engaging private householders** in retrofitting (two projects). Participants recognised that these were in keeping with Scottish Government's funding call and wider ambitions for the Energy Efficient Scotland programme.

Where authorities had also undertaken Phase 1 pilots, they used this experience to shape Phase 2 pilot applications. This included revising applications that had previously been unsuccessful, so that works could go ahead. However, experience in delivering Phase 1 projects also led some authorities to specify relatively straightforward projects which they knew would be achievable in the timeframe set.

For example, in one case, the council put a proposal together to provide interventions on a single community building, noting:

> *"I think perhaps we purposely didn't go down the route of something more complicated based on Year 1 and knowing the timescales and the spending and there was the funding element as well."*

This **simplification of projects to manage restricted funding and timescales** is understandable, but potentially happens at the expense of the more innovative, deeper retrofitting activities that will be required to meet Scottish Government's zero carbon by 2045 targets[5].

3.1.2. Alignment with local authority plans and existing projects

Local authority officers **sought to align their projects with existing council plans**; for example, officers provided detail of broader council targets that the pilot work would contribute towards. Cited strategies included: a Sustainable Energy Action Plan with a carbon reduction target of 42% by 2020; an Energy Efficiency and Affordable Warmth Strategy; and targets to achieve 40% reduction in carbon emissions by 2025. In several cases, councils had pilots for Local Heat and Energy Efficiency Strategies (LHEES) underway, and **identified projects to fit within the area-based approach** being applied here. This included the area-based selection of energy efficient retrofitting projects, and in one case, the extension of a council-owned combined-heat and power network to service more properties:

> *"I suppose the key thing there was the localisation of the energy that was being generated within the scheme as well which was one of the main elements of the second call for Energy Efficient Scotland as well"*

Alongside local approaches to project selection, authority officers cited work already performed to comply with Energy Efficiency Standards for Social Housing (EESSH) shaping their selection of projects for the Phase 2 pilots. Similarly, one council used the Phase 2 pilot to 'fill in gaps' in a small area where Home Energy Efficiency Programme Scotland: Area Based Schemes (HEEPS: ABS)[6] had already taken place:

> *"When HEEPS ABS came along that gave us the ability to do a larger project to upgrade the energy efficiency in both council properties and private homes which really left us with a few private homes and the community hall which is, to all intents and purposes, the only facility in [the town]…it was in desperate need of a bit of help and this gave us the opportunity to have a look at it and see what we could do."*

In several cases, **pilots were selected on the basis of work that had already taken place**, for example feasibility studies. This included work on the viability of incorporating a heat pump system to service a remote village, and a complex retrofit on a listed hard-to-treat building. Officers also noted an element of 'luck' where

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[5] Scottish Government. 2019. Scotland to become a net zero society. https://www.gov.scot/news/scotland-to-become-a-net-zero-society/

[6] Scottish Government, 2019. Home Energy Efficiency Programmes for Scotland: delivery report 2017-2018. Available at: https://www.gov.scot/publications/home-energy-efficiency-programmes-scotland-delivery-report-2017-18/

authorities had previously identified projects that happened to fit within the scope of the Phase 2 pilots:

> *"We, well we didn't actually, our project was lucky in a way that it fitted into the pilot of the scheme without having to change specification, we applied with the scheme that we were underway with…so we didn't actually have to change anything to meet the requirements of the project."*

3.2.   Outcomes

Key points:
- More ambitious projects (including hard-to-treat buildings and those with a combination of private and public sector stakeholders) experienced significant delays.
- Projects using established delivery mechanisms and taking a piecemeal approach to retrofitting (for example, adding EWI only) were delivered on time
- There were indications that energy and cost savings would be achieved through the pilots (although these were not confirmed at the time of report writing)
- Local authorities extended their existing roles through the pilots; in particular, as network owners and energy suppliers.
- Local authorities were able to leverage additional funding as a result of the Energy Efficient Scotland pilot, for example through Salix Finance.
- Several project teams were pursuing plans to extend the work carried out through the Energy Efficient Scotland Phase 2 pilot.

At the time of the final evaluation interview (October 2019), 6 of the 9 Phase 2 pilots were complete. There were **several instances of authorities experiencing significant delays** in pilot delivery, due to challenges with funding, procurement, and feasibility issues (discussed in sections 3.3, 3.4, and 3.6). Generally, more ambitious projects (for example, those treating multiple buildings; hard-to-treat buildings; and including private and public sector stakeholders) experienced delays. Projects that were more in-line with local authorities' **established delivery mechanisms and remit were delivered on time** (for example, retrofits to authority-owned community and public buildings; schools and leisure centres). Although some included the addition of innovative technologies; these projects tended to take the **piecemeal approach which is common in traditional approaches to retrofitting**. This included the addition of wall insulation, alternative lighting and advanced building controls systems, but did not extend to a holistic, whole building retrofit or area-based approach in all cases. For example, when referring to their successfully completed school retrofit, one authority officer explained:

> *"it's not a hugely unusual job for us. The architectural work was done in-house and then it was passed over [to another department] for the surveying work and the tendering and, you know, after that, it's been passed through the construction phase with the clerk of works on site so it's, you know, there was nothing out of the ordinary in the process for this job."*

3.2.1. Energy and financial savings

Formal monitoring of internal temperature and energy consumption had not been completed at the time of the second interviews. However, where projects had been completed, authority officers did report **promising signs that energy and cost savings would be achieved**:

> *"I think we're looking at a probably fifty percent oil saving now on the building and …that's just that's what we were getting…with the insulation, we haven't optimised the heating system yet so we're happy with that amount of saving"*

> *"yes we're saving on energy but we're not saving anything on the cost and we're doing it just purely to try and stay at a kind of stand still place yes it's been more energy efficient but we're not actually saving money off it because energy costs are always going up... yes that's difficult but at the same time when you take into account well we normally spend ten thousand pounds a year re-lamping and repairing these lights in this particular building it's we're not going to have to look at that again for seven to ten years"*

> *"we managed to do a full building energy management system upgrade and we did a full canopy, external canopy lighting upgrade there, which has shown massive savings since that's happened…[in the event space]…the chandeliers are now fully LED saving thousands of pounds, thousands of kilowatts a year for all the events"*

In a short timeframe, projects were thus able to start showing benefits. In addition to energy and cost savings, project teams also said that **building occupants had responded positively to retrofit works**. Local authority officers noted that occupants had reported being warmer and more comfortable, and happy with increased control over heating and lighting. Where lighting improvements had been made to a council building, officers reported occupants feeling that their working conditions had been improved:

> *"we had at least three known cases of those who had migraine issues prior to the lights being changed and, after that, in fact one sent an email acknowledging that [it had improved], another one was just verbally stating to myself about it … from a health and safety point of view, that was working below the office light levels in a building and so that was improved."*

Similar positive occupant feedback was received where schools had been retrofitted. Another critical outcome for several of the pilot projects, and of significance for the broader Energy Efficient Scotland programme, was engagement with building occupants and local communities; this is discussed in Section 3.5.

3.2.2. Extending scope of works and local authority roles

In some cases, the pilot work began to extend beyond original plans, for example, with one participant saying that the project (implementing LED lighting and advanced Building Management Systems) "*grew arms and legs*" in the course of the pilot. In such cases, the pilots had started to demonstrate value (through the outputs

discussed above) and further work was funded through local authority finance, or seeking additional external funding (this extension of work and leveraging additional funds is discussed more in Section 3.4.3).

In two pilots, **local authorities and project teams developed or extended their role as network owners and energy suppliers**. In one case, this included the extension of an existing local authority-owned district heating network and private wire. The authority team delivering the pilot discussed ambitions to become a 'private supplier' providing locally sourced electricity to local properties; however, for the pilot they limited their supply to council-owned buildings:

> *"I think what we have tried to do was to keep it as a true private wire installation so that all the sites that we're supplying are under the control of the council in some form or guise…so all the sites that were kind of feeding the private wire are still within the council's wider estate, which avoids some of the complications of becoming a true provider, a private supplier"*

By focusing only on supplying their own stock, the council were able to avoid some of the complications of becoming a private energy supplier. For this to happen, authority officers highlighted that regulations for local authorities to be energy providers would need to be developed, and that: "there's the complexity and the almost complete lack of skills that exist within the local authority to actually manage that asset". The second case involved a local energy charity and an external consultant. The charity could not sell energy, and so a trading subsidiary was established to manage heat supply agreements for heat supplied through a Ground Source Heat Pump being installed. Establishing the heat supply agreements was a complex process:

> *"we had to establish the principle with the funders … the process of drafting the Heat Supply Agreement, getting approval from Scottish Government for that, amending it to reflect their input and then getting contractual signoff from everybody on that agreement was a substantial piece of engagement work. So and in parallel with that the heat supply agreements include a schematic of everybody's heating system of what is being put in so that and it defines the demarcation of responsibility. So the internal heating system is the, is owned and operated by the home owner and up to the heat pump is owned by the community energy company and so if the heat pump fails it's for the community heat company to replace that."*

The knowledge developed in these cases is likely to be highly valuable in developing area-based plans for energy efficiency and heat decarbonisation, for example through LHEES. There are clear opportunities for sharing learnings about innovative approaches here, and **there may need to be additional support for local authorities looking to take on these roles**.

3.2.3. Leveraging additional funding

In several cases, the local authority teams had been **able to leverage additional funding as a result of the Energy Efficient Scotland pilot**. As well as the original match funding secured to finance the pilots (discussed in section 3.4.2), project teams described success in securing additional funds for future works and

extensions to the Energy Efficient Scotland projects, as a result of successful pilots. In one case, during the first evaluation interview, a local authority officer had described a desire to install a micro hydro scheme in the park where they were installing a Ground Source Heat Pump (GSHP). During the final evaluation interview, the officer explained that, as a result of the GSHP work funded through Energy Efficient Scotland, the team had subsequently secured funding for the micro hydro scheme, which was being installed:

> "It's not operational yet, it's still in construction, but one of the benefits of having the ground source heating, and having the funding to be able to do that, probably supported our bid for the micro hydro. We might not have got it otherwise but, because it was a nice, it was a unique system, it's a closed loop system now so, once that's running it will provide all the energy for the ground source heating, which will be excellent."

