

Local Heat and Energy Efficiency Strategies (LHEES): Phase 3 pilots – evaluation

October 2021

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Executive Summary

The Scottish Government introduced Local Heat and Energy Efficiency Strategies (LHEES) in 2017, and have since been piloting them with all 32 Scottish local authorities. LHEES will set out the long-term plan for decarbonising heat in buildings and improving energy efficiency across an entire local authority area.

This report presents the evaluation of the third, and final, phase of LHEES pilots, which involved nine local authorities and took place between November 2019 and April 2021. The LHEES phase 3 pilots focused on areas with either high heat demand, and therefore with significant opportunity for district heating, or a high proportion of off gas grid properties.

Findings and lessons can be used to inform the further development and implementation of the LHEES programme by Scottish Government, local authorities and project partners.

Headline findings & lessons learnt

Focus of this round of pilots:

The LHEES phase 3 pilots sought to address areas with high heat demand to highlight opportunities for district heating. However, in practice, recommendations for most of the local authorities included the deployment of air and ground source heat pumps.

Theme 1: Outcomes and achievements

The LHEES pilot process enabled councils to identify challenges and opportunities around decarbonisation, energy efficiency, heat networks and fuel poverty in their areas. Partnership working with consultants was instrumental in delivering the pilots and is expected to be central to future authority-wide LHEES programmes.

Key lessons:

- Adequate resourcing (including financial support, skills development and guidance) is critical for the successful delivery of LHEES.
- LHEES have the potential to enable access to other sources of funding such as Low Carbon Infrastructure Transition Programme (LCITP) to support implementation and transition to low carbon technologies.

Theme 2: Staffing and resources

Local authority ownership of the LHEES process, as well as awareness and support by senior officers and elected officials, were key factors influencing experiences with the LHEES pilot and the extent to which officers felt empowered to conduct the pilot. This was, in all cases, dependent on knowledge sharing and guidance from expert consultants. Alignment with existing commitments and policy goals around climate change and fuel poverty is a strength of LHEES.

Key lessons:

- Getting the message of LHEES across to senior management and elected officials, and securing their awareness, support and engagement is critical.

- External expertise is instrumental for local authorities to develop an LHEES.

Theme 3: Data sources and gaps

The phase 3 pilots provided a valuable opportunity for local authorities to work with data in new ways and to access new sources of data. However, data and software issues remain a challenge, particularly lack of data on non-domestic buildings, resulting in these buildings featuring less prominently in the strategies.

Key lessons:

- The ability of local authorities to access better energy performance data for non-domestic buildings, as it becomes available, will be essential for refining LHEES in areas where non-domestic buildings have been excluded from local decarbonisation plans.
- Many councils require software updates and upskilling of staff on use of software.

Theme 4: Stakeholder engagement

The Phase 3 pilots have been heavily impacted by the COVID-19 pandemic, making stakeholder engagement difficult. Moreover, local authority officers were unsure about who they should engage with around LHEES and how. They recognise this as a major challenge not only because of the task itself being resource and time consuming, but also because they do not feel sufficiently trained to deliver effective stakeholder engagement activities.

Key lessons:

- Local authorities would benefit from support from the Scottish Government to enable them to develop stakeholder mapping, engagement and management skills.

Theme 5: Future implementation

Local authority officers involved in Phase 3 pilots were broadly supportive of LHEES becoming a statutory duty. This will be critical to secure both government funding and internal allocation of resources to the further development of authority wide LHEES. Local authorities emphasised the importance of both adequate funding from Scottish Government for the development of LHEES and of considering future funding streams for the implementation of actions to deliver the strategy. The LHEES methodology should provide sufficient structure and guidelines, while allowing LHEES and the LHEES process to be adapted to unique local circumstances.

Key lessons:

- If LHEES is introduced as a statutory duty, adequate funding, reflecting a comprehensive understanding of the resources and skills required to effectively design and deliver LHEES will be vital.
- The methodology for delivering LHEES must be replicable and provide consistency and structure across different councils while being flexible enough to adapt to different local realities.

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1. Introduction

Local Heat and Energy Efficiency Strategies have now been piloted by all 32 local authorities with funding from The Scottish Government. This report presents the results of the evaluation of the third and final phase of these pilots, which involved nine local authorities and took place between November 2019 and April 2021¹.

Interviews were conducted with 15 stakeholders, including: officers of each of the nine local authorities, consultants supporting the pilots' delivery, Scottish Government officials and organisations involved with LHEES, such as Zero Waste Scotland and The Energy Saving Trust.

This report outlines key findings and recommendations from these interviews. The report also details the characteristics of each of the pilots as well as the resulting recommendations provided by the delivery consultants.

1.1. Local Heat and Energy Efficiency Strategies

In June 2015, the Scottish Government designated energy efficiency as a National Infrastructure Priority, and in 2016, Ministers made a commitment of £0.5 billion over the next four years to support energy efficiency and heat decarbonisation in both domestic and non-domestic buildings.

Energy Efficient Scotland was launched in 2018 with a dual focus: to remove poor energy efficiency as a driver for fuel poverty and to reduce greenhouse gas emissions through more efficient buildings and decarbonising Scotland's heat supply.

LHEES provide a pathway to delivering heat decarbonisation and energy efficiency, allowing local authorities to prioritise and target a range of work, such as deploying energy efficiency measures or encouraging the development of district heating or other low carbon heat sources.

The Scottish Government has worked with local authorities to pilot LHEES. The aim is to take a strategic approach to improving the energy performance of all buildings and decarbonising heat for the whole local authority area. The intention was that (after piloting on a smaller scale) every local authority would develop LHEES to be implemented over 15-20 years.

¹ The Phase 3 pilots were originally due to complete by the end of December 2020 but were extended to the end of March/April 2021 due to COVID-19.

Following two consultations in 2017², the Scottish Government proposed the following six broad stages of development for LHEES³:

- **Stage 1:** Assessment of existing local and national strategies and data availability.
- **Stage 2:** Assessment of existing building stock's energy performance and heat supply.
- **Stage 3:** Setting of aggregate targets for heat demand reduction and decarbonisation of buildings.
- **Stage 4:** Socio-economic assessment of energy efficiency measures and potential heat decarbonisation solutions.
- **Stage 5:** Selection of areas / prioritisation of opportunities for heat demand reduction and decarbonisation of buildings leading to the designation of zones.
- **Stage 6:** Costing & phasing of delivery programmes.

1.2. LHEES pilot programme

There have been three phases of the LHEES pilot programme:

- Twelve local authorities participated in phase 1.
- Eleven local authorities participated in phase 2.
- Nine local authorities participated in phase 3.

Evaluations of phases 1 and 2 have already been published^{4 5 6}.

Phase 1

The findings from the Phase 1 LHEES pilots were used to inform the subsequent phases. All Phase 1 pilots targeted energy efficiency improvement and heat decarbonisation and aimed to use a defined 'local area' to:

- Test tools and methods
- Identify sources of data and gaps
- Provide resources, capabilities and access to contractors
- Enhance opportunities for working across local authorities.

² Heat and Energy Efficiency Strategies: Consultation, 14/11/2017 <https://www.gov.scot/publications/scotlands-energy-efficiency-programme-second-consultation-local-heat-energy-efficiency/pages/1/>

³ It should be noted that these 6 stages are subject to change in future.

⁴ Local Heat and Energy Efficiency Strategies (LHEES): phase 1 pilots - social evaluation, 06/09/2019 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-phase-1-pilots-social-evaluation/>

⁴Local Heat and Energy Efficiency Strategies (LHEES): phase 1 pilots - technical evaluation, 06/06/2019 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-phase-1-pilots-technical-evaluation-report/>

⁵Local Heat and Energy Efficiency Strategies (LHEES): phase 2 pilots evaluation, 23/10/2019 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-lhees-phase-2-pilots-evaluation/>

There was substantial variation between local authorities in the focus of the pilots and the nature of the technical support provided. Phase 1 used a centrally procured consortium of consultancy services. Local authorities raised concerns, questioning whether they or Scottish Government oversaw the consultancy services and felt they got a poorer result than if they had directly procured their own consultancy.

Phase 2

Phase 2 LHEES pilots aimed to test and develop new methods for creating LHEES and explored taking a sectoral approach, while aims remained consistent to those from Phase 1.

Phase 2 focused on the following sectors:

- Self-funding (domestic and non-domestic buildings)
- Domestic private rented sector (PRS)
- SMEs
- Public sector buildings.

Phase 3

Phase 3 pilots continued to test and develop methods for creating an LHEES, identify data sources and data gaps, and improve understanding of the resources and capabilities needed for the development and delivery of an LHEES.

They differed from the pilots in previous phases because they were asked by Scottish Government to focus on one of the following:

- Areas with high heat demand and therefore significant opportunity for district heating.
- Areas with high proportion of buildings off the gas grid.

1.3 Report structure

This report presents the findings from our evaluation of the Phase 3 pilots:

- Section 2 briefly sets out the evaluation methodology, and there is a brief summary of each of the Phase 3 pilots in Section 3.
- Section 4 sets out the findings of the LHEES Phase 3 evaluation and compares these findings to those found in the evaluations of LHEES Phase 1 and Phase 2.
- Section 5 summarises the evaluation findings.
- Details of the organisations that contributed knowledge and views to this evaluation, a summary of each individual pilot and a glossary can be found in the annexes.

2. Evaluation methodology

We carried out desk-based research on the nine pilots and conducted semi-structured online interviews (approximately 1 hour long) with participating local authorities, Scottish Government and consultants who were involved in the process, as well as organisations such as Zero Waste Scotland (ZWS) and the Energy Saving Trust (EST). At least one local authority officer involved in the LHEES pilot from each of the nine local authorities was interviewed. ZWS and EST were not active participants in the LHEES pilots but their knowledge of LHEES (ZWS) and relevant data (EST) provided greater context and insight on opportunities and challenges faced by local authorities. ZWS and EST have had interactions with local authorities through shared workstreams and relevant workshops and so they were also able to offer their views on how LHEES have been perceived and applied by various local authorities.