By the end of this project, the micro hydro would provide energy to run the ground source heat pump and so the park would be able to operate as a 'closed loop' system which did not draw any energy from the grid. Two project teams discussed **leveraging more money from Salix[7] funding as a result of the Energy Efficient Scotland pilot work**. In one case, three schools received lighting improvements and were connected to an existing district heating network. The team explained that the Phase 2 pilot had allowed them to work more closely with the private partner contracted (through a Public Private Partnership contract) to manage the schools and subsequently perform improvements to an additional 3 schools. This included leveraging additional Salix funding:

> "We were then able to use the Energy Efficient Scotland grant to lever in more money from Salix to allow us to do three other High Schools that were unconnected to this so and that's happening towards the end of March…including the largest, one of the largest High Schools in Scotland. It's allowed us to do LEDs there and two others."

Another council explained that their installation of an advanced BMS through the Energy Efficient Scotland pilot would enable them to apply for more Salix funding in the future. In particular, more, higher quality data could be made available through the BMS:

> "We'll be able to use the data slightly differently, so, it might enable us to use Salix more than we had for some of the projects. Some of them are just projects you can never prove the savings so some of it will definitely go ahead."

Additional, high quality data could be used to demonstrate energy savings, and thus fulfil the requirements of Salix funding, for use on future projects.

3.2.4. Future project plans

Several council officers suggested that the work undertaken through the **Energy Efficient Scotland phase 2 pilots had created subsequent opportunities to extend their energy efficiency activities**. This included additional work on the

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[7] Salix Finance provide interest-free Government funding to the public sector to improve energy efficiency, reduce carbon emissions and lower energy bills. See: www.salixfinance.co.uk

buildings that had received energy efficiency improvements using Energy Efficient Scotland funding. For example, one council officer highlighted that the improvements to a school building made through the Phase 2 pilot now meant that they could explore the addition of low carbon heating technology and a Mechanical Ventilation Heat Recovery unit (MVHR), "*over the medium to longer term*". It would not have been appropriate to install these ahead of the Energy Efficient Scotland project, because the building was not thermally efficient or airtight enough.

Other project teams highlighted that the pilots undertaken using Energy Efficient Scotland funding were well suited to scaling up and extending to additional buildings or a wider area. For example, Energy Efficient Scotland funding supported the extension of an existing combined heat and power network. Whilst this project was in progress, the team explained their ongoing investigations into how they could extend the network provision:

> "*We're currently looking at extending [the combined heat and power scheme] to another couple of blocks of flats and supplying a renewable heating scheme an air source heating scheme for two blocks of flat as well which are satellite to [this] area. So, the fact that we could actually maximise the efficiency of the electricity use [through the work in the Energy Efficient Scotland pilot] means that we can actually develop these other schemes.*"

The wider impacts of the initial project funding through Energy Efficient Scotland could, in this case, lead to the extension of the network to an additional 2 large blocks of flats (the one included in the pilot contained 260 flats). Another clear example of the pilot potentially facilitating a wider roll-out was one project team's plan to extend the energy advice hub model that they had developed during the Phase 2 pilot. In this case, the council and delivery partners had collaborated to develop a council plan for a "*hub and spoke model*" that would **provide community outreach and energy events across the whole local authority area**. It was only through the development work carried out during the Phase 2 pilot that the viability of this model could be tested. After experiencing success in engaging the local community, and leveraging private investment in retrofit, the team were keen to continue. A similar scale-up was discussed in the case of a park refurbishment project that had installed Ground Source Heat Pump through the Energy Efficient Scotland pilot. This was described as a "*best practice model*", and the authority were subsequently planning to commission Greenspace Scotland to analyse more green spaces and identify opportunities for further installation of GSHP.

However, building on the success of these pilots is reliant on additional funding and continuity in the support from central government. One participant explained that, after using the Energy Efficient Scotland pilot to install a new BMS and more efficient lighting in a series of public buildings, they were exploring a secondary glazing solution. However, progress with this was restricted by "*a limitation on what funding is available under [Energy Efficient Scotland]…and…a limitation on what we can deliver resource-wise*". This illustrates the significance of funding, a clear direction, and continuity, in order to maximise on the potential and benefits of these energy efficiency pilots – this is discussed more in Section 3.6.

3.3. Pilot delivery

Key points:
- Partnerships for delivering the Phase 2 pilots were structured in four different ways:
  - All local authority in-house (2 pilots)
  - In-house with ALEOs (1 pilot)
  - External organisations playing a significant role in delivery (4 pilots)
  - Led by external organisations (2 pilots)
- There was no clear link between the structure of a delivery partnership and project success; instead, this was related to project complexity and establishing trust and communication amongst partners.
- Pilot teams found it challenging to identify contractors with suitable expertise, particularly for hard-to-treat buildings.
- Some contractors struggled to engage in projects with a short timeframe, with lack of capacity being an issue amongst smaller contractors
- Working with new contractors presented challenges with communication and snagging.
- Project delivery teams can play a significant gatekeeping and liaising role between contractors and private householders undertaking retrofit works.

3.3.1. Partnership working

Pilot delivery partners included Arms Length External Organisations (ALEOs)[8], local charities and third sector organisations. Such **partners can play a significant role in the development and delivery of the retrofitting pilots, including engaging with building occupants, providing project-specific expertise and overseeing project progress**. Across the Phase 2 pilots, there were four different partnership structures: all local authority in-house (2 authorities); in-house with ALEOs (1 authority); external organisations playing a significant role in delivery (4 authorities); led by external organisations (2 authorities). There was no clear link between the structure of a delivery partnership and project success. Interview participants did not report partnership structures as a factor when discussing challenges in project delivery (instead, issues around project complexity, funding, and timeframe dominated). Partnerships were continuations of established working relationships, and participants generally felt comfortable with the different structures established, each of which is now discussed in turn:

All in-house
The two local authorities that managed their Phase 2 pilots in-house worked extensively across different departments. In one case, 6 different council officers attended the interview (representing: building design; energy and climate change; housing standards; contract management); in the other there were 3 (representing: hydrogen projects; energy; surveying). One of the project teams highlighted that

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[8] There are an estimated 130 Arms-Length External Organisations in Scotland. An ALEO is formally separate to the council but its subject to its control or influence. See: https://www.audit-scotland.gov.uk/report/councils-use-of-arms-length-organisations

working with internal staff made it 'easier' to develop applications like that for the Phase 2 pilot:

> *"we don't have to rely heavily in initial stages on £X an hour but it is as such because there's that internal build-up of skills and knowledge within the council that I would say that has given it a positive note to it."*

The acquisition of skills within the council meant that officers were able to develop proposals without relying on potentially expensive external consultants. In addition, the participant noted that **developing internal resource can be beneficial for the retention of expertise**:

> *"internal teams have inherent flexibility that they can look at things outwith the original remit of what they may have been tasked to look at and also can be much more flexible about changing direction to get things from a different source."*

In-house expertise can offer a greater degree of flexibility, and continuity. The second local authority using this approach highlighted the need to address new challenges (for example climate change and resource use) as a reason for having to develop internal expertise:

> *"we're a bit self-taught, if you like, because we're trying, because we're aware of our what our carbon footprint was and…one of the main aspects is that we're in this period of austerity and we're trying to reduce [costs]"*

This expertise and continuity offered by developing internal expertise may be crucial for delivering the Energy Efficient Scotland programme, which will need a consistent and clear approach over the next 20 years to deliver energy efficiency and heat decarbonisation over a short timeframe. There is unlikely to be time for repeating training and education of new staff and partners as the speed of delivery ramps up.

In-house with arms-length organisations

One authority worked closely with ALEOs to deliver the Phase 2 pilot. The authority officer noted that they had approached ALEOs involved in the management of their social housing portfolio, and sports and cultural facilities, in order to identify projects for the pilot. Following the Phase 1 pilot, they had set up a working group with representatives of the different ALEOs branching from the council. Through this, they were easily able to coordinate and identify future opportunities. Participants highlighted that their **long working relationship helped to feel comfortable that the Energy Efficient Scotland pilot would be delivered successfully**:

> *"I was just going to say [the ALEO] were well versed in, you know, doing projects like this. That there's an element of trust between us. I think that we know that we've got partners that will get this work done so, you know, we do check in as and when required, but we trust that the work is getting carried out."*

External partners and in-house teams

In four cases, external partners played a significant role in project delivery. In these cases, local authority officers were involved in key decision making and maintained regular communication with delivery partners. Communication tended to happen around official reporting requirements, or if there were challenges in project delivery that required input from all partners. In all cases, **trust had been established**

between the project partners through existing relationships; they highlighted earlier collaborative working on energy projects, particularly area based schemes and experience from the Phase 1 pilots.

> *"Well following on from [Energy Efficient Scotland] 1 we had the [Energy Efficient Scotland] 2 bid in and we had interested parties for that, then we automatically would engage with [the project partner] to say 'this is what we're doing, this is what we're bidding for'."*

> *"as a managing contract agent [the delivery partner] has delivered, just about as far as I can recollect, all of the area based scheme funding for [this Council]. So, as part of that contract arrangement, there's an ongoing kind of awareness and, sort of, horizon scanning to see what other opportunities are coming up"*

Participants emphasised the **different skill sets available through working with different partners**. For example, in one case, the partnership involved a council officer overseeing the project design, whilst the delivery partner managed engagement with the building occupants:

> *"[The council officer] is a wonderful designer so basically [He] does all the design stuff …I tend to do sort of more administrative and public facing, hand-holding stuff and do sort of monitoring and evaluation, those kind of things."*

> *"we have the in-house expertise to look at the capital side of the programme but, in terms of the behavioural change side of things…with the people at the school, we don't have the resources, or perhaps the skills, to do that. So, basically, I'm managing and delivering the capital part of the programme and [the delivery partners] are delivering a behavioural change piece for us at the schools"*

This type of partnership can result in a relatively 'light-touch' approach from the local authority, as one council officer highlighted:

> *"once we'd kind of agreed to work together to develop up a bid as one of the elements of Energy Efficient Scotland 2, it was very much the [delivery partner] staff that put the proposal together. We stepped back then. We knew that there was a project there that would have a big impact …it really has been led by the [delivery partner] since then, in terms of every aspect of developing the bid and then carrying out the work and engagement, and so our side of it really is more, I guess, high level happening: dealing with the grants and comments during the government [discussions]"*

In this case, representatives from both the delivery partner and local authority seemed clear on the allocation of responsibilities and reported communicating well throughout the process of project delivery.