The interviews covered the main aims of this third phase of pilots (the testing and development of LHEES methods, data and data gaps, and resource and skills requirements) and also the wider policy landscape and the idea of LHEES as a statutory duty. We collated and analysed the results to identify key outcomes, challenges and lessons learned from the pilots. We also held a workshop to validate the findings from the interviews by discussing them with Scottish Government and all the participants involved. We incorporated the insights gathered from this workshop into the findings presented here.

At the time of writing, 6 out of 9 LHEES pilot reports were completed and submitted to ACE-R for review and to be included in this evaluation report. Consequently, three Phase 3 pilot results are not included in this report.

3. Summary of LHEES Phase 3 pilots

3.1 Context

One of the LHEES Phase 3 pilots focused on the whole council area, whilst eight focused on specific, smaller areas. Stakeholders noted that a whole-area approach gave them a broader understanding of the building stock and heat demand, in preparation for delivering a specific target area-wide LHEES in the future.

All of the LHEES Phase 3 pilots analysed energy performance and heat supply and discussed decarbonisation efforts for both the domestic and non-domestic sectors. However more focus was given to the domestic sector with more specific decarbonisation targets. This approach was predominately driven by access to data: pilot schemes found it more difficult to gain access to data for non-domestic buildings and felt less confident that private businesses would share their building stock data with the council. In addition, councils already had data and targets on levels of fuel poverty in the area and therefore this had greater focus in the pilot schemes.

Table 1: Summary of Phase 3 LHEES pilots for each local authority

Local authority	LHEES pilot scope
Angus Council	To identify the tools, data, skills and resources required to develop and deliver an area based LHEES covering all buildings (domestic and non-domestic). Six villages off the gas grid were selected by Angus Council for this pilot study: Inverkeilor; Glamis; Edzell; Newtyl; Monikie; and Aberlemno
Comhairle nan Eilean Siar (Western Isles Council)	Consideration of heat decarbonisation across the islands, and how this can be managed against a stock profile which consists largely of crofter housing off the gas grid. The project area focused on crofter housing on the Isle of Harris.
East Ayrshire Council	The focus was to identify high heat demand areas with potential for district heating. The area focus was East Ayrshire, Kilmarnock, North West Kilmarnock and South-Central Kilmarnock.
East Dunbartonshire Council	The project assessed the current energy efficiency of existing buildings (predominantly housing) within a defined area in East Dunbartonshire and considered options for improving energy efficiency and delivering a transition to renewable heat.

East Renfrewshire Council	The focus was to set targets and decarbonisation recommendations covering all buildings (domestic and non-domestic) with a focus on Neilston and Barrhead.
Moray Council	The pilot focused on two towns and rural areas within the local authority boundaries, investigating different solutions appropriate to the different locations: Burghead: Waste heat from a local maltings, marine sourced heat pump and biomass-based boilers. Elgin: Provision of Integrated Large town Masterplan with longer term LHEES. Rural areas: Energy efficiency measures together with low carbon heating solutions for various property types and environments.
North Ayrshire Council	An LHEES, including identifying high heat demand and fuel poverty covering the whole North Ayrshire.
South Ayrshire Council	Reduction of energy demand and decarbonisation of heat supply in both Prestwick (town with high heat demand and potential for district heating) and Dailly (village off the gas grid).
West Dunbartonshire Council	The focus was to set targets and decarbonisation recommendations covering all buildings (domestic and non-domestic) in an area of high heat demand with potential for district heating. The area focus was the Clydebank area of West Dunbartonshire Council.

3.2 Changes in scope

It is important to note that during phase 2, the scope of certain pilots was changed and/or enhanced as a result of local authorities declaring a 'climate emergency'. Similarly, pilots in Phase 3 narrowed and refined their scope in response to the COVID-19 pandemic.

3.3 Phase 3 comparison to Phases 1 and 2

The following section provides a brief analysis of the evolution of LHEES from Phase 1 to Phase 3, and coverage of the envisaged six stages. Throughout all three phases, Stage 3 (target setting) was often broad and lacked specific sector targets with a tangible timescale for them to be achieved.

It is difficult to compare cost and carbon saving assessments due to differences in reporting between the three phases. However, there appears to be a wide range in identified savings (from 9%-65%) across all phases, depending on the measures recommended.

Phases 1 and 2 covered the majority of LHEES stages (see page 7 for an overview of LHEES stages as defined in the 2017 consultations). However, particularly in Phase 2, Stage 4 (the socioeconomic analysis) was often excluded from the reports.

This contrasts with Phase 3 pilots, where Stage 4 was included and resulted in detailed socio-economic assessment of zoned energy efficiency measures and potential heat decarbonisation solutions. This change likely comes from the lessons learned by Scottish Government during Phases 1 and 2 about embedding a more direct approach to focused local area zoning and intentions to address fuel poverty⁷.

⁷ LHEES: guidance on strategy level socio-economic assessments, 4th February 2019 [LHEES: guidance on strategy level socio-economic assessments - gov.scot \(www.gov.scot\)](https://www.gov.scot/publications/lhees-guidance-on-strategy-level-socio-economic-assessments/pages/1-10.aspx)

4. Findings of the evaluation of Phase 3 pilots

4.1 Headline Findings:

The main findings from our stakeholder interviews are consistent with the main findings from Phases 1 and 2 of the pilots. The following themes were prominent and seen as the biggest successes and challenges throughout the LHEES process:

- The process proved to be a very useful data gathering exercise for local authorities and helped them to gain a more detailed understanding of the domestic and non-domestic building stock in their locality in addition to the heat demands.
- LHEES provided an excellent benchmark for the council's activities to date and helped identify priority areas to channel support in order to successfully begin to decarbonise.
- The LHEES process gave local authorities an opportunity for significant upskilling on decarbonisation through working with the consultants.
- The process encouraged cross departmental collaboration and put issues around climate change and decarbonisation further up the priority list of the councils' activities.
- The LHEES produced during the pilots were insufficiently detailed to allow councils to begin planning implementation actions.
- The task was demanding and time consuming and local authorities without a dedicated LHEES officer struggled to find sufficient resource to allocate to it.
- There was a concern over the lack of long-term funding needed to implement the scheme effectively.
- There was support from local authority officers for LHEES to become a statutory duty with sufficient accompanying resources to deliver an in-depth and useful strategy.
- Delivering LHEES on a long-term basis will require 1-2 full time staff.
- Engaging with the general public was difficult as local authorities did not want to raise the hopes of the public and did not feel they understood the outcomes of the pilot enough to communicate them clearly.
- Some local authority officers felt there was insufficient clarity from Scottish Government on what an LHEES should look like.
- Identification, sharing, and analysis of relevant data was difficult and further complicated by time consuming consent procedures.

An issue that did not come up in Phase 3, unlike in the previous phases, was the political sensitivities about an area-based approach. In previous phases councils highlighted that if pilots were focused on specific small areas there would be a negative response from other areas who may see this as unfair. This concern did not come up in the Phase 3 pilot which could be due to the fact that although pilots did have a specific small area focus, the wider local authority was also analysed, and authority-wide targets and priorities were identified.

4.2 Theme 1: Pilot outcomes and achievements

4.2.1 Summary of key findings

- **Increased understanding** – the LHEES process has enabled councils to identify challenges and opportunities around decarbonisation, energy efficiency improvements in buildings, heat networks and fuel poverty in their respective localities.
- **Funding** – without the funding from Scottish Government, councils would not have had the resources to develop an LHEES.
- **Lack of certainty over future development** – while pilots have presented local authorities with useful data and opportunities for future LHEES activities, some remain unsure about implementation of measures as they don't know what funding and resources will be available in the future.
- **Access to data** – LHEES has opened the doors for councils to access and understand data they had not used before.
- **LHEES can increase understanding of the local energy situation** but council capacity to move from this to implementing change will vary and additional support may be needed.
- **Alternative funding** – LHEES activity has enabled access to new funding opportunities such as LCITP grants.
- **Building internal momentum** – LHEES has fostered internal engagement within the councils and helped draw attention to climate change and related challenges around energy and decarbonisation, enabling task forces to drive change.

4.2.2 Developing a better understanding and building momentum

Council stakeholders noted that the LHEES funding has made it possible to initiate and trial valuable decarbonisation work in their local area. This has offered a variety of benefits and opportunities, including:

- Improved understanding of how to make homes warmer and more energy efficient, whilst moving away from gas heating, and building this activity into local housing strategies.
- Providing direction for fuel poverty projects.
- Enabling the exploration of opportunities around district heating.
- Opportunities to engage with new stakeholders.
- Consideration of the amount of funding required to take forward activities.
- Developing a decarbonisation evidence base.

As illustrated in the quote below from a local authority officer, the LHEES pilot facilitated engagement with what is seen by many as an impossible challenge, and demonstrated how local authorities can begin to address this:

The LHEES pilot has shown that decarbonisation is not an impossible task - just really hard - but not impossible! We have changed the discourse from "why should we even try to do this?" to "why shouldn't we do this?"

LHEES pilot activities have led to engagement with wider council colleagues, which in turn has stimulated new processes and knowledge sharing across the council, as well as adding LHEES into wider strategies and action plans.

Local authority stakeholders also considered that the pilots had enabled them to build on the momentum of existing activities, and in turn this has increased internal morale.

The pilots have increased understanding of the local energy situation and broadened engagement across stakeholders within and outwith local authorities. It is important that councils can learn from one another's experience, as different councils have made progress in different aspects of LHEES development.

One local council officer noted outdated council plans which hence could not be relied on as a basis for LHEES.

Conversely, one council considered that the results of their LHEES pilot show more of what had already been undertaken by the council rather than what is needed going forward. Other councils also felt unsure of how LHEES provides a pathway for the future as opposed to getting a 'closer look' or 'blueprint' of all the work that needs to be done in their building stock.

Several stakeholders noted that, from a strategic perspective, LHEES is considered a positive step towards decarbonisation of their local area, but ultimately the success of the LHEES pilot is dependent on whether or not the strategies are implemented. These councils were unsure about how to implement their strategy, leading to scepticism around the material impact of LHEES, as the following quotes highlight:

“As it stands, I don't see anything coming from the LHEES process as it exists at present.”