Led by charities and the third sector

Two projects were led almost entirely by charitable and third sector delivery partners. In these cases, the pilot work had been signed off by the local authority, but they had not subsequently engaged in project progress. For example, the interviews for this report were attended by delivery partner representatives alone. In one case, the delivery partner noted that pursuing their work was of mutual interest to both themselves and the local authority:

> *"even if sometimes the Council don't put themselves forward, we're quite keen that they make key decisions. Partly for self-preservation, we want to have that level of protection for ourselves, as well, we want the big decisions to come from the council, but partly because we feel that…they need to be involved in this decision making"*

In this case, it was also recognised as helpful for a third sector organisation to be overseeing the works because trust with the local authority had diminished amongst some members of the public:

> *"The businesses' attitude towards the council is quite poor at the moment so, for them to receive an offer of a consultancy…everything…will come on [delivery partner] headed paper."*

Thus the project, which sought to engage domestic and non-domestic owners and occupants, benefitted from using the third sector delivery partner's branding and logo. In this way, and where there was limited resource available within local authorities, third sector delivery partners were able to manage significant aspects of the pilot work. Consequently, third sector delivery partners can play a significant role in providing specific expertise and support. However, a national programme intended to result in retrofit of all buildings, with local authorities as a critical locus of planning, prioritising and implementing, will need to ensure that capacity and capability of local authorities are fit for purpose. This capacity needs to encompass: skills, local knowledge and project management, including procurement and contracting.

3.3.2. Contracting works

Contractors were recruited for the delivery of building works for all of the Phase 2 pilots. The work carried out by contractors included the addition of: insulation, LED lighting, advanced building controls, large-scale heat pumps, and the extension of existing district heating networks. In all cases, procurement took place via existing frameworks, including: Scotland Excel, Public Contracts Scotland and the Non-Domestic Energy Efficiency (NDEE) Framework. Challenges identified through the course of the pilots include: identifying contractors with suitable expertise; using local contractors; working with contractors; and contracting for works in the private sector.

Identifying contractors with suitable expertise
The Phase 2 pilots included complex projects wherein multiple different measures would be installed in buildings, different building types were included, and specialist technologies were trialled. This is a critical part of piloting energy efficiency improvements at the scale needed, particularly incorporating hard-to-treat buildings and testing innovative technologies. However, this revealed a **challenge in identifying contractors with suitable expertise**. One mixed-use hard-to-treat building included in the Phase 2 pilots was also a listed property; this meant that specialist contractors were recruited to work on the special concrete and glazing features of the building. This resulted in numerous different contractors with specialist expertise being recruited:

> *"It's a mix. We've got architects from [Scottish City] leading the whole team, but we've got a structural engineer, services engineers, quantity surveyors, fire safety specialists, health and safety specialist…it's a very*

> *big team, so it takes time…but we wanted to make sure we've got the right skills … just to give the right impetus to the whole project."*

In this case, project success was reliant on bringing a diverse range of skills together. Some participants highlighted that such project complexity could limit the number of contractors available or willing to bid for the work. This was highlighted in the case of extending an existing combined heat and power network and private wire connection:

> *"The fact that it was an existing system, as well, and the private wire side of things really hasn't been developed, to the best of my knowledge, anywhere in the format that we're doing, was challenging in terms of actually trying to tease that expertise from the market, and I think that was perhaps the reason that we got so few returns in terms of the final submission for the tender, because we were combining so many different aspects…trying to co-ordinate all these disparate, you know, different disciplines, if you like, the electricity side as well as the heat network side as well as the fact it was an existing scheme, as well as the fact you were dealing with a vulnerable client group, I think presented a particularly sort of group of challenges."*

Ensuring the availability of contractors for works like this, which includes a council-owned area based heating system, will be a crucial part of delivering Energy Efficient Scotland. This suggests a **need to focus on skills and supply chains for work on heat networks, and for complex project management (for example, listed buildings)**. In addition, where the expertise is available, the timeframe of the pilots meant that not all contractors were in a position to bid for the works. Brexit was cited as one issue that may be making contractors "*a bit nervous"* because of a reliance on suppliers who are on the continent. One participant reported identifying seven potential contractors early in the procurement process, sending the tender documents to these and only receiving three bids. The participant said:

> *"I think this is partly because, like, our turnaround time was quite tight…I thought that it felt there were enough people, enough firms out there that were capable of doing the contract…but the issue seemed to be the capacity within their own firms to be able to deliver something in four months' time that required significant resource. If we'd, say, tendered the works a year ahead, then I think firms are better placed to resource it effectively"*

Building on the findings from the Phase 1 evaluation report[9], this again indicates the significance of timeframe and the **need to provide enough notice of works for contractors of all sizes to be able to respond** to opportunities in the energy efficiency market.

Using local contractors
Although not always procuring directly from local contractors, the project teams reported that sub-contracting processes made the involvement of local contractors inevitable:

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[9] See: Bush, R., McCrone, D., Webb, J., Wakelin, J., Usmani, L & Sagar, D. 2018. Energy Efficienct Scotland – Phase 1 pilots evaluations final report. Available at: https://heatandthecity.org.uk/wp-content/uploads/2018/11/EES-Pilot-Evaluation-Phase-1-Final-Report1.pdf

> *"I mean, generally, it's going to be someone local, just purely from bringing all the trades together… there's lots of contractors out there who know how to organise lots of [sub-contractors] to do all the work, and programming it within the time and so on."*

For some project teams in remote areas, it was particularly important to try to recruit local contractors. For one remote project, the team had procured the work from a local contractor who had gained an accreditation to perform External Wall Insulation (EWI), highlighting that:

> *"the local industry is gearing itself up to be able to do this types of work because they can see that's what is going to be required to meet our needs of the county in going forward."*

In this case, the participants went on to explain that the contractor had also recently invested in a building cover system that would allow them to continue performing work in inclement weather – which was a particular challenge in their region. Working with local contractors is also important because they remain in the area and are able to manage any snagging with the work, helping to drive up quality. However, this **involvement of local contractors could also be limited by project timeframes and contractor capacity**. In one example, a preferred local contractor could not take part in the work because they were leading on another large project and did not have capacity to dedicate to this work in the timeframe.

Experience with contractors
Some teams expressed a preference for working with known contractors. One large Scotland-based contractor was noted for their ability to offer an 'all-under-one-roof' service which removed the need for project teams to identify additional sub-contractors.

> *"I think with, especially the EWI, it becomes quite difficult to find people that can do that and solar and everything else. So having one contractor that can do everything or at least subcontract some of the work you're just dealing with one person rather than five"*

This was a 'tried and tested' contractor who were able to work across several aspects of the pilot and deliver a reliable service. In other cases, to account for innovative aspects of the projects, **participants worked with new contractors and several reported challenges here**. In one example, a sub-contractor was not very reliable. It later emerged that they were a 'reincarnation' of a company with a poor reputation that had changed their name. The project team highlighted that if they had known this to be the case they would not have taken the sub-contractors on. In a different project, communication with a new, non-local contractor was cited as a problem:

> *"[With the] London-based company the communication process has been a wee bit poor. So, we feel that we are feeding them information that they are taking account of, but they're not engaging with it particularly well… it got a lot better once they'd actually got a project manager on board and then we made it quite clear we wanted regular updates and meetings with them"*

In this case, the project team had used the Non-Domestic Energy Efficiency (NDEE) framework for procurement; they highlighted that the communication challenges

could be a result of the contract written through the framework, and in future they would be:

> "[We are] looking to really beef up the part in the contract where we're talking about the partnership approach. NDEE doesn't really lend itself to that just because of the nature of it it's the actual contractor who's responsible for delivering the savings"

This clear communication needs to extend throughout the project delivery to commissioning and handover. This was demonstrated in another case, where the project team had started to notice some challenges during the late 'snagging' stages:

> "the most difficult thing, I think, [is that the project] has not gone as smoothly with the handover elements, partly because, I think, contractors at the end of the contract, kind of, just suddenly disappear. Contract administrators kind of just disappear. You don't see them as much, so when there are issues like there has been with, you know, the snagging in this case, something has gone down and trying to get that fixed quite quickly [has been challenging]."

This demonstrates that **any procurement framework must allow for the clear stipulation of communication and accountability requirements**, through the entirety of the project.

Contracting for works in private sector property

A final challenge emerging in the Phase 2 pilots is local authority support for management of works taking place in private sector homes. In three cases, the project teams were carrying out works on properties that were not owned by councils or housing associations. In one example, private householders were supported in accessing advice from HES for works to take place. In the other two examples, the project teams acted as liaison between contractors and householders.

> "…we help the residents to appoint them [the contractors]. So basically there was a list of four different architects who got sustainable and conservation skills they are accredited by RIAS and one resident came, phoned them, sent them you know this is the brief and we engaged with them to elaborate the design brief to get their feedback on that. So we send them this document and then it was a classical tender process with the tender reports agreed by the residents and then the appointment."

In this case, the contract would be between the residents and the contractor; however, the delivery team had coordinated the different property owners in the block, offered advice on suitable contractors, and the retrofitting process. This was felt to be a necessary support when managing a complex project that not all property owners would be expert in. This sentiment was shared in the second case, in which a shared heat network would cater to different private properties. The interviewee highlighted:

> "it's difficult for small entities like you know a group of owners to discuss, negotiate with a big contractor…maybe the project is seen as a bit dangerous for them because you know working with a group of owners is less comfortable than working with the university or local authority"

In both instances, the **project teams had expended a large amount of time and resource in coordinating different private owners, and liaising with**

contractors, despite not being contract signatories themselves. Although less formal in their relationship, other projects also sought to support private residents in retrofitting their properties. This extended to running a 'prequalification exercise' to identify suitable contractors and use this to develop a list of trusted traders that could be shared with private owners:

> *"We did this the prequalification exercise with our commercial department and the procurement department and put it out through Public Contracts Scotland to say that we were developing a standing list of contractors who could implement external, internal, cavity wall and energy efficient boilers and the guide is pretty simple it's a kind of two page of A4 trying to, we spent a lot of time trying to make it really, really simple for people because there's enough confusion in this market."*

In all of these cases, **project teams have had to play a significant role to develop support mechanisms for private owners to retrofit their properties**. The resource requirements of these activities need to be considered in the development of the wider Energy Efficient Scotland programme, the success of which will rely on leveraging private investment in retrofit.