“There's two aspects having an LHEES. In itself it is [going to] do nothing. Local authorities and organisations are full of great strategies that look great on the shelf; we could spend a lot of money, take up a lot of time in producing an LHEES. But really, that's absolutely of zero value unless we go forward and apply it. So for me, there's two strands to that. One is actually the production of the completion of an LHEES and then secondly is the ongoing application of it.”

In some cases, the uncertainty on how to implement LHEES has been linked to the impact of the COVID-19 pandemic (see below) as it has reduced stakeholder engagement activities and networking significantly though, even without the pandemic, the same uncertainty around how LHEES can be applied was a prominent concern in Phases 1 and 2. While some local authorities have work still to do, the results from the pilots can be used to help complete stages of the LHEES process that are unfinished or to improve already complete elements of LHEES, which in turn can support the future implementation of LHEES.

4.2.3 Impact of the COVID-19 pandemic

The COVID-19 pandemic has led to a great deal of frustration across all stakeholders interviewed as part of this evaluation. It has led to all pilots taking different approaches and deviating from initial plans.

Examples of COVID-19 impacts include:

- The inability to conduct housing stock checks, which meant that for one council there were difficulties in validating and updating data about their housing stock.
- A lack of stakeholder engagement activities, with some councils not delivering on internal stakeholder engagement.
- Other authority work taking urgent priority in response to the pandemic, to the extent that the LHEES pilot was put on hold.

There is a good understanding of the difficulties and limitations caused by COVID-19. However, there may be other factors that would have limited the effectiveness of the pilots in the absence of the pandemic, such as skills gaps and a lack of preparedness to map and engage with all relevant stakeholders.

4.2.4 Additional outcomes

Two council officers observed outcomes from the pilots that were not mentioned by the majority of others. These include:

- Accessing new funding opportunities through working with contractors. This has included access to Low Carbon Infrastructure Transition Programme (LCITP) funding. The council stakeholder noting this additional outcome commented that the work on LHEES had given their application strength and validity, since it had been based on strategic analysis. Scottish Government may wish to consider how they best recognise the added value of funding the development of LHEES, which can lead to councils accessing further finance for development and implementation of energy activities.
- Understanding procurement through the Scottish Government's Excel framework.

4.2.5 Comparison between phases 1, 2 and 3

Table 2: Evolution of findings: Theme 1 ‘Outcomes and Achievements’ comparison between Phases 1, 2 and 3.

	Key findings from one or more of the pilot phases	Changes in response
Key findings	Resources - A need for greater certainty in future resource levels at national and local levels	Local authorities from Phases 1, 2 and 3 expressed the same views on needing additional guidance to ensure consistency and parity across all local authorities.
	Results from pilots - Few new opportunities for action emerged ⁸	Phase 2 and 3 pilot results show opportunities for action for most local authorities, with varying levels of investment as well as division between action for domestic and non-domestic buildings.
	Useful evidence - Through the pilots, project teams were able to develop an understanding of the process of developing an LHEES and create an ‘evidence base’ of the building stock ⁹	This has been a shared finding in both Phases 2 and 3

4.3 Theme 2: LHEES staffing and resources

4.3.1 Summary of key findings

- **Ownership** – taking ownership of the LHEES process and working closely with consultants has empowered many councils, improved their collective technical knowledge of LHEES and supported upskilling efforts.
- **Aligned strategies** – some councils have found that the concept of LHEES supports their internal policy strategies and future plans. Councils involved in LHEES Phase 3 have found that LHEES can be a useful tool to demonstrate accountability and provide evidence that they are delivering on key policy commitments such as climate change or fuel poverty.

⁸ Local Heat and Energy Efficiency Strategies (LHEES): Phase 1 pilots - social evaluation, 06/09/2019 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-phase-1-pilots-social-evaluation/pages/5/>

⁹ Local Heat and Energy Efficiency Strategies (LHEES): Phase 2 pilots evaluation, 23/10/2020 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-lhees-phase-2-pilots-evaluation/pages/5/>

- **Resources** – LHEES pilots have struggled to take off in councils where staff are demotivated, overworked and feel understaffed. This has affected the delivery of the pilots and made the working relationship with delivery partners difficult.
- **Consultants are key assets** – councils have (for the most part) very positive attitudes towards working alongside consultants.
- **Engagement at higher levels of seniority** – ownership and vision have come from officers and teams with limited authority and influence. Some local authority interviewees believe senior management and elected officials are not interested in LHEES, while others are keen to get them on board as soon as possible. But most agree that if LHEES are to be successful, support and leadership by elected officials and senior management will be essential.

4.3.2 Strategic ownership of LHEES

Broadly speaking, council stakeholders noted that the resources provided by Scottish Government – including guidance, funding for internal council officers and funding for external consultants – have enabled them to gain an understanding of the process for developing an LHEES. However, the extent to which this translated into a sense of ownership of the pilot varied greatly.

In many cases, the ability to take ownership of the LHEES pilot was linked 1) to a recognition of how LHEES fits in with other targets and strategies and 2) engagement of the wider council and senior officers around LHEES. First, planning an LHEES can allow a council to integrate a new mechanism for commitment to the climate change agenda. For example, one council stakeholder noted that LHEES is a useful mechanism to hold local authorities accountable in light of national and local climate change targets. Authorities can use the LHEES both to demonstrate to the public that they are taking ownership of the transition at the local level, and to feed into the work of other departments in the council. Several councils highlighted links to existing council strategies (e.g. on climate change and on fuel poverty) as a useful way to engage senior officers around LHEES and build internal support. And as the following quote illustrates, gaining internal support including at senior levels was seen to strengthen the ability of the council to take ownership of the process:

“There is support from many areas of the council, including more senior colleagues which strengthens the role of the council within LHEES and future work.” (Local authority officer, 2021)

Scottish Government could consider how they may best support officers to foster this senior-level engagement, as this varied significantly between local authorities.

The experience of other local authorities reflected lower levels of empowerment to take ownership of the LHEES pilot. Some stakeholders considered that there was no clear mechanism to allow local councils to engage with their LHEES, and there were several references to LHEES being imposed on councils and individual officers. The following quote illustrates a number of the challenges local authorities may

experience in taking ownership of LHEES, including the importance of adequate resources, and engagement of staff with relevant knowledge and experience:

“There is not a lot of ownership [of LHEES] from the council. Council employees are already overworked as they are, and it feels like LHEES was dumped onto someone to be delivered. But it wasn't even given to someone with expert knowledge on this area. The LHEES is focusing on domestic housing stock, yet the officer managing it has a role in managing non-domestic assets.”

A broader point around knowledge requirements was emphasised by a local authority stakeholder, who found that a lack of knowledge in areas of decarbonisation and therefore lack of understanding of how to approach LHEES resulted in lack of strategic ownership and, ultimately, led to the creation of an LHEES that was felt to be vague and general in nature.

One local authority interviewee noted that they have yet to fully understand the national vision for LHEES, with particular uncertainty around the role of the council in relation to non-council building stock. This prevented a sense of ownership of LHEES. Another local authority participant considered that there needs to be greater awareness of LHEES – both within the council and amongst key external stakeholders – before ownership could be embedded and future stages could be taken forward.

Finally, it was suggested that COVID-19 has had an impact on strategic ownership due to other priorities taking precedence, a need to delay timelines and give up on engagement activities.

4.3.3 The role of local authorities in delivery

The previous section described varied experiences of local authorities in terms of ability to take ownership of the LHEES process. This of course impacted the ways in which they approached the LHEES pilots, but one common theme relating to the practical work with LHEES was its ability to encourage cross-departmental working. Stakeholders were broadly positive about the role of LHEES in bringing together many areas of the council, including asset management, energy, planning and housing teams. The following quote is illustrative of this experience:

LHEES encourages cross departmental working. As a small council we are used to this and it's usually quite a smooth process, but there is still an element of bunker mentality in some departments. LHEES has become a tool to break with that and shift focus to the whole of the Council.

Only one council highlighted a lack of engagement by internal stakeholders as a highly demotivating factor:

“There is a strong feeling that the council neither understands nor shows interest on LHEES, which inevitably ends up being highly demotivating.”

Interviewees from one council spoke about the practical processes through which they are sharing results with elected members. They hope that this will provide a framework for LHEES activities to inform the council's decision making going forward.

4.3.4 The role of consultants in delivery

The research team consider that local authorities have generally benefitted from working with consultants during the development of LHEES, but that the impact that this has had on local authority ownership of the strategy has varied. Scottish Government could consider developing guidance for local authorities on how most effectively to combine internal skills development with use of external consultant support to enable full local authority ownership of the LHEES and its implementation.

4.3.5 Skills and resources for production of LHEES

Similarly to Phase 1 and 2 LHEES pilot participants, Phase 3 stakeholders identified a range of skills required to produce an LHEES effectively – in terms of the skills that internal and external stakeholders already have or need for the piloting activity and also for the future delivery of LHEES. The skills identified include:

- An understanding of energy in domestic and non-domestic settings, including consumption and resulting bills, building physics and surveys (including EPCs), and decarbonisation measures and technologies.
- Liaison and relationship building skills, including those to support the identification, sharing and analysis of relevant data, and to implement action plans.
- Data collation and analysis, including GIS and heat demand.
- Proactive project management skills to aid the development and delivery of strategies and action plans.
- Knowledge and awareness of upscaling retrofit from individual buildings to large scale programmes, including the deployment of large infrastructure such as heat networks.
- Knowledge and awareness of current and future policy and its integration with LHEES activities.
- Strategic influencing and negotiation skills to aid discussions with senior management and elected members.
- Strong stakeholder engagement skills to aid facilitation within councils and with external stakeholders, including the general public.
- An understanding of council processes and procedures, including planning and building control functions.
- Local knowledge of buildings, stakeholders and issues.

The extent to which local authorities felt capable of delivering LHEES in-house varied significantly from council to council. The majority of interviewees identified data analysis, and GIS in particular, as an area where they had limited capability and capacity.

Council stakeholders noted that there is confidence that where skills are lacking, gaps can be filled by external consultants. However, this partnership working may

have led to a reliance on contractors and a reluctance to develop new skills internally as a result. Consultants are seen as better placed to undertake some activities – particularly areas of technical expertise.

One stakeholder noted that their council does have a technical team though not engaged as part of the pilot as there was concern that their work would overlap activities carried out by procured contractors. Nevertheless, integrating the technical team in the future is an option with any expansion of LHEES. This would take advantage of existing in-house skills and increase autonomy in the LHEES process.

Many of those interviewed as part of this evaluation highlighted resourcing issues. Several called for dedicated staff members and teams to deliver LHEES. One stakeholder also suggested that the assumptions of financial investment needed for LHEES were not accurate, and that in reality the costs of taking action (in this case, within domestic properties) was substantially higher than initially thought.

The LHEES pilots have demonstrated the very wide range of skills and knowledge needed for development and delivery of the strategy, as demonstrated in quote below from a local authority officer:

"We don't know what it is we don't know. There is certainly knowledge of energy efficiency in the existing housing stock, but we have no idea on district heating and heat networks".

Local authorities could consider mapping where these skills reside in the local area, enabling them to determine what can be done in-house and what requires external support.

In addition, Scottish Government could consider supporting local authorities in upskilling where LHEES and decarbonisation are new concepts. Before any form of delivery, low carbon options need to be understood and a minimum threshold of understanding within local authorities if they are expected to deliver an LHEES programme. For example, one council officer did not know what a heat network was until after their LHEES Phase 3 pilot had begun.

4.3.6 Comparison between phases 1, 2 and 3

Table 3: Evolution of findings: Theme 2 ‘LHEES Planning’ comparison between Phases 1, 2 and 3.

	Key findings from one or more of the pilot phases	Changes in response
Key findings	Skills - Supporting and upskilling officers would be critical for enabling the delivery of LHEES ¹⁰ . Some councils have some in-house capacity but most lack the range of skills needed to develop & implement LHEES.	Local authorities from all phases have agreed that further upskilling and technical support for officers is vital to ensure a smooth roll out and maintenance of LHEES.
	Replicable method - Councils expressed disappointment that, whilst they had a better understanding of what an LHEES involved, they did not feel that they had been left with a method that they would be able to roll out across the whole local authority to develop a full LHEES.	Phase 2 showed that some councils saw the lack of feasibility in their project as a useful lesson and were not discouraged by the lack of replicable methods. Phase 3 showed varied results which allowed some councils to elaborate their plans, while others would need to re-develop their scope and targets before a method can be implemented.
	Partnership with consultants – Hiring consultants with prior knowledge of the local area, and working in close partnerships, helped to ensure a sense of local ownership of LHEES.	Councils from all three phases have agreed that working with consultants has been an instrumental asset in delivering pilots and also future LHEES programmes. However there is a distinction between experience in Phase 1 and Phases 2 and 3. The centrally procured technical support in Phase 1 was less well received: some local authorities views were that they did not get customised support in Phase 1 and that consultant contribution was largely desk-based and standardised, rather than responsive to local priorities.

¹⁰ Local Heat and Energy Efficiency Strategies (LHEES): Phase 2 pilots evaluation, 23/10/2020 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-lhees-phase-2-pilots-evaluation/pages/5/>

4.4 Theme 3: Data

4.4.1 Summary of key findings

- **A useful exercise** – local authorities had the opportunity to learn from and use data that they had not previously worked with. Through collaboration with consultants, some councils also increased their understanding of data previously used, learning how to use known datasets with more versatility, looking at and working with data in new ways, uncovering new opportunities for action.
- **Internal data and software issues** – outdated council-held datasets on energy use in buildings and in some cases, software used to look at heat data and existing housing stock, is a major concern for councils trying to create a reliable plan of action to address energy efficiency measures.
- **Lack of non-domestic data** - Lack of data on non-domestic buildings is also a major concern.
- **Home Analytics** – while this is a crucial source of data, the datasets rely heavily on unreliable EPCs, some of which have been grossly miscalculated (according to a number of local authority officers). Home Energy Scotland and Heat mapping data were also regarded as highly valuable sources of data.

4.4.2 Overview

Stakeholders noted that participating in the LHEES pilots had enabled them to access and work with valuable data. Whilst most of this data had always been available, the LHEES pilot activities gave council stakeholders the opportunity to use it for the first time. Support from external consultants was pivotal in this, along with local knowledge to support data analysis activities.

Several noted how working with data – including existing and new data sets – was a particularly useful exercise and helped them build their understanding of spatial data analysis. For example, this has included understanding where local heat loads are, and where demand for heat could come from. In turn this helped the council approach specific stakeholders to consider where connections to a heat network could be placed.

As noted in the previous section on LHEES planning, the extent to which officers felt capable of delivering LHEES in-house varied significantly from council to council. The majority of interviewees identified data analysis, and GIS skills in particular, as an area where they had limited capability and capacity. LHEES teams must have the technical know-how to understand and deploy opportunities around retrofit and the deployment of local carbon technologies.

Going forward, local authorities will need support in improving their data skills. Scottish Government could produce and maintain guidance on the data sets that exist, how to access them and how to use them.

4.4.3 Sources of data

A wide range of data sources were detailed in the stakeholder interviews and workshop. This included:

- EST's Home Analytics, and wider Home Energy Scotland datasets
- EPC datasets
- Scotland heat map datasets
- Local authority data, including:
 - Stock Condition Surveys
 - Data from previous projects, such as fuel poverty surveys
- Consultant data, including:
 - Wider Stock Condition Surveys
 - Local measures installation data
 - HEEPS data
 - Data from previous projects with academics.

4.4.4 Barriers to data

Stakeholders identified three types of barrier to accessing and using data as part of the LHEES pilots: 1) availability and accuracy; 2) access and 3) software.

First, lack of data and weaknesses of existing data sources was a recurring theme. In particular, data on non-domestic buildings as well as private rented properties is lacking. But limitations were also noted around existing data sources.

The reliability and accuracy of individual datasets was an issue raised by all stakeholders across all pilots. Comprehensive, reliable data is central to the planning and implementation of LHEES, and consideration should be given to investment to improve these data sources going forward. Stakeholders found that Home Analytics data provided limited information on individual local council areas, was not 100% accurate and needs updating to include more recent EPC data. Consider, for example, this quote from a local authority officer:

There are gaps in EST's Home Analytics dataset. For example, we found one property in a street that was EPC Band C. The dataset makes the assumption that all properties in that street are also EPC Band C.

Moreover, local authority officers from several councils struggled to engage with this data for implementation in their strategic work. One stakeholder experienced

difficulties connecting Home Analytics data with their own social housing energy performance data.

Numerous stakeholders also noted the lack of data on non-domestic building stock as well as complexities of merging different non-domestic datasets.

Several local authorities discussed how the COVID-19 pandemic had limited their ability to conduct housing stock checks, which could otherwise have been conducted to validate/update existing data and fill any gaps in data on local housing stock.

Secondly, several stakeholders discussed challenges around data access and sharing between local authorities and delivery partners. GDPR restrictions and data sharing protocols were considered strict and cumbersome, and stakeholders called for the Scottish Government to produce additional guidance on sourcing and using data for analysis.

Another stakeholder noted the difficulties in accessing data from other departments across the council and the wider public sector, noting that if key data is not shared at the right time, the implementation of the pilot becomes a struggle.

Third, and finally, several councils highlighted the problem of outdated software and a lack of efficient data storage. They consistently noted that they would need additional funding to upgrade software, e.g.: GIS systems.

The research team recommend that the Scottish Government, in collaboration with relevant partners, could facilitate improvement of datasets in key areas, including the energy performance of non-domestic buildings. Actions could also be taken to address quality issues and gaps in existing data sources, and to give local authorities priority access to new and improved datasets. Local authorities would also benefit from keeping their own local datasets as up to date as possible and identifying (and securing) the software and capabilities needed for effective data analysis.

4.4.5 Comparison between Phases 1, 2 and 3

Table 4: Evolution of findings: Theme 3 ‘Data’ comparison between Phases 1-3

	Key findings from one or more of the pilot phases	Changes in response
Key findings	Dataset awareness- LHEES Pilots supported people to be made aware of what datasets were available and how they could be used.	This point was shared by councils participating in Phases 1-3.
	Data Availability - A lack of data available for some types of building stock, with commercial buildings being particularly problematic.	This too was a common finding with councils participating in Phases 1-3.
	Data Sharing Agreements - The future roll-out of LHEES would benefit from clear guidelines in terms of when data sharing agreements are required, and the provision of templates for these ¹¹ .	Councils from Phases 2 and 3 expressed concerns with regards to the slow speed and difficulty of establishing sharing agreements. The process is time consuming and at times there could be delays from any of the parties involved which hinders the ability to share data efficiently and quickly.

¹¹ Local Heat and Energy Efficiency Strategies (LHEES): Phase 2 pilots evaluation, 23/10/2020 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-lhees-phase-2-pilots-evaluation/pages/5/>

4.5 Theme 4: Stakeholder engagement

4.5.1 Summary of key findings

- The **COVID-19 pandemic** has significantly affected stakeholder engagement (Inside and Outside Councils) throughout LHEES Phase 3, particularly in councils with no experience in working remotely.
- **Uncertainty going forward** – councils are not entirely sure which outside Council stakeholders are most relevant to deliver LHEES and they have not done extensive enough mapping to determine who will be instrumental to make LHEES programmes successful going forward.
- **Incentives missing** – some councils feel they lack the instruments to incentivise stakeholders such as housing developers, private rented sector, non-domestic property managers and social housing providers to decarbonise if the regulation is not there to encourage them.
- **Internal engagement** – for the most part, councils have had a positive experience engaging internally with colleagues from other council departments.

4.5.2 Key findings

One of the major impacts of the COVID-19 pandemic has been the limited delivery of stakeholder engagement around the LHEES pilots. While not a core requirement within Phase 3 pilots, most councils declared that they had wanted to deliver much more in this area but had no option but to limit or stop all stakeholder engagement activities altogether.

Most pilots noted stakeholder engagement activities – both internal and external - as core LHEES pilot activities. This is because these activities help build greater local ownership of LHEES activities, which in turn leads to greater chances of success.

Many stakeholders noted positive internal stakeholder engagement activities, including (in a few instances) the involvement of senior management and elected members.

One interviewee noted the positive steps taken by their consultant who had been setting up focus groups of external stakeholders, including local businesses, universities and housing stakeholders.