3.4.   Funding

Key points:
- Pilots treating authority-owned and single buildings delivered works within the budget and timeframe available.
- There were significant funding shortfalls on more complex and innovative projects.
- Limited timeframes for submitting pilot applications can prohibit the acquisition of accurate contractor quotes and result in underfunding later in the project.
- Limited finance can create a short-term focus and false economies, with more adverse impact (and financial investment) in the longer term, when repairs and upgrades may need to be made.
- Multiple sources of funding were used to complete the proposed works; this included sizeable unanticipated investments from within Council and delivery partner budgets.
- Securing match funding after securing Energy Efficient Scotland pilot funding resulted in significant project delays.
- Different funding sources were needed to complete different aspects of the work; these were complex and time consuming to manage.
- Existing financial support for householders (e.g. HES loan) was deemed to be complex to secure
- Coordinating multiple homeowners and multiple funding sources for whole-

3.4.1. Managing funding shortfalls

There was a mix of experiences with regard to funding for the Phase 2 pilots; in some cases project teams reported sufficient funding, whilst in others they reported significant funding shortfalls (taking into account both Energy Efficient Scotland

funding and match funding – discussed in Section 3.4.2). The projects that reported **sufficient funding were those where teams had previously worked on similar projects. These tended to be single buildings that the local authority owned**, for example a school or community centre (3 local authorities). Some teams reported selecting these projects in order to ensure that they could deliver the works within the budget and timeframe available.

However, **significant funding shortfalls were reported on the more complex and innovative projects**. This included those projects trialling new technologies; working with multiple privately-owned properties; or working on hard-to-treat buildings. In one instance, the project team had applied for £1 million from the Energy Efficient Scotland programme, for the implementation of a ground source heat pump-powered district heating network & energy efficiency measures to surrounding properties (to be match funded through an application to the District Heating Loan Fund). The team had received roughly £160,000 funding from the Energy Efficient Scotland programme. This funding provided £5,000 per property being retrofitted; this covered the cost of upgrading the heating system, but very little for energy efficiency works. To accommodate this, the team reduced the energy efficiency works to those *"which were essential in order to secure the effective performance of the system and secondly secure the Renewable Heat Incentive"*. In addition, the team sought match funding from multiple sources; this is discussed more in section 3.4.2. A second project team reported a funding shortfall of £400,000, which they match funded through the local authority (see section 3.4.2).

It was suggested that **more funding may be required for projects in rural and island communities**, to account for challenges of engaging the workforce (who, if not based in the region, may have additional fees for travel and accommodation) and transporting relevant parts and technologies. Funding shortfalls were often identified when tendering works, with contractors quoting more than project teams had anticipated. It was suggested that project teams had insufficient time to acquire quotes or undertake formal procurement within the timeframe for Energy Efficient Scotland funding proposals (see section 3.6):

> *"that's quite a process to get surveys and identifying what's required and then get the quotes and go through procurement to get a number of quotes and compare and all the rest so when you've got a grant application that's saying you've got six weeks/five weeks or something to submit that application."*

Thus, **limited timeframes for applications can prohibit the acquisition of accurate quotes and result in underfunding later in the project**. There was only one example of a project team having tendered the works before the funding was in place. They noted that:

> *"we appointed contracts before we had all the funding in place …we had to take that risk of you know in a sense…but in fact we would have had to pull that if we hadn't had the money and then there's always a slight financial consequence to doing that in contract."*

This participant later explained that it was fortunate the tendering had taken place earlier, because the contractor needed a long lead in time to start commissioning and ordering suitable parts (for a ground source heat pump, in this case). In another

case, where a mixed-occupancy hard-to-treat building was being retrofitted, the team reported quotes returned through the tender process being £300,000 (excl. VAT) over budget. In response, a participant explained:

> *"we had to spend time to find solutions once again … increase the budget, ask for additional funding … which we managed to get from the Scottish Government, and get an extension in terms of the deadline and get, also, additional funding for the capital costs and additional funding for the staff"*

In order to progress with the project, the team sought additional funding, but also explained that they revised the plans to remove any elements that were not deemed absolutely necessary. For example, they had originally sought to test internal wall insulation, in order to see whether this was more effective (in this hard-to-treat building) than the use of cavity wall insulation. A similar strategy was applied by another council who experienced a funding shortfall. They were extending an existing district heating network and private wire connection, and noted that:

> *"there was a number of aspirational elements we wanted to do in terms of being able to build redundancy and provide additional pipe circuits for example, provide additional redundancy in terms of the transformer"*

In their original bid, the team had included elements of '*future-proofing*' to ensure the longevity of the network and connection (which, by the end of the project, would serve approximately 600 people). Although not to the detriment of the operation of the system, these elements were lost in revising the proposal to meet the funding requirements. **Limited finance thus creates a short-term focus that may create false economies, with more adverse impact (and more financial investment) in the longer term, when repairs and upgrades may need to be made.**

The types of activity proposed by these project teams, which test and verify successful strategies for complex retrofitting and heat decarbonisation, are absolutely critical to achieving the Scottish Government's climate goals. It is not sufficient to continue with a piecemeal approach to retrofitting, or only pursue the least expensive options. Retrofitting activity must go beyond 'quick fix' measures like more efficient gas boilers and external wall insulation. Instead, to meet the Government's target for net zero emissions by 2045, retrofitting and heat decarbonisation needs to be holistic, and include innovative approaches. **This will require sufficient funding to be made available through Scottish Government, alternative sources, or a combination of both** (this is discussed more in section 3.4.2).

3.4.2. Match Funding

A stipulation of the Energy Efficient Scotland Phase 2 pilots was the need to seek match funding. Several project teams acquired match funding from within council budgets (four projects), but usually, **multiple sources of funding were used to complete the proposed works**. One project team found that, once the work had started, there was "*far more wrong with the buildings*" than had been anticipated. Additional work was also required to ensure that the projects were compliant with NDEE and demonstrated financial and energy savings. This resulted in requiring additional funding from two ALEOs, the Council, and Scottish Government. At interview, the team explained that a £500,000 project was now a £1 million project,

and that there had been "*sizeable amounts of money*" from the council and its ALEOs, which extended beyond the 50% suggested in the pilot brief. This funding was critical to the success of the project; however, the team also implied that they would not be able to leverage this amount of internal funding again, noting that they were: "*once bitten, twice shy*". In another case, it was suggested that additional council funds had to be used because the project team had left it too late to apply for external funding. Some authorities also reported applying for Salix funding, although this was not widely cited. The requirement for match funding was recognised as beneficial in one case, where an interviewee noted:

> "*a match fund type thing encourages investment from both sides and ensures the longevity of a project as well…when there's match funding there's a lot more interest from the council in ensuring things are better scrutinised, to ensure that, beyond the grant funding, we can actually operate this and be in a position to continue to deliver the project as it should be.*"

Third sector delivery partners also contributed to match funding, but highlighted that they did not have access to many of the funding sources directed at the public sector, or local authorities specifically. Because of this, they had to draw on different funding sources, including technology and energy specific schemes, such as the District Heating Loan Fund (which provided roughly £1 million for a district heating project), a conservation funding programme and Scottish Power Energy Networks Green Economy Fund. Additional funding was sought from charitable foundations and lenders to social projects including Esmée Fairburn Foundation and Social Investment Scotland (£250,00 each to one project). Two of the projects with the most complex match funding arrangements still had not commenced the capital works at the time of the second evaluation interview (October 2019). It was suggested that **securing match funding had resulted in significant project delays**:

> "*The first year was taken up to a large extent with trying to resolve issues with respect of the District Heating Loan…However, in that process, we established that the funding didn't cover some of the costs which would be incurred and so there was a need for external loan funding and so that was secured in principle from Social Investment Scotland and Esmée Fairburn Foundation for around half a million, about two hundred and fifty thousand pounds each. So that gave us a total of one point seven million-ish which was, together with some private investment, was enough to deliver a district heating project using ground source heating with energy efficiency for buildings in and around the village.*"

Working with multiple people to acquire funding, and managing multiple different funding sources and were highlighted as significant challenges for timely project delivery:

> "*Within the council there is the architects, the engineers, we've had help from people to get other grants. Energy Efficient Scotland started it…[then] we applied for RCGF which is Regeneration Capital Grant Funding…and that got us another million and then [a colleague] who's running the committee side of [the building] so we've now got a pot basically and that's now big enough to do a proper refurbishment.*"

> "*I suppose the biggest challenge with this whole project has been the number of different grant funders we've had involved in this, and the timing*

*of those grants to be spent by a certain time has put a lot of pressure…it
does put a real pressure on the project concerned and adds increased
risk, and then things have to be done in, perhaps, an order that's not
right... because some of the funding needs to be spent by a certain time"*

The use of multiple funders was often necessitated for cross-sector works, for
example the installation of energy efficiency measures and a new heating
technology. This is because different funders have quite distinct works that fall within
their remit. This has been hard to manage and led to significant delays for the project
teams delivering Phase 2 pilots, and is **likely to be prohibitive to the future area-
based energy efficiency and heat decarbonisation that Scottish Government
are envisioning through Energy Efficient Scotland and LHEES**. In particular,
different funders will certain elements of a project, and have different terms and
conditions and timeframes for bidding and project completion. It would be useful
then, to either look at current funding sources (many of which route back to funding
from central government) and consolidate these to cater for the complex works
taking place under Energy Efficient Scotland, or provide support for local authorities
in managing multiple funding applications, spending and associated reporting
requirements. This could take the form of providing standard templates for routes to
funding for complex retrofit.