There was some confusion for some council officers as to who they should be engaging with, while others noted that there would be no external stakeholder engagement activities until after the pilot was complete or that activities did not include engagement with the general public. Some council officers noted that since elected officials and senior members of the council were not expected to participate in the pilots, officers felt reluctant to engage with external stakeholders until they felt the support of the senior counterparts.

4.5.3 Barriers to engagement

Many Phase 3 pilot participants noted that engaging with external stakeholders was difficult, especially the general public. As illustrated below, this is a general challenge for local authorities, which is equally important in the context of LHEES:

“We struggle to get engagement from the local community, regardless of the topic.”

One council noted that their approach to LHEES had been influenced by past negative stakeholder engagement experiences where response rates had been alarmingly low for issues considered vital to the community. In the case of this LHEES pilot, this learned experience led to the geographical selection of an area where council officers knew that the community were keen on alternative energy, to see whether this approach would result in a high level of engagement from the general public. However, the pandemic meant that this could not be tested during the pilot. Reflecting on their experience around stakeholder engagement, they suggest a key finding from the pilots may be the challenging nature of effective public engagement:

“One of our links is with local community councils – but none of them are meeting at all at the moment due to COVID. One of the findings of this project may actually be how hard it is getting to people, getting through to them, developing awareness and understanding. One of the reasons why we chose one of the locations [for the LHEES pilot] was because they have people who are interested in alternative energy – would that make a difference?”

Limited resources were declared as a key barrier to fulfilling engagement activities. As exemplified below, interviewees noted that there had not been a lot of internal engagement and subsequent support for LHEES, due to limited resources within their councils:

“Overall the sense is that LHEES is too much work and people are already quite strained as it is.”

While there are certainly success stories of stakeholder engagement from the Phase 3 pilots, there are concerns that future work on LHEES [if LHEES is made into a statutory duty] will require substantial stakeholder engagement, and that there are a lot of parties that need to be brought in to deliver LHEES successfully.

Several local authorities are not confident in their stakeholder engagement skills and have not conducted comprehensive stakeholder mapping and other preliminary activities to allow them to understand who they should work with during the implementation of LHEES.

Councils will need support in stakeholder mapping and relationship building and management as LHEES expands beyond the pilot phase. This upskilling in councils is necessary to enable officers to confidently map and engage stakeholders, as well as to empower officers to successfully interact with various stakeholder groups of new significance such as Distribution Network Operators (DNOs), private rented

sector (PRS) landlords and commercial building owners. This activity could include the production of guidance.

Upskilling in stakeholder engagement will reduce the reliance on formal regulation as the main motivator on private actors if councils are able to encourage and facilitate public-private collaboration around decarbonisation. In addition, interviewees considered that stakeholder engagement may be constrained by a lack of shared commitment to LHEES aims. Scottish Government could support local authorities by providing long-term policy clarity and effective public communication of energy transition goals. This could also be by a general framework for stakeholder engagement which could then be adapted to local circumstances. As a result, there could be an increase in stakeholder willingness to engage with local authorities.

4.5.4 Comparison between Phases 1, 2 and 3

Table 5: Evolution of findings: Theme 4 ‘Stakeholder Engagement’ comparison between Phases 1, 2 and 3.

	Key findings from one or more of the pilot phases	Changes in response
Key findings	<p>Scope and Expertise - Neither local authorities nor consultants recognised this task as being within their scope of works for the pilot, and there was a lack of resource and expertise to undertake this work¹². In Phases 1 and 2 this seemed to be background rather than foreground in LHEES pilots – it was a concern for the future potential implementation. Getting property owners of all types to participate has been much more central in the EES capital programmes, where self-funded groups were the target of engagement.</p>	<p>Stakeholder engagement has varied significantly from one phase to the other. While Phase 1 councils felt that stakeholder engagement was not a pertinent task within their responsibilities, phase 2 councils considered that it was too early to engage with the public and phase 3 pilots faced the COVID-19 pandemic and lockdown which made stakeholder engagement outside of the council extremely difficult. Having said that, councils in both Phase 1 and Phase 3 acknowledged that there is a lack of resource and expertise to undertake stakeholder engagement.</p>
	<p>Managing Expectations - Officers also did not want to raise expectations by going out to communities to discuss potential heat and energy efficiency interventions that may not go ahead due to lack of funding or certainty over the future of LHEES.</p>	<p>While councils from Phase 1 pilots did not want to raise false expectations with the local community because of lack of certainty over the future of LHEES, Phase 3 councils were more concerned about the overarching regulation that incentivises decarbonisation and low carbon options as opposed to public perception of LHEES</p>

¹² Local Heat and Energy Efficiency Strategies (LHEES): Phase 1 pilots - social evaluation, 06/09/2019 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-phase-1-pilots-social-evaluation/pages/5/>

4.6 Theme 5: Future implementation of LHEES

4.6.1 Summary of key findings:

- **Several councils noted the implications of unique local circumstances**, geographical needs and socio-economic contexts for how they approached the LHEES pilot.
- **Councils are conscious they cannot fund LHEES alone.** While they may be able to attract some funding from other sources, Scottish Government will have to provide adequate funding to enable further roll-out of LHEES as funding the activities in the LHEES delivery plan is costly at the public estate level.
- Funding from Scottish Government is essential, but councils are aware that they should also look at **integrating local funding and support decentralised, flexible energy markets** within their LHEES strategy to secure alternative sources of revenue. This applies to funding the production of an LHEES plan and to its delivery.
- **For LHEES to be effective there needs to be a statutory duty supporting implementation** as a lack of a statutory duty limits local authority officers ability to persuade developers, social housing providers and residents that decarbonisation measures must be implemented if councils are to reach their climate targets and commitments. Council officers feel that in the absence of a statutory duty, political leaders and senior officers will not prioritise LHEES.
- There is concern regarding the **intensive resourcing requirements** surrounding LHEES if it were to be taken forward.
- There was a common view that **external consultants will be key** to supporting future LHEES work.

4.6.2 Policy and strategic alignment of LHEES

Stakeholders interviewed as part of this evaluation understand that LHEES is part of a broader national strategy around decarbonisation, and that local councils have an essential role in convening stakeholders, influencing the direction of activities at the local level and taking forward action. However, there were concerns that there is a range of decarbonisation policies and regulations that need to be enacted or strengthened before LHEES can be delivered effectively, as well as a much larger cultural shift in attitudes to take forward decarbonisation activities. Without these, stakeholders considered that the impact of LHEES in the future would be limited. Consider, for example, the following quote from a local authority officer:

Local authorities have a role of influencer – but that’s a tricky role as long as there is no regulation on private householders to reach energy efficiency levels – there is in the social housing sector... Regulations are coming in the private housing sector, but it still remains to be seen.

The first recommendation called for by stakeholders was to make LHEES a statutory duty, and for the Scottish Government providing support and resources to enable the effective delivery of LHEES by local councils and key stakeholders. Stakeholders noted that the duty should be replicable across Scotland’s 32 councils, but at the

same time be flexible and adaptable to different geographical and socio-economic contexts and local priorities.

The second high level recommendation was a call to enact and strengthen regulations around the decarbonisation of buildings. For example, one interviewee noted that without policies mandating commercial sector premises to improve their energy performance or connect to heat networks, they would struggle to engage with and act in this sector. Another area of concern was the cheapness of natural gas, and how the taxation regime should be shifted to promote decarbonisation whilst at the same time protecting low income and vulnerable households from falling into fuel poverty.

4.6.3 Stakeholder engagement

One interviewee had concerns over the level of stakeholder engagement required in the future should LHEES be taken forward as a statutory duty. While agreeing that stakeholder engagement is key to the delivery of LHEES at the local level, they had concerns that the activity would be a large draw on resources.

One council noted how the production of the LHEES report and other associated documents would be useful in engagement of elected members and senior officials, influencing them to take up the cause and facilitate action in the local area, as well as engagement with the wider local community.

4.6.4 Support required from the Scottish Government

Stakeholders gave mixed messages in terms of the support given and required from the Scottish Government:

Some authorities were very positive about the involvement of officers from the Scottish Government, noting that they had been helpful and supportive, whereas others noted that there had not been enough support or that support wasn't required at all. One interviewee commented that they were unaware of the Scottish Government's vision around LHEES.

One council stakeholder called for the Scottish Government to consider communications and interactions, as well as general support, aimed at senior council officials in the future. They felt that this has been lacking within the pilot activities.

Funding allocations, both for LHEES activities within councils and for associated consultancy support, were a hot topic of discussion with council officers across departments. One interviewee noted that while their council was struggling financially, the funding for the pilot had enabled decarbonisation activity to be taken forward. In addition, the need for capital funding support to enable the projects to get

off the ground – taking LHEES plans to implementation stage - was emphasised by a wide range of stakeholders.

One council called for more workshops between local authorities and other LHEES stakeholders to promote and share best practice, emphasising the benefits of these forms of engagement:

“The Scottish Government workshops also offered support because periodically getting feedback from others - case studies and experiences from people in different authorities - that has helped us understand the pitfalls, the challenges we've all had. Each of these learnings are absolutely vital and it stops you from replicating something that hasn't worked”

4.6.5 Support from consultants

In comparison to previous LHEES phases, there was much more positive feedback from local authorities in Phase 3 about the experience of working with external consultants. This includes how they were procured all the way through to how they have worked closely with councils during the pilot.

Most, if not all, stakeholders wanted this activity to continue, noting how consultants were keen to educate, share knowledge and findings about local building stock, and guide council stakeholders through data and technical elements of the pilot. The benefits of working with external consultants is demonstrated in the following quote:

“The power of having great people working together, communicating, makes us able to take advantage of these opportunities”. (Local authority officer, 2021)

If consultant support is not part of LHEES in the future, local councils would be concerned as to how they would be expected to achieve the same outcomes without being technically as well versed as contractors.

One council interviewee commented that there had been some uncertainty around the ownership of LHEES. They noted that they relied heavily on their contractor to lead the LHEES process, but at the same time there was the expectation from Scottish Government that LHEES should be council driven and locally owned. On a similar note, another local authority interviewee noted that their delivery partner had a slightly different vision of LHEES for the local building stock, resulting in some confusion.

There were some issues with miscommunication between consultants and councilsthat, in the opinion of one council interviewee, had led to the council not being able to make the most of the relationship.