3.4.3. Private investment in retrofit

In several cases, the Energy Efficient Scotland projects sought to retrofit privately
owned and privately rented properties. Although some grant funding was made
available through Energy Efficient Scotland, this was often insufficient to complete
the works required, and project teams worked to leverage the additional private
investment (two projects). Encouraging private investment was also a feature of
Energy Efficient Scotland pilots which developed strategies for engaging with the
privately owned and privately rented domestic sectors. During their first interview,
one project team expressed concern at not having any grant funding to offer the
private sector:

> *"we were actually looking for grant funding to go alongside [private
> investment]. So we would use resource funding to fund a consultant to
> give some specialist advice and then we would be able to offer some grant
> funding to the household to encourage [retrofit works]…but the whole thing
> got removed. So we're basically taking forward a project that is purely
> consultancy and if the householder wants to invest it's a full investment
> from themselves."*

During the final evaluation interview, the team estimated that £1,500 would be the
maximum that an average person would be prepared to pay. However, their energy
consultant had estimated that, to achieve an EPC C for all of the properties looked at
in the pilot, the average investment would be £19,500 per property. This team also
reported very little engagement that had resulted in actual retrofitting works taking
place (see section 3.5). Another team trialing an engagement strategy had referred
participants to the Home Energy Scotland (HES) interest-free loan for domestic
retrofitting works. However, they explained that there were still challenges in
residents actually accessing this:

> *"the loan's not really a loan, so you have to have the money in the first place and pay it back afterwards. So that's another major difficulty to get people to use that as a source of funding and it's not really made clear to people that that's the case."*

Concern about the HES loan requiring upfront payment was shared by a participant in another interview. Consequently, **existing support mechanisms may need to be reconsidered to ensure that they are suitable for use, and sufficient to encourage take up of retrofitting**. Engaging participants and leveraging private investment in retrofit could also be a challenging and time consuming task where capital works were planned. Three projects worked explicitly with private households for the installation of energy efficiency and heat decarbonisation measures. In two cases, the projects required very regular and intensive engagement with residents in order to support them through complex processes. In a hard-to-treat mixed use tenement, this included supporting the establishment of a residents' association, identifying potential contractors for the works, advising residents on the works taking place and supporting the process of the residents contracting the works. An interview participant explained these complexities:

> *"the documentation has been prepared, so it is the job of the design team to get that on time. Owners are putting their shares in the joint bank account and they are signing the grant offer, …we've got maximum two grant offers per individual: one for the conservation funding, one for the energy efficiency plus one for all of them so they have to sign plus we've got legal documentation at the back of each grant, standard security for the repayable grant and a constitutive deed which is a requirement from our funder for the [grant] so it's a lot of stuff to sign. When they have to all sign the same documents logistics it's taking time, people are on holiday so yes we are at the point where we are trying to get everything signed."*

Coordinating multiple different homeowners for a whole-building retrofit is evidently a complex task; the success of Energy Efficient Scotland will thus be reliant on community development and leadership. This is exacerbated in this case by the fact that **owners are relying on a combination of two different grant offers, along with their own contributions and having to consolidate all of this into a single bank account**. At the time of the second interview, this project was yet to commence capital works. The project is demonstrative of the scale of the challenge in recruiting building owners, and leveraging private investment for the Energy Efficient Scotland programme.

3.5. Engagement

Key points:
- Engagement was most straight forward for project teams working on public-sector, council owned buildings.
- Whilst access to schools to complete retrofitting works was relatively straight forward, it was more difficult to engage staff and pupils in lessons about energy efficiency.
- Local authorities' and delivery partners' established presence in an area supported community engagement activities
- One of the most time and resource intensive activities during Energy Efficient Scotland Phase 2 pilots was engagement with occupants in the privately owned and privately rented sectors, and business owners.
- Providing financial contributions made it easier to engage residents.
- Compulsory requirements for a sinking fund and regular maintenance surveys would make energy efficiency work in tenements more straight forward.
- Business owners were consistently difficult to engage with.
- Mail-out engagement activities receive very low return rates; community-based engagement requires a remit broader than just expensive retrofitting activities to initially build trust.

All Phase 2 pilot project teams undertook engagement work with building occupants, building owners and local communities. This work took different forms, and working across different sectors raised varied challenges for project teams.

3.5.1. Public sector engagement

The most successful engagement was for project teams working on public sector, council-owned buildings. These included community centres, museums, event facilities, bus stations, and schools. Council ownership usually meant that the teams were readily able to access these properties for initial assessments and carrying out the works. Where councils owned the buildings being treated, they tended to have long-term knowledge of the property and existing close engagement with occupants:

> *"It's part and parcel of the day-to-day operation my team do anyway so we take overall control of the maintenance repairs within the buildings but we work very closely with the event managers and we have an energy champion in every single one of our buildings so we keep them informed about what's happening"*

However, public buildings are frequently in use, so the primary task in these cases was to coordinate with different building occupants and consider usage. This could be problematic for coordinating works, and resulted in some minor delays to project completion:

> *"I think with the properties we've picked they have quite active you know facility sides…if you look at a bus station clearly you know it's a building that needs to operate and the same with the [event space] and the museums. The only difficulty really has been the [event space] and [finding a] window for the lighting just because…we really need that to be when the building's not in use so that presented a challenge."*

Although coordinating timings could be a challenge, the project teams working in these spaces generally found that building occupants were receptive to the works taking place. In addition, occupants were in a position to comment on the conditions within the building and where to focus changes:

> *"I'm going round the buildings and speaking to the curators, the business managers, the operational managers, whatever it'll be. So it's not just the focusing on the works, it's also engaging with the people who operate the buildings to try and understand. You go and speak to the security guards or the tour guides and you speak to them and they go 'oh you don't want to stand over there, there's a draught coming in that window'."*

Thus, there were high levels of engagement between the pilot teams and occupants and managers of authority-owned public buildings. This allowed pilot teams to gain a strong sense of occupants' experiences of using the buildings, and identify problems that may not initially be apparent. Through these discussions, occupants were aware of the works taking place and able to support in accommodating retrofitting activities.

Engagement in schools

Four of the Phase 2 pilots included the energy retrofitting of schools. Like other public sector buildings, **accessing schools for works to go ahead tended to be relatively straightforward**. The primary concern in these cases was the coordination of works around term time, examinations, and pupils' activities:

> *"It's relatively straightforward we're effectively the landlord of the building and the school are tenants but of course there's a relationship there so they're a key stakeholder in any work that we do so we are keeping the school up-to-date with all our plans. We try and deliver as much work as we can during the summer holidays when the school isn't in use so there's no disruption to the building occupants"*

> *"It's been liaison with our children's services so they have a property manager effectively who's got oversight of all the schools properties and we are in the stage now where we're having individual liaison with the head teachers within the schools affected to talk about the practical aspects of the impact on their school you know how we can minimise the impact certainly in terms of the school term periods."*

Beyond physical interventions to improve the energy efficiency of the properties, project teams saw work in schools as an opportunity to engage pupils with energy information:

> *"one of the key elements for ourselves in the future is to educate the users of the building to let them, to make them be aware that they don't have to ramp the heating up because the building should operate without the additional heat that they would normally put into it."*

This usually focused on the works that had taken place and what this would mean for how pupils and staff use the building in future. In one example, the project team discussed how the retrofit works would reduce the exchange rate of fresh air entering the building and so potentially increase carbon dioxide levels in the classroom spaces:

> *"We've installed these CO_2 monitors and we've set them so that they indicate the CO_2 levels in the classroom and, when it gets to the amber indication, they're meant to open the windows before it gets to red. So they've been shown how to work that."*

In one case, the project team recognised that it was **harder to engage with high school pupils because of timetabling and exam pressures**. Consequently, they adopted an approach of working with 3 primary schools in the region that fed into the secondary school. Through this, they noted that they were able to have a *"more intensive approach with the primary school pupils"* whilst the secondary pupils received informative assemblies. The engagement activities used in this case included working with head teachers and activities for pupils including 'solar workshops' and 'hands-on activities. However, this high level of engagement was more difficult than the team had anticipated:

> *"We were met with quite a bit of resistance initially because [the school] felt that waste was more on their agenda at the moment and it was something they were teaching much more than energy efficiency. So we had one school who just wouldn't take part, unfortunately, although they did come round…we did a take home resource/competition just to finish it all off and they did take part in that aspect which was great and they've since warmed a bit to the project"*

These examples illustrate local authorities' familiarity with coordinating works on school buildings, but also the challenges of achieving a deeper engagement about energy efficiency with pupils and staff. In this case, a strategy to connect energy and waste would perhaps be useful, for example: '*zero energy waste*'. These lessons are important for thinking about how to deliver wide-scale awareness and understanding of energy efficiency in buildings and encourage subsequent retrofitting activity.

3.5.2. Community engagement

Local authorities and their delivery partners have an established presence in communities. This was beneficial for encouraging works, particularly where building users had seen similar work taking place in the area. When discussing the retrofit of a community hall, one of the participants explained how their previous work in the area meant that users of the hall were already engaged and positive about the work going ahead:

> *"I think a big influence in that… we've obviously done so much in the village itself with the domestic side of things, so they were used to us being there and, when we floated the idea [for the pilot], we went to the committee and we said 'well this is what we're thinking of doing' and they were very positive about it in that sense"*

Another positive example of community engagement was the case of a park where, amongst other renovations, a ground source heat pump was being fitted. The

delivery team were very active in engaging local community groups, running events for the wider public and developing a "*whole programme of family fun events over the year*". This approach was resource intensive, but delivered successful results:

> "*Yes I think it's really inspired the community as well because they're very determined now we've got the ground source heating they want the micro hydro and they're quite willing to lobby anyone who gets within their vicinity but because they're very proud of the fact that their park…the focus in their area will be this sustainable heating and they're really proud of. I mean I knew within staff and ourselves and you know but actually just the wider public.*"

In this case, the participant highlighted the development of interest in energy and energy efficiency beyond the park itself. The distinctly 'local' aspect of community engagement was highlighted by a team who were running a local information centre that people could visit for energy information:

> "*you've got to be really, really sensitive with community engagement so there isn't an off-the-shelf package that you can take to go and do something because people have their own priorities…they've been working as a group within an area for years and years and years and you could really easily step on people's toes coming into an area, or they feel that they've tried this type of work in the past and it didn't work, and I think that's why community engagement takes such a long time to build up*"

Again, here, the participant notes the time and resource commitment needed to deliver successful community engagement. This work will be crucial to the wider roll-out of the Energy Efficient Scotland programme, the success of which is reliant on the public having an awareness and understanding of energy efficiency (in both domestic and non-domestic settings), along with a willingness to experience disruption whilst works are taking place in their area. This knowledge will also lay important foundations for householders engaging in the upgrade of their own properties.

3.5.3. Engaging private owners, renters and businesses

One of the most time and resource intensive activities during Energy Efficient Scotland Phase 2 pilots was engagement with occupants in the privately owned and privately rented sectors, and business owners. The promise of a financial contribution made engagement much easier for one project team who were extending an existing district heating network. In order to cater to the whole building, the team needed to recruit 15% of occupants who were private owners. At the time of the second interview, the team noted that they had 'over 50%' of the private owners signed up. They explained this uptake in relation to their funding:

> "*the way we've structured the funding that we received was to actually use that funding to pay for the cost of work for the owners…the owners are aware that if their gas boiler does pack in right now they would have to put up the cost for replacing the heating system within the property…[they're] being offered a free connection right now to the district heating system and the only thing they'll be paying is the consumption of the system*"

In this case, the team also emphasised that they thought the engagement from the private owners would increase once the building works had commenced. The

building was primarily council-owned with tenants under social rent agreements, and so works could go ahead even without agreement from the private owners. This was not the case in some of the other pilot projects. Two ambitious projects sought to engage private owners for retrofitting works and connection to a new district heating network in a small community, and perform energy efficiency work on a hard-to-treat tenement building. In these examples, the project teams both discussed the need for extensive engagement with the owners.

> *"there were several public meetings and throughout the course of the wider energy transition project to introduce the specifics of the Energy Efficient Scotland project and then there's been monthly newsletters prepared as well to let people know about progress…you can lose participants just from not keeping the engagement up but it needs to be very carefully balanced between getting in touch with people all the time when you don't necessarily have anything to say."*

Here, the participant highlights a **need to balance maintaining communication with ensuring that worthwhile information is being shared**. A similar communication strategy was used in engaging owners in a hard-to-treat tenement building. This included initial letters, door knocking and then meetings with all of the owners together. These meetings continued as the project progressed, and the project team were also available to respond to individual queries. This tenement included private owners, private rentals, and council-owned properties. A big challenge for the project team was identifying the relevant decision makers for each property. Amongst the 12 flats in the block included in the pilot, this meant searching through the landlord register, negotiating estates being run by solicitors, communicating with owners living abroad and finding relevant people within the local authority to speak to:

> *"There were all those layers of complexity around engagement. The council flat was for sale so then it was taken off the market and passed to sheltered housing…it's even difficult to find who to speak to within the council"*

In order to proceed with works on this mixed-use tenement, a residents' committee was formed. The committee were involved in project decision making and, at the time of the final evaluation interview, were in the process of placing finances in a shared bank account and signing an agreement with the chosen contractor. However, the hard work and resource intensity of recruiting and supporting the residents through this led the project team to reflect on what mechanisms could help in the future:

> *"You may be aware of the working group on tenement maintenance…it would solve the owners committee issue because they are proposing to make it compulsory you would have a sinking fund so it means money's available to do repairs meaning also you've got an organisation in place. We spent six months it's something important to say but six months to reach the last owner and just a fourteen property building. And the last thing is compulsory [maintenance] surveys…every five years."*

With a compulsory sinking fund for repair works, and regular maintenance surveys, mixed-use tenements would be better placed to undertake energy retrofitting works when necessary. It will be important to make this a standard requirement in order to move forward with the Energy Efficient Scotland programme.

Area-based engagement strategies

The Phase 2 pilots also included trials of much broader engagement activities, seeking to increase awareness and uptake of energy efficiency measures within a particular area (for example, a small town or village). In one case, a mail-out strategy was trialled. This included a leaflet explaining the energy project and the offer of a free energy assessment and EPC. During the first evaluation interview, the participant explained that they anticipated low return rates from direct mailings:

> *"So for the landlord element we started out with a hundred and twenty-one letters going out to landlords. We've had eighteen register for the service which is a return rate of fifteen percent which from a direct mailing in our experience is actually quite good...The rural element, we've sent a hundred and forty-two letters out and nineteen have registered for the service, a thirteen percent return rate so we're happy with that. The disappointing one so far is the businesses so again we've actually mailed a hundred and forty-one businesses and we've had a return rate of five."*

Although the return rate is low, the participant reported that numbers were promising compared to how people normally respond to mail-outs. However, the project team noted that they had found the results "*disheartening*", with energy efficiency measures installed in only 3 households and 2 businesses by the time of the second interview (the potential financial reasons for this are discussed in section 3.4.3). Another pilot trialled the development of a community hub, which local residents could visit to learn more about energy efficiency measures. They highlighted that it **took a long time to build trust and momentum within the community**:

> *"a lot of it has been about engagement, building numbers, building contacts so all your water campaigns, your freebies, your draught-proofing everything else. I think, for the first two years, when you're really embedding those things, are really important, but then, I think, if we were going forward, staying in the same area or maybe branching out wider, it would start to get much more focused in on getting people through the journey of getting measures and improving their EPCs…you can't go straight in and say 'right, I want you to spend thousands on your house and I'll hold your hand while you do'. It it's not as straightforward as that."*

This project team highlighted that campaigns around smaller measures and activities relating to waste and energy (for example, offering reusable nappies) were crucial for building awareness and interest in the community. **Once initial trust was in place, they were much more able to engage participants in discussions of more costly retrofit activities**.

Several councils also worked to engage non-domestic partners. As in the case above (where the team had only five responses from businesses), responses from the non-domestic sector was consistently low. One suggestion was to **develop an obligatory framework that required engagement** from these groups:

> *"we've been here a couple of times, with trying to engage some of our big industrial partners …and those discussions get so far, to a certain extent, then something changes…and these discussions stop. It would be useful [to have] some kind of statutory obligation on industry to become more efficient and reduce carbon"*

Where the Phase 2 pilots included elements of private sector engagement, all participants highlighted how resource intensive this work is.

> "The focus of funding is very much on capital works and yet, to deliver anything which is going on inside someone's house involves a lot of engagement if you are going to secure and then maintain buy-in and, to do engagement, you need time…and…there's the technical work required in us having gone to have one-on-one discussions with everybody about the terms of the contract they're signing…and…the technical surveys that needed to take place by our sub-consultants on the terms of the heat loss calculations and then the heating system designs and, obviously, then drawing up every single house, doing their heating system layouts and so on all of that is classed as enabling works, none of it is actually capital works."

This quote highlights the **significant time commitment, and associated funding, required to support private owners in complex retrofitting**. In addition, any resource for engagement work must ensure continuity of contact. Several participants highlighted how time consuming and difficult it was to build trust amongst building owners and local communities, including the need to avoid constant turnover of engagement staff due to time limited contracts. With breakdowns in communication, or schemes coming to an end just as engagement is building momentum, there is a risk that the public's trust in energy efficiency programmes will diminish. This highlights the need for both national and local coordinated information campaigns and engagement activities.

3.6. Lessons for subsequent funding rounds

Key points:
- The Energy Efficient Scotland Phase 2 funding call had sufficient breadth. It will be important to retain the approach of supporting a variety of technologies, building types and sectors in future funding rounds.
- There must be clarity about what is covered within different funding calls.
- Feasibility studies were useful for assessing the viability of projects ahead of the pilot, and helped to support the delivery of pilots within the allocated time and budget.
- The timeframe of the Energy Efficient Scotland Phase 2 pilots was deemed to be too short for more complex, hard-to-treat buildings, large infrastructure projects, and community engagement strategies. A 2 or 3 year timeframe may be more feasible than the current 18 months.
- There is a need for clear signalling and continuity with the funding made available through Energy Efficient Scotland and related schemes.
- There were very limited opportunities for project teams to share information through the course of the Phase 2 pilots. This is prohibitive to sharing examples of best practice and overcoming challenges of delivering energy efficiency and heat decarbonisation.

3.6.1. Funding call and application process

Participants appreciated the breadth of the Energy Efficient Scotland Phase 2 funding call and, in several cases, had tailored existing projects or planned projects to the call requirements. For example, one council officer explained that they had applied with a scheme that was already underway, and that they "*did not have to change anything to meet the requirements of the project*". This is useful for quickly responding to a funding call, but indicates a risk of achieving limited additionality through Energy Efficient Scotland. Moving forward, it will be important to **ensure that funding calls support deep, complex retrofitting of the type needed to meet emissions reduction targets**. In addition, participants noted that the breadth of the funding call created the potential for lots of different projects to be included:

> "*I think within the Energy Efficient Scotland call it was very explicit 'these are the key challenges and the areas [where] intervention is needed'…I mean you could have picked twenty projects if you had enough money and enough willing partners so that, actually that the call was actually really, really quite good you could almost tie any kind of energy efficiency programme into it.*"

This indicates an alignment between the activities of local authorities and those requested in the Energy Efficient Scotland Phase 2 funding call. Another participant explained that the proposal *"felt quite open"*:

> "*I proposed what I thought was the best solution for the buildings that fitted well with the programme and it felt like there was flexibility to use our judgement on that… I would agree I think it does feel quite an open programme it's having worked under other funding streams in the past which are far more set in terms of the parameters that you're working within…there's a bit more opportunity to make it work here*"

In this case, the participant noted that they had been able to suggest the best solutions for the building, rather than falling back on those stipulated by the funding stream. This was mirrored by another participant, working on a hard-to-treat building:

> "*what I was really grateful for…was that Energy Efficient Scotland didn't take a very strict view of everything so for instance…they allowed insulation where others would go 'well that's not a renewable energy source', and even to the extent they allowed me to do modelling to show that installing roof lights would, larger roof lights would lower the lighting energy and so because of that they were really happy to fund it.*"

Being able to include all of the different elements that constitute a holistic building retrofit (insulation, lighting, alternative heating sources) is crucial to delivering successful retrofit. Consequently, **it is important to retain the approach of including different technologies together within future Energy Efficient Scotland funding rounds**. In addition, participants expressed appreciation for flexibility in order to complete works.

> "*these are pilots and when you are dealing with multi-ownership domestic properties you will encounter changes to your original proposal that you really need to be accepted fairly quickly to allow the project to keep moving so I think [Scottish Government have been] fairly supportive on the*

pushback and things because you can't foresee all of the issues that you're going to be faced with from the beginning."

This highlights the importance of incorporating flexibility into Energy Efficient Scotland funding, especially when tackling hard-to-treat buildings and buildings of multiple ownership, which cannot be overlooked in rolling out a national-scale programme. This will also apply to buildings where payback will not necessarily be delivered in the short term (for example, where retrofitting works are too expensive to see payback in the 8-years which is a common requirement for publicly funded works).