The support provided by Scottish Government for procurement of contractors with relevant experience in LHEES pilots was welcome. However, one local authority was pleased to be able to procure the services of a regional consultant with vast amount of experience in the local area. It is important that experts bring together

technical know-how and an understanding the geographical and socio-economic constraints and challenges of each individual local authority.

4.6.6 Skills

A long list of skills and knowledge areas have been identified as core to the implementation of LHEES (as outlined in section 4.3.5). This includes technical knowledge of energy demand in buildings and the decarbonisation of heat, policies, and project management and interpersonal skills in stakeholder engagement and negotiation.

With the anticipated roll out of LHEES, the Scottish Government will need to consider the capability and capacity within local councils, as well as across the wider stakeholder group who are vital to the implementation of local activities. The extent to which individual pilots felt capable of delivering LHEES in-house varied significantly from council to council. The majority of interviewees identified data analysis, and GIS in particular, as an area where they had limited capability and capacity.

4.6.7 Strategic positioning within councils

Numerous council interviewees expected that, upon completion of the pilots, LHEES will be fed into wider strategies, including housing, local energy plans and climate change strategies, as demonstrated by the following quote:

“Once the LHEES pilot is finished, the council will integrate that into an upcoming Climate Change Strategy which is being developed. It is expected that whoever becomes the lead on the climate change strategy will take on the lead on LHEES going forward -- while LHEES will remain inherently cross-departmental in nature”.
(Local authority officer, 2021)

Such integration of LHEES in council wide strategies, plans and activities is central to driving progress towards decarbonisation targets. Scottish Government could develop guidelines for LHEES integration across local authority activities.

4.6.8 Comparison between Phases 1, 2 and 3

Table 6: Evolution of findings: Theme 5 ‘Future implementation of LHEES’ comparison between Phases 1, 2 and 3.

	Key findings from one or more of the pilot phases	Changes in response
Key findings	Statutory Duty - Local authority officers and consultants interviewed were in favour of LHEES becoming a statutory duty. ¹³	Councils from all LHEES Pilot Phases agree that statutory duty status would be beneficial for the future roll out of LHEES.
	Incentives for Large Businesses - It would be helpful if Scottish Government created or reinforced mechanisms to encourage large businesses to engage with LHEES.	Phase 2 and 3 councils also agree that further regulation and/or mechanisms to incentivise large businesses are going to be necessary in order to support future implementation and incentivise LHEES programmes.

¹³ Local Heat and Energy Efficiency Strategies (LHEES): Phase 2 pilots evaluation, 23/10/2020 <https://www.gov.scot/publications/local-heat-energy-efficiency-strategies-lhees-phase-2-pilots-evaluation/pages/5/>

5. Conclusions

5.1 Outcomes and achievements

- Local authorities involved in the Phase 3 LHEES Pilots were able to develop an understanding of the process of producing an LHEES, and access data to create an 'evidence base' of the local building stock.
- Working in close partnership with consultants was seen as instrumental to delivering an LHEES pilot and is expected to be central to future area-wide LHEES programmes.
- Phase 3 pilots confirmed that local authorities would not have the capacity and resources to develop an LHEES without funding from the Scottish Government.

5.2 LHEES Staffing and resources

- The extent to which local authorities took ownership of the LHEES process was strongly dependent on the extent to which responsible officers felt they had the right skills and expertise as well as feeling empowered to lead on this work.
- LHEES planning is highly resources intensive, and councils often struggled with the time commitment of the pilot, on top of existing workload.
- Engagement and involvement from senior management and elected officials is also crucial, along with the need for further upskilling within Councils to enable effective engagement with and ownership and delivery of LHEES.

5.3 Data sources and gaps

- LHEES development was a useful exercise for local authorities because it included accessing and analysing energy performance and building stock data in a way that they had not had the opportunity or incentive to do previously.
- Through the LHEES pilots, local authorities also identified challenges posed by outdated data and software, and the limits this put on the reliability of the strategies to deliver decarbonisation.
- Data on non-domestic building stock was scarce, resulting in non-domestic buildings featuring less prominently in the strategies.
- Some councils also lacked internal expertise on software such as GIS.
- As better data become available to the Scottish Government, it is essential that this is made available to local government.
- It is also crucial that the Scottish Government ensures resources are available to allow for local authorities to upgrade council software and train staff in its use.
- Local authorities should prioritise the maintenance of local buildings (domestic and non-domestic) datasets as part of the ongoing LHEES process.

5.4 Stakeholder engagement

- The COVID-19 pandemic significantly affected stakeholder engagement throughout Phase 3, resulting in limited or no engagement with non-council stakeholders and the wider public.
- Council officers were unsure about who would be instrumental to LHEES success, and therefore who they should be engaging with.
- They also felt that there was a lack of incentive for private sector actors and the public to engage in the implementation of LHEES.
- The Scottish Government could usefully support local authorities with guidance and skills development in stakeholder mapping and relationship building and management.
- Long term climate and energy policy clarity will further support public engagement with LHEES. The development of performance standards for properties across Scotland, linked to trigger points (e.g. sales and rentals) can drive engagement around climate change and local LHEES activities, and drive demand for retrofit.

5.5 Future implementation

- There was broad support across local authorities involved in the Phase 3 pilots for LHEES to become a statutory duty. It was felt that this will be critical to secure both government funding and internal allocation of resources for the further development of area-wide LHEES.
- A further conclusion from this evaluation of Phase 3 pilots is the need for the final LHEES methodology to provide sufficient structure and guidelines in order for councils to effectively implement LHEES in their local areas.
- Implementation of LHEES will require appropriate long-term funding.
- Adequate resourcing for the successful planning and delivery of LHEES is crucial. This includes financial support, skills development and guidance.
- In introducing LHEES as a statutory duty, there needs to be an understanding of the resources and skills required to effectively deliver LHEES and assurance that these will be appropriately resourced.

Annex A: Organisations interviewed and/or involved in the workshop

1. Angus Council
2. Arup Group
3. Changeworks Consulting
4. ClimateXChange, The University of Edinburgh
5. Comhairle nan Eilean Siar (Western Isles Council)
6. East Ayrshire Council
7. East Dunbartonshire Council
8. East Renfrewshire Council
9. Energy Saving Trust Scotland
10. Moray Council
11. North Ayrshire Council
12. Professor Janette Webb, The University of Edinburgh
13. Ricardo Energy & Environment
14. Scottish Government
15. South Ayrshire Council
16. Tighean Innse Gall (TIG)
17. West Dunbartonshire Council
18. Zero Waste Scotland

Annex B: LHEES Phase 3 pilot outputs

The research team had access to output reports from six of the nine local authorities participating in Phase 3. Table 6 provides high-level summaries of each of these six pilots. This is followed by more detailed overviews of each pilot.

Table 6: list of local authorities in Phase 3 with published pilot reports divided by scope, data sources, stages completed, recommended measures, cost and expected CO₂ savings.

Local authority	Scope	Data sources	LHEES stages completed	Recommended measures	Cost	CO ₂ savings
Angus Council						
Targets and decarbonisation recommendations covering all buildings (domestic and non-domestic).	Inverkeilor, Glamis, Edzell, Newtyl, Monikie, Aberlemno Heat pumps, heat networks, radiator sizing, bio-mass boilers, building heat loss calculations.	Home Analytics, Scotland Heat Map, EPC register, tenure data provided by the Council, Scottish Household Income Deciles	Elements of Stages 1, 2, 4, 5 and 6 are included.	Air sourced heat pumps are suitable for most property types and therefore strategically important. Biomass boilers could be used in large rural, detached properties with high heat demands. Angus is well suited to renewable power generation.	Individual heat pumps low investment cost. Biomass DH and individual heat pumps high capital investment costs.	Individual heat pump analysis: Effective at reducing CO ₂ emissions (58%)
East Ayrshire Council						
Targets covering all buildings (domestic and non-domestic).	East Ayrshire, Kilmarnock, North West Kilmarnock and South Central Kilmarnock. Focused on high heat demand areas (where there is potential for district heating).	Home Analytics, Scotland Heat Map, EPC register, data provided by the Council regarding tenure	Elements of all 6 stages are included.	Build knowledge of low carbon solutions for heritage assets. Explore low-carbon heating and Passivhaus/ Enerphitt standards in the non-domestic stock. Develop Heat network strategy for Council housing stock.	Low carbon space heating upgrades would cost £36m. Installing solar thermal £135m.	41 kilotonnes of CO ₂ per year could be saved

East Dunbartonshire Council						
Domestic and non-domestic.	Keystone and Dougalston; North Castlehill and Thorn; South Castlehill and Thorn. Focused on air source heat pumps and heat networks as the most suitable heat generation technology.	Home Analytics, Scottish Heat Map	Stage 1 and 2 completed (Background Energy Status Review, 2020). Stage 5 completed based on spatial analysis, discussed with Council.	Consider a roadmap to low temperature heat networks in the medium to long term. Identify means to ensure space heating is designed to be compatible with heat pumps and low temperature heat networks. Develop plan to enable future hot water provision by low temperature heat networks. Identify opportunities to reduce cost of installing heat network pipework.	No cost estimates included in current reports.	No savings estimates provided in current reports.
East Renfrewshire Council						
Targets and decarbonisation recommendations covering all buildings (domestic and non-domestic).	Neilston and Barrhead Focused on air and ground source heat pumps as the most suitable heat generation technology	Home Analytics Data, Scotland Heat Map, EPC register	All 6 stages included	The domestic sector is recognised as having a key role in energy efficiency strategies, with a number of key targets and plans in place, especially within social housing. No plans related to the efficiency of the non-domestic sector were identified.	Installing all identified low carbon space heating upgrades would cost £22m. Installing all possible solar thermal is estimated to cost £102m.	Installing all measures is estimated to save 39kt of CO ₂ per year, which equates to 0.9 tonnes per household.