However, participants also **highlighted the need for providing more clarity in the Energy Efficient Scotland Phase 2 call for pilots, particularly relating to what the funding could be used for**. In one case, the participant noted that they had written the bid to include grant funding for householders undertaking energy efficiency works, but this element of the funding was subsequently removed. They explained that they would have written the proposal differently if they had known that grant funding would not be available:

> *"Had we known from day one that it was highly unlikely that the Scottish Government were going to give grant funding to these householders to be part of the project, we could have removed that element and concentrated on something to jazz up the consultancy process a little bit more, rather than, what happened is we put in the bid, it was assessed for quite a while, it then came back and it was a quick decision, 'you need to remove this grant', so we removed the grant. We didn't really have any more time to, because we removed quite a big element of it, so we could have put resource into making other elements of it a little bit better."*

A similar challenge was described by a team seeking to deliver energy efficiency works to both domestic and non-domestic properties in the area:

> *"The call talked about it being applying to domestic and commercial buildings. We had a project which encompassed the domestic and non-domestic buildings…and yet it wasn't clear from the application stage which would be eligible for funding and which wouldn't be…and actually it was only through the direct negotiation and final grant award that it became clear…so our actual grant application figure bears no relationship to the grant award figure at all and that only became clear once we were on the programme if you like."*

In addition to late clarification on the way that funding would be allocated in the phase 2 pilots, project teams highlighted that the change in focus across the different Energy Efficient Scotland pilot rounds had been difficult to plan for:

> *"the three bids that have come out under the pathfinder…they've all had different criteria attached to them so we're not seeing continuity so we can't plan next year's transition because we don't know if it'll have another aspect to it"*

It was emphasised that this contradicted advice from Scottish Government to start planning for future projects 'in the background' of current activities, with the participant noting: *"we don't know what type of work they're looking for, so we can't plan any works".* In relation to this, several interview participants commented on the use of feasibility studies for supporting the pilot work.

Project teams reported feasibility studies, or completing similar work in similar buildings, prior to the pilot commencing to be helpful for completing the works. In one case, the local authority had been planning the works for some time and had already undertaken feasibility studies:

> *"we actually did quite a lot of feasibility work upfront it did cost but what it did mean is that when we got the bid for the money and delivered the work there was very little unexpected outcomes or outputs because we'd been through quite a rigorous process looking at different options and district heating systems and different types of heating systems like air and water so it wasn't just ground source"*

In this case, the team had already funded work to assess the most suitable heating solution for the project, and they reported 'very little' unexpected outcomes; the project was completed within the funding and timeframe specified, despite involving the complex installation of a ground source heat pump. However, there is a risk that the resource invested in feasibility studies will be wasted if funding for subsequent larger project works is not then secured. In another case, the retrofit of a school was completed on time and within budget, but the project team noted that they had completed similar works on two other schools in the region, and so they were confident that it would work again.

In contrast, several of the projects that struggled to complete on time or within budget noted that they had experienced unanticipated problems during the pilot. These included discovering additional fire safety requirements, identifying repair works that needed to be completed before retrofitting work could commence, and receiving contractor quotes that were much higher than anticipated. For example:

> *"the fire stuff that we didn't know about was really quite startling to us when we got you know the full extent of what was needing done there. So the council came in and gave some additional funds around that [the housing association] put a lot of money in…we were trying to ensure that the building didn't close either and trying to put some stuff into it."*

In this case, once the pilot commenced, the team found that there was additional work required to ensure that the building met fire safety standards. This piece of work had not been funded and so the council and the housing association both had to use their own funds. At interview, they noted that, had they known, they "*would have asked for more help financially and possibly structured the delivery [in a way to compensate for the fire safety works]*". Although the pilots had to demonstrate how they had developed strategies to reduce risk, **the current structure of the Energy Efficient Scotland funding programme does not provide the time or finance for feasibility studies to be completed prior to works commencing**. In relation to the lack of opportunities to conduct feasibility studies, one participant explained that the funding schemes are *"all entirely focused on capital funding, [there are] very strict restrictions on how much of the grant can be spent on the associated work that is necessary to deliver".*

Creating some continuity in the funding stream, and associated certainty over what the Energy Efficient Scotland programme will and will not fund is critical

for facilitating successful energy efficiency and heat decarbonisation works.
With more certainty, interview participants emphasised that they would be more able
to prepare for future funding applications:

> *"You could be doing your feasibility preparation to say 'OK this pot's
> coming next year so let's work up some of these projects work out which
> ones are feasible', and then you've got a much stronger application going
> in."*

In addition to supporting the development of successful funding applications,
feasibility studies will be crucial for extending retrofitting activities beyond the
piecemeal approach that has been used so far:

> *"larger projects like district heating, it was our colleagues in the stock
> condition saying that if there was an allowance for a feasibility study, then
> there might be a project at the end of it.*
>
> *…Because the way things are going you're going to run out of areas that
> are suitable for an EWI scheme and you're going to need to think of
> something else and it's not going to fit that timeframe."*

This participant emphasised that the 'tried and tested' approaches will soon reach
their end point. Increasing the scale and breadth of decarbonisation will require
tackling hard-to-treat properties, mixed-use buildings, and implementing the
replacement of heating systems on a large scale. To achieve success in these
cases, it is going to be important to ensure that the viability of the project is tested
ahead of the award of funding, and support councils to develop accurate proposals.
Both of these can be delivered through supporting feasibility studies for capital
works.

3.6.2. Timeframe

The project teams were asked to complete their Phase 2 pilots within 19 months.
The pilot timeframe was the same regardless of whether the project was retrofitting a
single use building (for example a school or community centre), a mixed-use
building, or managing a large infrastructure project (for example district heating
extension or the installation of a ground source heat pump). Some teams took the
approach of planning a project so that it would fit within the timeframe:

> *"It's over a period of eighteen months but from that point of view we will get
> done within the timeframe what we said we're going to get done that's not
> a problem."*
>
> *"the fact that Scottish Government funding is annual…it almost creates the
> situation where local authorities are going to look at projects that can be
> delivered in a fairly short timescale because you don't know what the
> funding is going to be after the next April comes around."*

**Although successful for delivering projects on time, this strategy could lead to
projects that were restricted in their ambition and reach**, for example treating a
single school building. Whilst useful for delivering small scale work, this approach
limits the potential for wide-scale energy retrofit and heat decarbonisation, which will
necessarily require engaging with more complex building types and infrastructure
projects:

> *"The timetables always seem to be unrealistically short in terms of the reality of delivering any major piece of construction infrastructure. The obligations to fulfil of the statutory elements of construction take much longer than they did ten years ago even and that doesn't always seem to be reflected in terms of there's an expectation at large that a piece of work can be completed within a twelve to eighteen-month period and for a lot of big infrastructure projects that's unrealistic"*

The project discussed here was the extension of a district heating network. The project team proceeded to explain their normal strategy for a project of this type:

> *"when we normally programme for a project of this type of scale and monetary value we would be looking at a period of two years: a year worth of preparation design and tendering process and a year of construction related work."*

In this case, the team suggested a **two-year timeframe for complex infrastructure projects. When discussing the benefits of a longer timeframe, another project team suggested a three-year timeframe**, so that "*the harder but more beneficial projects have got a chance to actually happen*". Similarly, when discussing engagement with private home and business owners, one project team highlighted the much longer timeframes that people might need. They found that there can be large delays between people learning about energy efficiency measures and implementing those measures. For example, whilst a person might alter their behavior or add loft insulation, more significant changes to properties are made the next time a home renovation is planned. A much longer term perspective needs to be applied to these groups:

> *"it's all about timescale that is the biggest challenge for all of these projects and the time that it takes from somebody to have the initial idea that they want to do something to their home through to actually kind of having implemented it. You can't measure between August last year and February next year in terms of the number of measures because it doesn't make it look like it was a worthwhile investment it's got to be looked at as a part of this whole route map that's being developed a twenty year programme you know the start of a journey for people."*

It was also highlighted that **a longer timeframe would allow for much better alignment with existing funding strategies and schemes**. In particular, council funding plans are managed over a five-year timescale, whilst under the HEEPS programme, councils know their funding allocation over a three-year timeframe. For example, one project team had attempted to connect with Council plans for the regeneration of a local town centre. However, the shorter timeframes for the Energy Efficient Scotland programme meant that the team were unable to align with the ongoing regeneration plans.

Even where teams had restricted their plans to measures in a single building, they noted the challenges of completing the work within the timescale provided:

> *"when you're trying to work in these big buildings, they've got their schedule out for the next year or more, they're taking bookings that far in advance so when we're looking at the big buildings we have the funding year and we were able to get in at that end period"*

> *"It did run within the timescale that was intended but it was pretty intense I think for [the project manager] at the end. So we did want to use local contractors where possible and they were using a local glazing contractor but in terms of kind of capacity it meant that the work couldn't be done when they would have liked to which was over the summer holidays and they ended up having to do work while school was in."*

Thus, the short time period can make it challenging to complete works, particularly on public buildings in regular usage. Interview participants also suggested that challenges in managing the timeframe were exacerbated by delays in receiving funding after the award had been announced:

> *"we put a bid in and they gave sort of an indication that it had been approved but then from the indication that it was going to get approved to the actual award that period of time I'm sure off the top of my head was something in the region of four to five months."*

The short timeframe for putting together an application was also identified as a reason for encountering unanticipated costs and running over budget later in the project:

> *Respondent 1: "the six weeks or the short period of time you have to put your bid in, you're estimating.*
>
> *Respondent 2: You absolutely are, you've not costed it properly…That was what happened with the community centre as well…we had a quote for the work and we put the bid in on the basis of that quote and then once you actually go out and do your detailed surveys and things like that it's actually going to cost more than what we've bid for but it really is just an educated guess as to how much funding you will need."*

Continuity

In addition to longer timeframes, **several project teams discussed the need for continuity in the focus of Energy Efficient Scotland, and available funding**. With such continuity, teams would be more able to plan for projects over a longer timeframe, and establish support mechanisms and frameworks. This is especially true where projects may not payback over the short timescales commonly expected for local authority projects, and where teams are seeking to build momentum in engaging local populations with retrofit. In the latter case, it can be particularly detrimental to provide support and then remove it, since this can diminish trust developed with local residents.

> *"I think it would be quite a reputational risk for [us] especially given that it's within the title and that you know we're not a local organisation but we've come into a local community and we have embedded quite well and I think although they know it's two years they would just be like yes there's another one gone and I think that would you know if we were then to try and do something else at a later date that would be stacked against us I think."*

In another example, the project team had been working on one building that was part of a larger complex. Throughout the course of the pilot, they had received increased interest from those in the surrounding buildings and expressed a desire to support those residents through the retrofitting process. The project team highlighted the

mutual learning and familiarity that would help to explore future retrofitting opportunities:

> *"so yes we are getting to know the area and they are getting to know us and how it works and what can be done with this building."*

In addition to familiarity with a local community, expertise within councils and project teams also changed throughout the pilots. In at least 3 of the 9 local authorities involved in the Phase 2 pilots, staff had been moved to a different area of the authority or left. Although some of this is inevitable, much of it is related to local authority resource and efforts to minimise spending. This shift in personnel can result in a loss of knowledge[10], with potential detriment to the overall delivery of Energy Efficient Scotland:

> *"[the team members who have left] really understood the SEEP application system, they had contacts there they knew who to talk to and they were able to navigate themselves around it very easily but I fear that that perhaps might be lost in the future."*

3.6.3. Facilitate information sharing

Most of the interview participants suggested that sharing information with officers from other local authorities about the Energy Efficient Scotland pilots had not taken place:

> *"Interviewer: Have you had any collaboration or kind of knowledge sharing with other councils around pilot projects?*
>
> *Respondent: No [laughs].*
>
> *Interviewer: No, I mean are you aware of what other councils are doing or of any of the other pilot projects that are going on?*
>
> *Respondent: No I couldn't say…that's terrible isn't it."*

Sharing lessons from Energy Efficient Scotland pilot delivery and project outcomes is currently poor. Interview participants noted that they did not have opportunities to share information about the Energy Efficient Scotland pilots. In addition, there was some confusion over the role of and support available from different organisations:

> *"we'd looked at the baselines so for [a local authority] projects starting up there'd been one RES referral in the whole three years from the [local authority] and you think well there's a bit of a misunderstanding of what these organisations are providing at the."*

Thus there is a need to work towards greater understanding of and alignment across the different organisations involved in facilitating energy efficiency improvements. One delivery partner felt that their pilot was too different from others in the

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[10] There is existing research demonstrating how increasing resource constraints and regular restructuring can result in damage to the institutional memory of local authorities. See: Webb J, Tingey M & Hawkey D, 2017. What we know about local authority engagement in energy systems: ambitions, activities, business structures & ways forward. London, UK Energy Research Centre and Loughborough, Energy Technologies Institute.

programme to find overlaps in the work taking place. However, interviews with all pilot delivery teams have revealed valuable experiences in all projects, which need to be shared in order to build capability and momentum from early beneficial work. Interview participants expressed a desire to share more information:

> *"I think what's most useful in those sorts of environment for learning and the knowledge sharing…we want to know where they've had the problems so where things haven't worked…if there's some way of that that collective knowledge share of you know both the good and the bad…having some kind of constructive basis would be useful."*

Where information sharing took place, this was either with organisations other than local authorities, or through other programmes that project teams were involved in. One delivery partner highlighted that they work across 3 local authorities, "*so that information sharing happens within the office*". Pilot teams explained that information sharing happened through other parts of the funding they had received. Examples included events organised through: Scottish Power Energy Networks (SPEN); Scottish Housing Best Value Network; Salix; and NDEE:

> *"The NDEE had a seminar meeting was that June or July time up at the Falkirk Wheel so there was various other councils there. I went along as well. There was councils, universities, and the likes of. It was an opportunity for everybody just to kind of discuss different NDEE projects and see some of the projects that had been done, highlight problems or successes…one of the councils that was there was planning doing [the same type of building] in the next one, so they took my contact details and, if and when it gets to that stage, they'll be in touch to see what we did."*

Sharing information is a valuable way to share project successes and challenges, but also ensure that mistakes are not repeated if different councils are trying to achieve similar things. Although opportunities exist through other funding schemes, there were no information sharing opportunities associated with Energy Efficient Scotland, or the Phase 2 pilots specifically**. Not having opportunities for information sharing has the potential to inhibit the further development of the Energy Efficient Scotland programme**. This is especially the case where complex projects have been undertaken, where councils and delivery teams have gained experience in engaging with private property owners, and in developing new mechanisms for the provision of energy.

4. Conclusion

This report has presented a social evaluation of the Energy Efficient Scotland Phase 2 pilots. The Phase 2 pilots, coordinated by Scottish Government, took place between September 2017 and March 2019. The pilots form a part of the development of broader Energy Efficient Scotland programme, following from the Phase 1 pilots, which have been evaluated separately[11]. The Phase 2 pilots sought to support further capacity building within local authorities, with a focus on:

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[11] See: Bush, R., McCrone, D., Webb, J., Wakelin, J., Usmani, L & Sagar, D. 2018. Energy Efficienct Scotland – Phase 1 pilots evaluations final report. Available at: https://heatandthecity.org.uk/wp-content/uploads/2018/11/EES-Pilot-Evaluation-Phase-1-Final-Report1.pdf

- Hard-to-treat buildings
- Strategies for engaging the self-funded market
- Innovative technologies
- Area-based approaches

Capital works thus included efforts to extend existing district heating schemes, improving the thermal efficiency of private dwellings, and implementing LED lighting and BMS into non-domestic buildings. The non-domestic buildings treated were primarily council-owned (for examples, schools and museums). Engagement strategies included mail-out to residents, but also the development of community hubs. This evaluation draws on evidence from interviews conducted with all of the teams taking part in the nine Phase 2 pilots. The interviews were carried out at the beginning and end of the pilots, and they explored organisational aspects of the pilots, including: pilot content; partnership working and procurement; skills and resources for delivery; and perceptions of the broader Energy Efficient Scotland programme. A socio-technical evaluation, including the analysis of social surveys and technical monitoring in treated buildings, will be published in mid-2020. This report has explored 6 themes: the selection of projects; pilot outcomes; pilot delivery; funding; engagement; and lessons for the broader Energy Efficient Scotland programme.

Pilot teams were able to identify projects to fit within the scope of Scottish Government's call, and projects were often shaped by work taking place within existing local authority strategies, including: SEAP, LHEES and EESSH. Early engagement in the pilot process was helpful; however, prior work on Energy Efficient Scotland pilots also led project teams to specify more straightforward projects, which were deemed to be feasible in the timeframe and budget provided. This strategy is understandable, but in order to deliver the Scottish Government's ambitious 2045 climate targets, it will be essential to develop Energy Efficient Scotland so that it is supportive of more complex, ambitious projects.

Indeed, the pilots that sought to tackle hard-to-treat building and those with a combination of public and private sector occupants experienced significant delays. Two of these had still not commenced capital works at the time of the second evaluation interview, whilst works on another were just getting underway. Despite this, the Phase 2 pilots did deliver positive outcomes, including: leveraging additional funding; providing foundations for further work; and there was anecdotal evidence of energy and cost savings. The pilots also allowed local authorities and project partners to begin exploring the extension of their existing roles, for example, as heat network owners and energy suppliers. Complexities in the regulation and management of this led one authority to limit their provision to just council-owned housing stock; further support for this would be beneficial in the wider roll-out of Energy Efficient Scotland.

The pilots were delivered through a combination of local authority leadership and partnerships with ALEOs and third sector organisations. Participants often worked with organisations they had prior relationships with, and reported comfort in the partnership arrangements used for the pilots. This expertise and continuity offered by developing internal expertise may be crucial for delivering the Energy Efficient Scotland programme, which will need a consistent and clear approach over the next

20 years to deliver energy efficiency and heat decarbonisation over a short timeframe. There is unlikely to be time for repeating training and education of new staff and partners as the speed of delivery ramps up. There were more significant challenges in procuring contractors to complete capital works, these included: identifying contractors with suitable expertise for hard-to-treat buildings; a lack of capacity amongst smaller contractors to engage in the pilots at short notice; communication with new contractors. For the roll-out of Energy Efficient Scotland, it will be crucial to support the development of supply chains. This indicates a need to bring more skilled people into the energy efficiency business supply chain, with training for high standard of retrofit work but also skills in managing hard-to-treat buildings and large-scale infrastructure projects (like GSHP and District Heating). In addition, Scottish Government must provide clarity and continuity about future funding and work opportunities for supply chain actors.

The Phase 2 pilots which treated authority-owned and single buildings delivered works within the budget and timeframe available. However, there were significant funding shortfalls on more complex and innovative projects. In some cases, this led pilot teams to limit the ambition of their project, for example, not including activities to support the longevity of the scheme. This short-term focus may create false economies, and result in increased financial investment in the longer term. Multiple funding sources were used to complete the proposed works; however, securing match funding after the pilot funding had been confirmed could result in significant project delays. In addition, multiple funding sources were needed for different aspects of the work (for example, heating was funded separately to energy efficiency); this resulted in complex project management and reporting requirements, and should be avoided to support future, holistic retrofitting.

Existing financial support for householders was deemed to be complex to secure. In particular, the HES Loan was cited as a large barrier to householders undertaking retrofit because it still requires them to have an upfront payment for the retrofit activities. Working on whole-building retrofit where there are multiple owners and occupiers (for example, a tenement building), and multiple funding sources, was a highly complex and time consuming task. Engaging with private householders and businesses will require long-term, repeated interaction. The Energy Efficient Scotland Phase 2 pilots have supported the development of these skills within project teams; lessons from these activities need to be shared and this work needs to be recognised within future funding (rather than only supporting capital works, for example).

Key Lessons:
- Longer timeframes will be needed to support holistic retrofitting of complex hard-to-treat buildings
- Local authorities will require further support if, through Energy Efficient Scotland, their roles extend as network owners and suppliers, for example in developing heat supply agreements
- Scottish Government must provide clarity and certainty in the funding and roll-out of Energy Efficient Scotland, to support readiness amongst supply chains.
- A clear long-term funding trajectory, including the types of works that will be supported, needs to be provided. This is particularly critical for cross-sector retrofit, and hard-to-treat buildings.

- Scottish Government need to explore how to streamline existing funding sources to support holistic, area-based retrofitting and heat decarbonisation.
- Broader engagement, and subsequent investment in private retrofit, will require long-term, repeated interaction with householders and businesses. Energy Efficient Scotland funding needs to reflect this, and support the development of skills for householder engagement and the management of retrofit involving multiple stakeholders.
- There needs to be a clear structure to support information sharing and subsequent capacity building amongst local authorities and project partners.

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