Moray Council						
Domestic and non-domestic	The whole of Moray with focus on Burghead and Elgin Off gas properties was a key focus in addition to ground/air source heat pumps as the most suitable heat generation technology	Home Analytics, Corporate Address Gazetteer, EPC data, Census data	All 6 stages included	Join up existing and future priorities/ activities/ strategies. Focus on improving fabric efficiency of pre-1919 properties to be compatible with low carbon heating.	Installing all possible domestic fabric upgrades is estimated to cost £128m, installing all identified domestic low carbon space heating upgrades would cost a further £134m.	Installing all domestic measures is estimated to save 93 kilotonnes of CO ₂ per year, which equates to 2.2 tonnes per household.
West Dunbartonshire Council						
Targets and decarbonisation recommendations covering all buildings (domestic and non-domestic).	The Clydebank area of West Dunbartonshire Council Focused on air source heat pumps and heat networks as the most suitable heat generation technology	Home Analytics, Scotland Heat Map, EPC register, data provided by the Council regarding tenure, the Scottish Household Income Deciles.	Elements of the 6 Stages are included.	32% of domestic properties suitable for heat pumps (when loosening this criterion to include mains gas heated properties for heat pump suitability) Heat pumps were recommended for 43% of the non-domestic buildings (either air source or ground source).	Domestic: installing all identified low carbon space heating upgrades would cost £5.7m.	Domestic: Installing all the measures is estimated to save 7.3 kilotonnes of CO ₂ per year

Angus Council

Focus: Study focused on areas suitable for heat pumps, heat networks, radiator sizing, bio-mass boilers, building heat loss calculations. To identify the tools, data, skills and resources required to develop and deliver an area based LHEES for Angus. Study area defined by Angus Council consists of the following areas: Inverkeilor (Village location); Glamis (Conservation Village location); Edzell (Village location); Newtyle (Village location); Monikie (Village location); Aberlemno (Parish with small village).

Data sources: Home Analytics; Scotland Heat Map; Domestic Energy Performance Certificates (EPCs); Data on privately rented properties and social housing stock data; Scottish Household Condition Survey (SHCS); Angus Council owned non-domestic properties data.

Recommendations

- Air source heat pumps are likely to be a low carbon heat option suitable for most property types and are therefore strategically important.
- 90% of properties were identified as being likely to be suitable for heat pumps if heat emitters (radiators) were upgraded.
- Heat pumps were found to be the only technology which can be widely deployed, offer a running cost saving to most properties and decarbonise heat.
- There are options for heat networks in the study area however they are not currently viable without further reductions in capital and/or operating costs.

Stages completed: Use of six stages of framework. The majority of LHEES stages are included. Stage 1 and 2 provides a detailed assessment of local and national strategies in addition to an area wide assessment of existing domestic and non-domestic building stock. Stage 3 is absent in terms of a lack of setting area wide targets but Stage 4 (conducting a socio-economic assessment of potential energy efficiency and heat decarbonisation) is detailed. Costing and Phasing in Stage 6 looks at broad funding streams and is not tailored to each specific priority or recommendation.

Key challenges/findings

- Individual heat pumps were effective at reducing CO₂ emissions (-58%) and made the largest contribution towards the reduction of fuel poverty (-24%); 29% savings in household's fuel bill on average. In addition, they were the lowest investment costs and created a 29% decrease in annual fuel costs.
- Biomass DH and individual heat pumps were the most effective to reduce CO₂ emissions among the proposed policies (-66%) but had a higher capital investment compared to baseline.
- Heat network options were investigated for hard-to-treat non-domestic properties in clusters which could be used to form heat networks and were deemed not likely to be financially viable, however carried forward to compare to other options for hard-to-treat properties.
- EPC band A to C makes up under 25% of properties in all areas.
- High % of D-E rated properties in all villages – with energy efficiency and renewable heat measures these are most likely to achieve EPC C grade.
- Discrepancies between projected and home analytic heat demands at an individual property level. Verification of heat load/demand critical.

East Ayrshire Council

Focus: To identify the tools/data/skills/resources required to develop an LHEES for East Ayrshire. Targets covering all buildings (domestic and non-domestic). The prioritisation of the two selected zones, North West Kilmarnock and South Central Kilmarnock. Focused on high heat demand areas where there is potential for district heating.

Data sources: Home Analytics; Scotland Heat Map; EPC register; Data provided by the Council regarding tenure; Data on privately rented properties and social housing stock data; Corporate Address Gazetteer data; Census data; Scottish House Condition Survey (SHCS)

Recommendations

- Non-domestic: Over half of the buildings (58%) have been recommended heat pumps and 55% of the non-domestic properties have been recommended solar thermal. Wall insulation measures were recommended to over half of the buildings (52%). Loft and roof measures were recommended to 33% of buildings.
- Domestic: A small number of properties suitable for an air source heat pump (15; 2%), though this percentage increases when we include properties currently connected to the gas grid (45%). Loft and wall insulation opportunities were identified for 58% of properties (34,372 properties).

Short term/immediate targets (2021-2025):

- Improve knowledge and understanding of low carbon interventions suitable for heritage assets.
- Develop an area wide LHEES strategy in line with future Scottish Government requirements.
- Explore low-carbon heating and Passivhaus/ EnerPHit standards in the non-domestic stock.
- Promote net zero carbon in new private development.
- Formulate Council's carbon footprint for non-domestic buildings.
- Zero emissions heating for new builds.
- Develop a heat network strategy for existing/new council housing stock.

Stages completed: Elements of all 6 stages are included. Local authority-wide setting of aggregate targets for heat demand reduction and decarbonisation of buildings (stage 3) covers the short, medium and long term. the socio-economic assessment of zoned energy efficiency is explored in the workshop but could be detailed throughout the analysis. The prioritisation of areas (stage 5) focused on Kilmarnock, North West Kilmarnock and South Central Kilmarnock.

Key challenges/findings

A process for access to the data required for third party consultants needs to be refined as time delays can be attributed to:

- Data access. Although the Scottish Government is working on this, it was unclear if and how access to EPC data would be arranged.
- Data 'awareness'. It is critical that the officer/managers in charge of LHEES development at East Ayrshire Council are aware of:
 - The existence and knowledge of access to requested datasets such as Home Analytics and Scotland's Heat Map.
 - The legalities regarding the datasets, knowledge of (contract variations on) data sharing agreements between local authorities and Energy Saving Trust or OS.
 - The level of data literacy required to understand what the requested data needs to contain and in what format.

East Dunbartonshire Council

Focus: The pilot project focussed on opportunities available for decarbonising heat and reducing heat and energy demands within buildings in chosen data zones. Air source heat pumps and heat networks was the focus as the most suitable heat generation technology.

Data sources: Home Analytics; Scotland Heat Map; Additional data collection

Recommendations

- Keep up to speed with the likelihood of the gas grid being decarbonised and the timescales to inform the LHEES and future revisions of it.
- Keep abreast of changes to the data available, of methodologies to estimate existing and future heat demands to ensure that assumptions on both building performance and the effects of behaviour change are understood.
- Overall, the strategy should consider a roadmap to low temperature heat networks in the medium to long term both as an alternative to heat pumps but also as a technology/heat source alternative in the longer term.
- Identify means to ensure space heating in new and refurbished buildings is designed at low temperatures to be compatible with both heat pumps and future low temperature heat networks.
- Develop plan to address challenges and opportunities in hot water provision to ensure that low temperature heat networks can be deployed in the future.
- Identify opportunities, as part of other projects, to reduce the cost of installing heat network pipework.

Domestic:

- Improve energy efficiency by various measures including loft and cavity wall insulation, draught proofing, floor insulation, and solid wall insulation.
- While the intuitive approach to fuel poverty would be to focus on least efficient properties, analyses show more efficient properties are also associated with fuel poverty, and so fuel poverty alleviation should consider all properties.
- To enable electric heating/heat pumps steps would need to be taken to address risk of increased energy bills, including energy efficiency, quality installation and solar PV.

Non-domestic:

- Improve energy efficiency of all buildings and reduce electrical loads.
- Fuel switching in gas supplied buildings.
- For buildings with electric heating, install heat pumps.
- Across the three areas district heating may not be the perfect solution due to limited large heating loads, no waste heat, but smaller clustered district heating schemes could be viable.

Stages completed: Use of six stages of framework. Stage 1, 2 and 5 completed.

East Renfrewshire Council

Focus: Focused on heat pumps as the most suitable heat generation technology. An analysis of the domestic and non-domestic building stock of East Renfrewshire has been the focus in addition to specific analyses carried out on Barrhead and Neilston.

Data sources: Energy Saving Trust's Home Analytics; Local authority data; Scotland Heat Map; EPC register.

Recommendations made

Immediate priorities:

- To ensure new builds are built to the correct standards.
- Improving the efficiency of non-domestic buildings including council stock.
- Stakeholder engagement with householders (owner occupiers and those in the private rental sector).
- The governance structure within the Council will need to be considered in order to ensure buy-in to the development, management and delivery of the strategy.
- The potential for using a carbon budget across the Council mooted as an option to explore.

Medium term priorities:

- A need to have a firm council position on carbon reduction (targets, degree of prioritisation etc.) as well as a carbon budget.
- A 2025 target for carbon emissions reductions was felt to be useful to work towards and engage people around, given the relative distance between now and 2040.
- Net zero targets should be linked to fuel poverty targets.
- All development (non-domestic and domestic) should be in line with LHEES and the climate change strategy.

Stages completed: Use of six stages of framework. The majority of LHEES stages are included. Stage 2 (an area wide assessment of building stock) is very detailed and spans the specific two areas stated above. Stage 3 (target setting) lacks exact decarbonisation targets and instead gives a broad overview of the immediate, medium term and long-term priorities. Stage 6 (costing and phasing) is generic and provides an overview of funding streams.

Key challenges/findings

- Most of the council's policies which relate to the LHEES lack measurable aims and targets. Those that do, mainly come from central government targets.
- The domestic sector has a key role in energy efficiency strategies, with a number of key targets and plans in place, especially within social housing.
- No plans related to the efficiency of the non-domestic sector were identified.
- Tackling fuel poverty is a priority. The council aims for fuel poverty to be reduced, but targets have not been set.
- While no specific targets were found; the council outlined its support for and encouragement of heat networks.
- Over one-third of the domestic properties are suitable for wall insulation measures, with the majority being cavity wall insulation (25% of stock) and internal wall insulation (11% of the stock).
- For 20% of the properties, no suitable measures were identified. From the 7,968 properties with currently no suggested fabric or heating improvement, 1,675 properties (21%) have an EE band D or worse.
- A lack of clarity on long term direction was also highlighted.

Moray Council

Focus: To identify the tools, data, skills and resources required to develop and deliver an area based LHEES for Moray. Off gas properties was a key focus in addition to ground/ air source heat pumps as the most suitable heat generation technology. Predominant focus on carbon reduction potential, replicability and integration into longer term planning. This covers the whole of Moray with a focused analysis on Burghead and Elgin.

Data sources: Home Analytics; Corporate Address Gazetteer; EPC data; Census data

Recommendations made

- The most common recommendation for all non-domestic categories was double glazing, and/or secondary glazing.
- Wall insulation was recommended to 32% of the non-domestic properties with cavity wall insulation being predominant.
- Half of the non-domestic properties were recommended heat pumps.
- 46% of domestic properties are suitable for wall insulation measures, mostly internal wall insulation (30%) and cavity wall insulation (15%).
- Of the 5,309 domestic properties with no standard suggested fabric or heating improvement, just under one-fifth have an energy efficiency band D or worse.
- A small proportion of the stock was considered suitable for air source heat pumps (11%). This increases substantially (up to 38%) when loosening this criterion to include mains gas heated properties for heat pump suitability.

Stages completed: Use of six stages of framework. All stages completed.

Key challenges/findings

Domestic:

- For overall council as well as Elgin area, only small proportion of housing stock identified as suitable for ASHP due to mains gas connection; if heat pump criterion loosened to include properties heated by mains gas, this increases significantly (from 11% to 38% across all of Moray, and from just 3% to 38% in Elgin).
- 57% of properties suitable for solar thermal installation.

Non-domestic:

- Most common EPC recommendation = double and/or secondary glazing.
- 1/3 of properties recommended wall insulation (mainly cavity wall).
- ½ of properties recommended heat pumps.
- EPC data only available for 5 non-domestic properties in Burghead (227 in Elgin, and 650 across Moray).

Challenges:

- A process for access to the data required for third party consultants needs to be refined as time delays can be attributed to:
- Data access. Although the Scottish Government is working on this, it was unclear if and how access to EPC data would be arranged.
- Data 'awareness'. It is critical that the officer/managers in charge of LHEES development at East Ayrshire Council are aware of
- Further Council-held data on privately rented properties and local development plans are also required for an LHEES, and this can be held between different departments, so as part of the data access procedure, cross-departmental communication is key.

West Dunbartonshire Council

Focus: The report focuses on the Clydebank area of West Dunbartonshire Council. The LHEES area of Clydebank covers 14,666 domestic properties. Air source and ground source heat pumps and heat networks were the focus due to being the most suitable heat generation technology.

Data sources: Home Analytics; Scotland Heat Map; Domestic Energy Performance Certificates (EPCs); Data on privately rented properties and social housing stock data; Scottish Household Condition Survey (SHCS); West Dunbartonshire Council owned non-domestic properties data

Recommendations made

- 35% of properties are suitable for wall insulation measures, with the predominant measure being cavity wall insulation (14%). External wall insulation is suitable for 11% and internal wall insulation for 10% of the properties.
- Given that many properties have mains gas as their main fuel type, a small proportion of the stock was considered suitable for air source heat pumps (1%). This increases substantially (up to 32%) when loosening this criterion to include mains gas heated properties for heat pump suitability.
- EPC data was available for 89 non-domestic properties.
 - Recommendations were provided for 96% of these properties.
 - The most common recommendation for fabric upgrades was double glazing, and/or secondary glazing.
 - Wall insulation was recommended to 30% of the properties with cavity wall insulation being the predominant insulation type
 - Heat pumps were recommended for 43% of the buildings (either air source or ground source).

Immediate priorities:

- Request more support from Scottish Government, look at utilising the Council's ESCO.

Stages completed: Elements of the 6 Stages are included. Stage 3 (target setting) is broad and lacks specific targets. Stage 6 (funding opportunities) is limited in detail.

Key challenges/findings

- The Council recognises the domestic sector as having a key role in energy efficiency strategies, with a number of key targets and plans in place.
- While no specific targets were found; the Council outlined their support for and encouragement of heat networks.
- A process for access to the data required for third party consultants needs to be refined as time delays can be attributed to:
 - Data access. Although the Scottish Government is working on this, it was unclear if and how access to EPC data would be arranged.
 - The existence and knowledge of access to requested datasets such as Home Analytics and Scotland's Heat Map.
 - The legalities regarding the datasets, knowledge of (contract variations on) data sharing agreements between local authorities and Energy Saving Trust or OS.
 - The location of the requested datasets or what colleague is responsible for the data.
 - The level of data literacy required to understand what the requested data needs to contain and in what format.

Glossary

Decarbonisation	<p>The reduction of carbon dioxide emissions through the use of low carbon energy generation, energy efficiency retrofitting of buildings and low carbon technologies.</p>
Distribution Network Operator (DNO)	<p>The company that owns and operates the distribution network (the power lines and infrastructure that bring electricity from the national transmission network to homes and businesses). There are two DNOs operating in Scotland: SP Energy Networks serve central and southern Scotland, and Scottish and Southern Electricity Networks (SSEN) serve the north of Scotland.</p>
District Heating	<p>Distribution of thermal energy in the form of steam or hot water from a central source of production through a network of pipes to multiple buildings or sites for use in space heating or process heating, or hot water.</p> <p>This can also take the form of a communal heat network where the energy centre supplies heat and hot water to one building.</p>
Energy Efficiency	<p>The goal to reduce the amount of energy required to provide products and services. This can mean different things for different sectors but in relation to buildings this means reducing the amount of heat or cooling needed to maintain a comfortable temperature within a building through measures such as insulation, more efficient heating technologies and building management systems.</p>
Energy Service Company (ESCo)	<p>A business that provides a broad range of energy solutions including design and implementation of energy savings projects, retrofitting, energy conservation, energy infrastructure outsourcing, power generation and energy supply, and risk management.</p>
Energy Performance Certificate (EPC)	<p>Certificate awarded to buildings to be sold, let or to be constructed which determine on a scale from A to G how energy efficient a building is; A being the most efficient building. EPCs are a legal requirement for all buildings in the UK.</p>
Fuel Poverty	<p>Fuel poverty refers to the inability to meet fundamental energy needs such as heating, cooling, cooking and lighting, at an affordable cost. In Scotland, the official definition is set out in the Fuel Poverty (Targets, Definition and Strategy) (Scotland) Act 2019, which defines a household as fuel poor if:</p> <ul style="list-style-type: none"> • after housing costs have been deducted, more than 10% (20% for extreme fuel poverty) of their net income is required to pay for their reasonable fuel needs; and • after further adjustments are made to deduct childcare costs and any benefits received for a disability or care need, their

	<p>remaining income is insufficient to maintain an acceptable standard of living, defined as being at least 90% of the UK Minimum Income Standard (MIS).</p>
Heat Map	<p>A data visualisation technique that shows magnitude of a heat phenomenon such as 'demand' as colour in two dimensions. The variation in colour may be by hue or intensity, giving obvious visual cues to the reader about how the phenomenon is clustered or varies over space. There are two fundamentally different categories of heat maps: the cluster heat map and the spatial heat map.</p>
Heat Networks and District Heating	<p>A heat network is the system of insulated pipes which transports heat from a source (or multiple sources) to more than one end user. The UK government has stated that heat networks will be used more frequently to heat our homes and businesses. In short, heat networks form part of new energy infrastructure, vital in supporting the move to a low carbon energy system.</p> <p>District Heating refers to the distribution of thermal energy in the form of steam or hot water from a central source of production through a network of pipes to multiple buildings or sites for use in space heating or process heating, or hot water.</p> <p>This can also take the form of a communal heat network where the energy centre supplies heat and hot water to one building.</p>
Heat Pumps	<p>A heat pump is a device used to warm and/or cool buildings by transferring thermal energy by transferring and concentrating thermal energy using heat exchanger technology similar to that used in refrigeration.</p>
Home Analytics	<p>A dataset developed by the Energy Saving Trust and used by government, local authorities, housing associations and commercial businesses to assist them in developing, targeting and delivering their schemes, programmes and products.</p>
LHEES	<p>Local Heat and Energy Efficiency Strategy. LHEES are intended to establish local authority plans for systematically improving the energy efficiency of all buildings and decarbonising heat.</p>
Low Carbon Infrastructure Transition Programme (LCITP)	<p>The Low Carbon Infrastructure Transition Programme (LCITP) was launched in March 2015, in partnership with Scottish Enterprise, Highlands and Islands Enterprise, Scottish Futures Trust and sector specialists. The LCITP aims to support Scotland's transition to a low-carbon economy. Its main focus is assisting projects to develop investment-grade business cases that will help secure public and private capital finance to demonstrate innovative low-carbon technologies in Scotland</p>

Off Gas	Buildings which are not connected to a natural gas network for heating provision.
Retrofit	Conducting energy efficiency upgrades to existing domestic and non- domestic buildings such as upgrades to the fabric of the building including the walls, roof, floors, windows and doors; strategies for ventilation, heating efficiency and cooling in the summer months. This can also include implementing low carbon heat provision.
Scottish Government's Excel procurement framework	The service is designed to help councils meet the challenge of reducing budgets whilst meeting growing demand for services. It offers collaborative procurement that saves money for local authorities.
Statutory Duty	A duty imposed through legislation. If LHEES were to become a statutory duty this would mean that developing and reporting on LHEES would be a legal requirement on local government.
Zoning	A zoned approach to heat and energy efficiency takes a view of local opportunities and limitations. It considers the most appropriate heat decarbonisation and energy efficiency solutions for that area in consultation with local stakeholders. This supports the 'zoning' of a local area for active deployment of a particular solution.



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This publication is available at www.gov.scot

Any enquiries regarding this publication should be sent to us at

The Scottish Government
St Andrew's House
Edinburgh
EH1 3DG

ISBN: 978-1-80201-412-9 (web only)

Published by The Scottish Government, October 2021

Produced for The Scottish Government by APS Group Scotland, 21 Tennant Street, Edinburgh EH6 5NA
PPDAS941767 (10/21)

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